INTERNATIONAL COUNCIL OF ASSOCIATIONS FOR SCIENCE EDUCATION

ADVANCING SCIENCE AND TECHNOLOGY EDUCATION ACROSS THE WORLD

EDITED BY

BEN AKPAN, BULENT CAVAS, & TERESA J. KENNEDY

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INTRODUCTION

BEN AKPAN, BULENT CAVAS & TERESA J. KENNEDY

Founded in 1973, the organisation is known as the International Council of Associations for Science Education in English. In French, it is known as the Federation International des Associations de Professeurs de Sciences; while its name in Spanish is the Federación International de Asociaciones de Profesores de Ciencias. ICASE is the recognised contracted name of the organisation in all languages. ICASE may also be referred to as the Council.

The objectives of ICASE are to:

- extend and enhance the quality of formal and non-formal science and technology education for all, with particular reference to the children and youth of the world;
- provide and support activities and opportunities that will enhance formal and non-formal science and technology education throughout the world; assist and support all members and other organisations throughout the world that are involved in formal and non-formal science and technology education;
- establish and maintain an international communication network for member organisations and their members involved in formal and non-formal science and technology education; and
- encourage and support the establishment and development of professional science and technology organisations, especially teacher organisations in all countries.

ICASE provides opportunities for member organisations and their representatives to promote excellence and innovation in science teaching and learning for all through:

- connections to the members of other science organisations around the world;
- opportunities to serve in ICASE international leadership positions, on standing committees, and involvement with international research initiatives;
- communication venues to disseminate information internationally to the members of international science organisations through the ICASE listserv, newsletter, and peer-reviewed ICASE journal;
- collaborative funding opportunities to promote science education at regional levels; and
- organisation of ICASE World Conferences, regional events, and workshops providing opportunities for professional development and networking.

In this handbook, we bring you snippets, as well as many pictures provided by ICASE members, documenting ICASE activities and accomplishments that have occurred over the past 50 years. Please read on.

THE BEGINNINGS

BEN AKPAN

The movement to develop and renew science education was dominant in the 1950s and 1960s and led to the formation of science teacher associations in many countries. Subsequently, the need arose for the exchange of information among these associations. This, it was thought, could be done by establishing an international federation of science teacher associations which would assist in the development of science education at all levels through the strengthening of national associations and the sharing of ideas and activities across frontiers. In particular, it would provide a forum for groups of people with similar problems to share their concerns and hopefully find solutions. During a preliminary meeting organized in 1972 by UNESCO, plans were made for such a federation to be launched in 1973 at the International Conference on Integrated Science Teaching held at the University of Maryland, USA. The plans came to fruition on 15 April 1973 through the effort of UNESCO when the International Council of Associations for Science Education (ICASE) was inaugurated with the following as foundational members: Australia (ASTA), Barbados (BASE), Belgium (VeLeWe), Canada (BCSTA, STAM, STAO), Denmark (LMFK), Ghana (GAST), Guyana (STAG), Hong Kong (HKSMA), India (AISTA), Indonesia (IPSM), Ireland (ISTA), Italy (AIF), Jamaica (ASTJ), Kenya (KSTA), Lesotho (LSMTA), Netherlands (NVON), Nigeria (STAN), Philippines (OCTA), St Vincent (StVAST), Sierra Leone (SLAST), Singapore (STAS), Swaziland (SSTA), Trinidad and Tobago (ASETT), UK (ASE), USA (NARST, NSTA, FUSE), Zambia (ZASE), Caribbean region (CROASE), and West Africa region (WAAST). Highlights of the inaugural meeting included the adoption of the ICASE Constitution as well as its logo. ICASE raised USD250 through voluntary donations by members to facilitate its establishment. UNESCO, subsequently, provided USD2,000 under contract to assist ICASE in its first year of existence, as well as a grant of £10,000 to distribute a regular newsletter.

The first President of ICASE was Professor David Lockard, while Mr. Dennis Chisman (by common consent, the Father of ICASE) was Executive Secretary/Treasurer. Mr. Chisman would later in 1985 relinquish his post as Executive Secretary and continued as Honorary Treasurer while Dr Jack Holbrook took over as Executive Secretary. Other Presidents of ICASE include: Mr. B. G. Pitre (1975-1978), Mr. Robert Silber (1979-1981), Mr. Brian Atwood (1981-1985), Dr Winston King (1985-1989), Mr. Bob Lepischak (1989-1993); Dr Brenton Honeyman (1993-1997), Ms. Anna Garner (1997-2001), Dr Robin Groves (2001-2004), Dr Janchai Yingprayoon (2004-2007), Dr Jack Holbrook (2008-2011), Dr Ben Akpan (2011-2014), Dr Teresa Kennedy (2014-2017), Dr Bulent Cavas (2017-2020), Dr BaoHui Zhang (2020-2023), and Dr Declan Kennedy (incoming, 2023-2026). Dr Peter Spratt who was elected as President-Elect in 2004 unfortunately passed on before he could assume office in 2007. ICASE Executive, therefore appointed Dr Jack Holbrook to assume the presidency in February 2008 in his stead. ICASE membership rose steadily from inception to 44 in 1983. Today, the membership spans the world as ICASE closely follows its Constitution (revised in 2001) and the Strategic Plan (created in 2011). UNESCO's support for ICASE has been both "phenomenal and commendable" In the words of Sheila Haggis (popularly called the Mother of ICASE):

The chemistry that has made the UNESCO-ICASE link so powerful is the very special chemistry of human relations. When trust builds up between people sharing common goals, all kinds of exciting things can be made to happen.

Professor David Lockard chairing the first ICASE Executive Committee meeting, 1973

CONFERENCES

BEN AKPAN, BULENT CAVAS & TERESA J. KENNEDY

ICASE was inaugurated in the course of the International Conference on Integrated Science Teaching which was held at the University of Maryland, USA. Subsequently, many conferences were organised by ICASE in conjunction with other organisations. These include an international conference on integrated science education in Nijmegen, The Netherlands in 1978 – the proceedings of the conference were published in the UNESCO series *New Trends in Integrated Science Teaching*, while a summary of the key papers and discussions was published by ICASE; an international conference hosted by the Australian Science Teachers Association in 1988 with support from UNESCO, the National Commission for UNESCO in Australia, as well as other organisations; and the World Environment, Energy and Economic Conference that was held in Winnipeg, Canada in October 1990 and organised by the Science Teachers Association of Manitoba (STAM) and the Manitoba Education and Training Department in association with ICASE and other organisations – this conference produced the Manitoba Protocol, a declaration approved by the conference delegates as a commitment to the principles of sustainable development for the future. There have been many regional conferences in Africa, Asia, the Caribbean, Europe, and North America. The regional structure in Africa was the Forum of African Science Educators (FASE). In 1993, UNESCO, in collaboration with ICASE, convened an international forum entitled Project 2000+: Scientific and Technological Literacy for All (STL). The purpose of this event was to establish a global agenda encouraging governments and all stakeholders to work on reforming science and technology education for all. In 1999, a world conference on science education was held in Budapest, Hungary. The conference negotiated a new social contract for science education in the 21st Century, identifying the efforts that needed to be made in response to social expectations and the challenges posed by social and human development. ICASE representatives from around the world were active participants in this conference and the resultant documentation. Likewise, the International Experts Conference on Science, Technology and Mathematics Education for Human Development, held in November 2001 in Goa, India, was organised by UNESCO and the Commonwealth Association of Science, Technology and Mathematics Educators (CASTME). ICASE put forward a background paper during this conference entitled Statements on Policies, Standards, Relevance and Links for Science and Technology (and Mathematics) education. This paper formulated the organisational structure for future ICASE world gatherings.

In the early years of the 21st century, ICI (a Chemistry Industry, formerly known as Imperial Chemicals Incorporated) teamed up with ICASE and supported several workshops as well as the 1st ICASE World Conference, held in Penang, Malaysia, in 2003. The event was held in conjunction with the Southeast Ministers of Education Regional Centre for Science and Mathematics Education (SEAMEO-RECSAM). The 2nd ICASE World STE 2007, Perth, Australia was held in conjunction with the Australian Science Teachers Association of Australia (ASTA) and the Science Teachers Association of Western Australia (STAWA). The event contributed to the Perth Declaration on Science and Technology Education. The 3rd ICASE World STE 2010, in Tartu, Estonia, was held in conjunction with the University of Tartu and the Estonian Association of Chemistry Teachers (EACT). It resulted in the Tartu Declaration on Science and Technology Education. The 4th ICASE World STE 2013, in Kuching, Malaysia, was hosted by the Universiti Malaysia Sarawak (UNIMAS). The conference contributed to the Kuching Declaration on Science and Technology Education. The 5th ICASE World STE 2016, in Antalya, Turkey, resulted in the Antalya Declaration on Interdisciplinary Practices in Science and Technology Education. The 6th ICASE World STE on the theme Science Education for the Future was held in Suan Nongnooch Garden, in Pattaya, Thailand in 2019. The 7th ICASE World STE will take place in Dubai, United Arab Emirates from 27-30 March, 2023, jointly hosted by the British University in Dubai (BUiD) and Amity University Dubai, in collaboration with the UAE Mathematics and Science Teachers Association (MSTA), and supported by the Government of Dubai through Dubai Tourism. This conference, on the theme STEM Education Solutions to Complex Global Challenges, coincides with the 50th anniversary of the founding of ICASE.

ICASE HEADQUARTERS

DECLAN KENNEDY & TERESA J. KENNEDY

The headquarters of ICASE is located at the Eureka Centre (an ICASE-accredited Science and Technology Education Centre) on the campus of University College Cork (UCC). The Eureka Centre provides facilities to train student science teachers, organises continuing professional development programmes for practising science teachers, and facilitates ICASE professional development activities and training events.

Eureka!
Eureka Centre
for Inquiry Based Education
in Science and Mathematics

The ICASE Headquarters Office was established in 2013. Prof. Dr Jack Holbrook, University of Tartu, Estonia, ICASE President, presented the ICASE accreditation plaque to Prof. Pat Fitzpatrick, Head of College of SEFS. Also, pictured above (left to right) Noel Brett, Manager Eureka Center, Jill Haynes, SEFS Office, Prof. Dr Teresa Kennedy, University of Texas at Tyler, USA, ICASE President-Elect, with Prof. Dr Declan Kennedy and John Lucey, both from the School of Education UCC.

Membership

ICASE invites national, sub-national, and multi-national organisations interested in the promotion of science and technology education to join its worldwide network. Organizations eligible to join ICASE as full members are science teacher associations (STAs), science societies, and related institutes of science education. Associate membership is available to any sub-national science and technology education organisation, universities or university departments and faculties, centres and museums, and institutional or corporate foundations, companies and businesses interested in the promotion of science education around the world. Over the past 50 years, over 200 organisations have been members of ICASE (see the ICASE website for a list of all participating member organisations since 1972). https//www.icaseonline.net/.

ICASE Governance Structure

The ICASE governance structure comprises:

- A Council of Full Members which is responsible for approving constitutional changes (electing the Management Committee, and if necessary, dissolving the Council).
- The Executive Committee, comprising the President, President Elect or an ImmediatePast President, the Secretary, the Treasurer, Management Committee Appointments, elected representatives from each of the ICASE Regions, and appointed Chairpersons of Standing Committees. It is responsible for determining and monitoring policy, implementing policy decisions, approving budgets, and monitoring financials.
- The Management Committee consists of the President, President-Elect, or Immediate Past President, the Secretary, and the Treasurer. It is responsible for the day-to-day administration and operation of the Council.

ICASE Strategic Plan

ICASE priorities aim to enhance and support the quality of science and technology education for all; provide science and technology education opportunities that enhance formal and non-formal educational experiences internationally; promote, facilitate and support collaboration between all members and their affiliated organisations throughout the world; and encourage and support the establishment and development of professional educational organisations focusing on science and technology-related initiatives on a global scale.

ASIAN SYMPOSIUM

JACK HOLBROOK

Following the election of the 1st ICASE President, Mr. B.G. Pitre, who was the President of AISTA (All India Science Teachers Association), it was fitting that the first ICASE regional Asian symposium should be held in New Delhi, India. This event occurred in December 1977 with the help of NCERT (National Council of Educational Research and Training of India).

The symposium brought together science teachers and educators from science teacher associations in Asian countries, such as Singapore, Philippines, Hong Kong, as well as India. One topic of interest included the teaching of Integrated Science at the junior secondary level. This was an area of interest for both sponsors of the meeting (UNESCO and the British Council).

Dennis Chisman, as ICASE secretary/treasurer, was also the science representative from the British Council and played a major role in the organisation and running of the symposium. In focussing on the teaching of science at the junior secondary level, where the integration of biology, chemistry and physics into a single course was in its infancy, discussions related to how a single teacher can cover these hitherto diverse areas, especially when the inclusion of practical work was strongly promoted.

This led to discussions related to experimentation concerns and the need for ICASE to be involved in improvising of science equipment, even to the extent of low, or no cost, home-made apparatus, a feature of which was the substance of a later ICASE project, also under the guidance of Dennis Chisman.

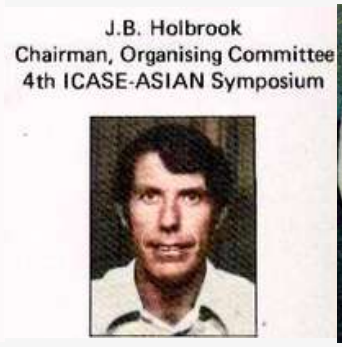
Discussions on home-made equipment also stimulated a later ICASE booklet on science resource notes covering uses of disposable plastic syringes in science teaching. In this ICASE booklet, circulated to ICASE member organisations, the introduction pointed out the need to share ideas across member organisations and indicated that the booklet was intended to share 16 ideas, including:

- Gaseous Diffusion in Air and in a Vacuum;
- Fish Air-bladders and Cartesian Divers;
- A Model to Illustrate Haemodialysis; and
- The Fountain Experiment.

The discussions held within the symposium also related to promoting science as an experimental subject, highlighting the ways in which simple demonstrations could be developed using household materials such as plastic cups and bottles, so as to undertake experiments, for example, on dissolving salt in water to separate salt and sand, or to determine density.

This initial 1977 Asian symposium paved the way for further regional symposia in Asia.

The first ICASE Asian Symposium in India 1977



PROJECT 2000+

SCIENCE AND TECHNOLOGY EDUCATION FOR ALL

JACK HOLBROOK

Project 2000+ was a novel collaborative venture, based on a partnership between a group of major intergovernmental organisations and agencies and non-governmental organisations, with special concerns and responsibilities in the field of science and technology education and research. In July 1993, they convened an International Forum and invited participants to establish an agenda for action, supporting steps that individuals, institutions, organisations and governments can take together in working to reform and revitalize science and technology education at all levels.

The above is the introduction to the Project 2000+ declaration – The Way Forward, formulated by a steering committing comprising UNESCO, The World Bank, UNICEF, UNDP, UNEP, the Commonwealth Secretariat, and NGOs such as ICSU, ICASE, IOSTE, GASAT and WOCATE.

Project 2000+, initiated via an International Forum held in UNESCO headquarters in Paris, was a major initiative of UNESCO and ICASE. The forum, held from 5-10th July 1993, focused discussion on six major themes:

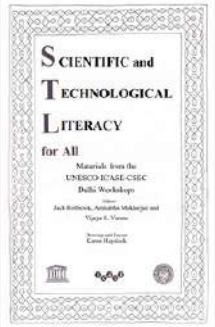
- The nature of, and the need for, Scientific and Technological Literacy (STL);
- Scientific and Technological Literacy for Development;
- The Teaching and Learning Environment for STL;
- Teacher Education and Leadership for STL;
- Assessment and Evaluation for STL; and
- Non-formal and Informal Developments of STL.

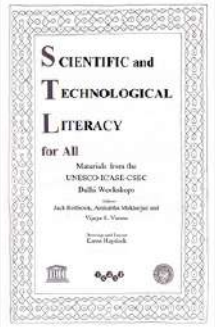
The forum led to the Project 2000+ declarations, summarised as a call on governments, industry, public and private sector interests and education organisations to review scientific and technological education (STE) at all levels. Additional priorities included;

- Prioritise STL for all;
- Promote equal gender access to STE;
- Develop school and out-of-school programmes opportunities, curricula and assessment;
- Ensure appropriate pre-service and in-service provisions; and
- Encourage and support evaluation, research and development in STE, while recognising the central role of teachers in achieving STL for All.

This forum spurred ICASE to distinguish between traditional and STL teaching in terms of concepts orientation, processes, connections and applications, plus paying attention to creativity and attitudes. It led to the running of ICASE STL workshops (seminars) in a number of countries in Asia, Africa and South America. It also led to an ICASE publication on Supplementary Teaching Materials, published in 1997, promoting the STL philosophy and applying this to 10 exemplar teaching materials. These exemplars were identified as:

- Maintaining a Metal Bridge;
- Can Vegetable oils be used as a fuel?;
- Discovering old settlement sites;
- Wood: a potential fuel for tomorrow;
- Is orimulsion suitable as an alternative fuel?
- Saving cultural monuments from corrosion;
- Which medicine is better - black or white?
- How to avoid bicycle accidents;
- Radon in our homes: is the risk acceptable?;
- An astronomical clock.





RECOLLECTIONS

ROBIN GROVES & ELAINE HORNE

It is a delight to provide some memories for this ICASE publication. Our involvement with ICASE was a significant part of our lives from 1999 until 2013. Involvement was largely through ICASE World Conferences, four of which between 2003 and 2013 we played a significant role in convening and organising.

- April 2003 – SEAMEO RECSAM, Penang, Malaysia, planned in two years after another country was unable to continue, was an outstanding venue, and wonderful atmosphere of peace and harmony during international conflict and SARS epidemic, Highlights included strong UNESCO cooperation, discussion groups leading to the Penang Declaration, *The Way Forward*, and fantastic local team of organisers.
- July 2007 – Perth, Australia, convened by us on home territory, included great venues, and internationally renowned speakers,. The General Assembly was held at a World Conference for first time, with over 1,100 registrants including 400 from overseas. The Perth Declaration was created. Following the conference, we organized a UNESCO Science Education Forum with representatives from 65 countries, leading to the development of a UNESCO science education policy document.
- June/July 2010 - Tartu, Estonia at the University of Tartu, which was a great heritage venue featuring charming Eastern European hospitality. Outcomes included emphasis on first principles, challenging speakers, the first Chisman Oration, Tartu Declaration.
- September 2013 - University of Malaysia, Kuching, Malaysia, exotic location, diverse speakers and sessions, environment highlighted as significant part of Declaration for the first time.

We are very proud that ICASE World Conferences have now become a regular ICASE activity, following the priority setting and policy development during my term as President (2001-2004). These events have become havens of harmony, enjoyment and productivity in a sometimes-troubled world. There have been many other successful World Conferences since 2013. In January 1999, I was invited to be the ICASE journal editor, having been involved in science education and aware of ICASE for over ten years. Elaine and I agreed to do it and for the next three years produced four issues of Science Education International a year to print-ready stage in our small home office, to send to Hong Kong for printing and distribution to members and other subscribers. The network of contributors in many roles around the world was fantastic. As SEI Editor, I was part of the ICASE Executive and involved in all aspects of ICASE's activities. In 2000, when the President-Elect resigned, I agreed to be nominated for President and was elected. As journal editors, World Conference conveners, Standing Committee chairs, members of the Executive Committee, and president, it was an honour to be involved with and to represent ICASE. We found so often that people from all parts of the world are making wonderful contributions to science education.

Robin, ICASE President's Opening Address, ICASE2003, Penang Malaysia

Elaine and Robin, with Lord Robert Winston, Keynote Speaker at ICASE2007, Perth, Australia

Welcome Function at ICASE2013, Kuching, East Malaysia

ICASE Executive Committee, meeting at ICASE2010, Tartu, Estonia

PUBLICATIONS

SUE DALE TUNNICLIFFE & STEVEN S SEXTON

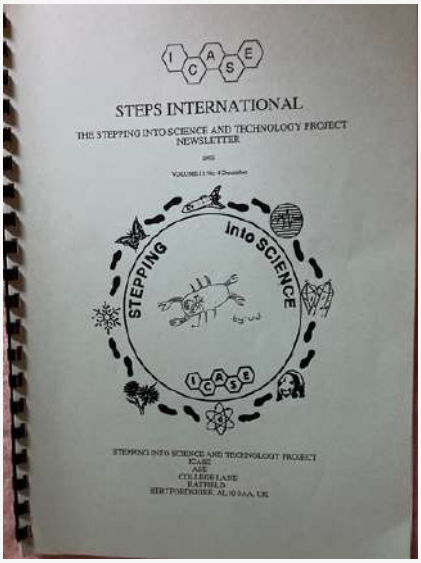
In 1986, after a meeting with ICASE executive members in the United Kingdom, it was suggested that ICASE should widen its area of work and interest to include primary science. Hitherto its work had been focused on secondary science. It was suggested that Sue Dale Tunnicliffe attend the CONASTA 36 (36th annual Conference of Australian Science Teachers Association) which was held in Canberra, Australia, where the ICASE executive were holding their annual executive meeting.

It was decided that ICASE would start a primary science section although it was suggested it be called "pre-secondary science" as the age of secondary schooling varies so much around the world, as indeed does the start of primary formal education. At the time, ICASE produced a hard copy newsletter or leaflet which was a collection of hands-on activities collected from member associations. This newsletter was posted to the secretary of membership organisations who then disseminated as appropriate. This initiative was funded by a legacy of GBP 10,000 which had been left to ICASE by Sheila Haggis, one of the three founding members of ICASE. Through her work at UNESCO in Paris, she remained a key supporter of strategic initiatives undertaken by ICASE.

In support of primary/pre-secondary science, several publications have resulted. ICASE produced two source books of activities and a number of conference packets for participants at workshops. The materials for the workshops were sponsored and produced by firms involved in pre-secondary science. The Association for Science Education (ASE) sold copies of the *Stepping Into Science* activities until stocks ran out. The images below represent some of the earlier publications supporting primary/pre-secondary science.

Additionally, a number of ICASE special publications were produced, such as the *Who's Who in Science Education*, and a commemorative book entitled *Pasture*.

Similar to the ICASE Newsletter, the ICASE journal *Science Education International* was also originally a hard copy publication. However, both are now available in online format only. In 2017, the ICASE journal became an Open Journal System publication and publishes articles from early childhood through to tertiary and distributed quarterly each year, attracting authors from around the world.



COLLABORATION WITH NATIONAL AND INTERNATIONAL AGENCIES

TERESA J. KENNEDY

ICASE maintains important relationships with many organisations around the world to ensure that a collaborative international community of science educators can thrive.

United Nations Educational, Scientific and Cultural Organisation (UNESCO)
Partnership with UNESCO, the founding organisation, remains an important objective of ICASE. Since convening the first meeting to discuss the formation of ICASE in 1972, UNESCO has been very supportive and involved in ICASE activities, assisting with many research projects and professional development activities undertaken by ICASE membership, including attending and providing keynote addresses at all ICASE World STE events to date.

ICASE regularly receives documents pertaining to UNESCO science education initiatives and disseminates these materials to the international ICASE community through the ICASE website, at all ICASE World and Regional Conferences, as well as through the ICASE Newsletter.

ICASE is recognized by UNESCO as an official collaborating non-governmental organisation (NGO) and important stakeholder. Members of the ICASE Executive Committee, as well as representatives from ICASE member organisations, are frequently invited by UNESCO to take part in consultation meetings as well as provide input to the Collective Consultation of NGOs on Education for All CCNGO/EFA, a key mechanism within the UNESCO Education Sector created to facilitate reflection, continuous dialogue and joint action between NGOs and UNESCO in the area of education.

To date, ICASE has served three different terms on the NGO-UNESCO Liaison Committee, elected by the more than 400+ international NGOs in official partnership with UNESCO (2016-2018; 2020-2022; and 2023-2024), with Teresa Kennedy serving as the ICASE Representative to UNESCO since 2011. Currently, she serves as Vice President of the NGO UNESCO Liaison Committee, and as the Liaison Committee representative to the Intergovernmental Oceanographic Commission at UNESCO. For more information, see https://ngo-unesco.net/.

Ministries of Science and Education
ICASE has been a key player in participating in and reshaping science education policy through collaborative work with various governmental agencies to support change in science education and effectively manage a joint investment in science, technology, engineering, and mathematics (STEM) education through policy review, revision, and implementation.

International Conference of NGOs in Official Partnership with UNESCO, 2022

UNIVERSITY COLLABORATIONS

MIIA RANNIKMAE & BULENT CAVAS

ICASE has been working in collaboration with universities over the decades, bringing together experts from universities to create curriculum and teaching materials development under the umbrella of science teacher associations (STAs). New directions came in at the end of the 1990s when ICASE formed links with industries such as ICI and CEFIC. Several joint meetings between universities and STAs took place, and ICASE worked with university members to conduct workshops to develop new teaching and learning materials. Several universities adopted the supplementary materials in their training programmes, and many books and articles were published and placed on the ICASE website: https://icaseonline.net/pub.html

Since 2006, ICASE has become an equal partner to university members of the European Commission (EU) through funded research and development projects such as FP6-PARSEL, FP7-PROFILES, FP7-ENGINEER, and Erasmus Plus Projects. These initiatives established strong links with 22 European universities. Below are photographs taken at a few of the ICASE events for EU funded projects.

PROFILES Project
Kick-Off Meeting,
Berlin-Germany

PARSEL Project
Kick-Off-Meeting
Lisbon, Portugal

ENGINEER Project
Workshop,
Jerusalem, ISRAEL

DAYLIGHTING RIVERS
Project Workshop,
Online Conference

ICASE AND YOUTH

ENSURING A SUSTAINABLE FUTURE IN SCIENCE AND TECHNOLOGY EDUCATION

HIND ABOU NASR KASSIR & TERESA J. KENNEDY

Science, Technology, Engineering, and Mathematics (STEM) is central to the recruitment and retention of youth in the context of higher education. To address the world-wide teacher shortage of STEM educators, ICASE places priority on providing meaningful and impactful opportunities to engage all science teachers, including new teachers and preservice science educators, in the activities of the Council. Building a strong science teacher pipeline begins with initial preK-12 preparation in STEM disciplines, continues through higher education, and is supported through on-the-job professional development working with experienced STEM educators and the scientific community. ICASE plays a strong role in this collaborative and generational process to develop the future STEM workforce.

STEM teachers provide their students with interdisciplinary opportunities guided by learning goals, not performance goals alone. Engaging and motivating students begins with empowerment to apply their own subjective values and positive expectations they have for themselves. When guided through interdisciplinary STEM pedagogical approaches, youth gain critical competencies and learn experientially through problem-based challenges. ICASE activities for teachers and their students have included the organization of youth-oriented programs such as science exhibitions, quiz competitions, and international STEM collaborations such as the COVID-19 Engineering Design Challenge that brought together over 1,000 youth from 14 countries.

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The ICASE Strategic Plan aims to support science teachers through building strong understandings of the importance of STEM education and implementing contextual experiences for youth based on curiosity, innovation, and growth mindset. Indeed, research suggests that youth engaged in exploration avidity and intellectual risk are more likely to be strategic thinkers and gain deeper understandings of philosophical concepts. ICASE seeks to empower youth knowledge in the Nature of Science (NOS), a critical component of scientific literacy. Engaging actively in STEM disciplines develops critical skills needed for informed decision-making about scientific issues as well as day-to-day societal challenges. Youth that are interested in scientific theories and research have a major role in generating contextually relevant research problems and guiding developments toward creating sustainable future investigations.

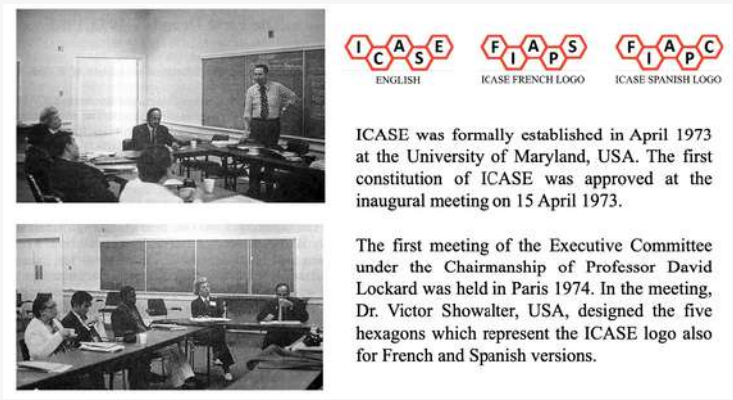
ICASE believes in facilitating the development of personal youth agency through intentional, productive, and constructive engagement. To this end, many science teacher associations support the attendance of new and preservice teachers at ICASE World Conferences and professional development training events. ICASE strives to align learning with the United Nations Sustainable Development Goals (SDGs) since STEM education impacts each of the 17 SDGs in one way or another.

The multitude of ICASE activities that have been carried out over the past fifty years have facilitated science teachers world-wide to transfer knowledge that has empowered future research in STEM fields and led to well-established scientific theories that are internally consistent and highly substantiated. ICASE strongly believes that youth science educators and researchers will inevitably contribute to the quality of future research generated globally, as well as the practicality and effectiveness of its implementation. Youth hold the key to future scientific development and innovation, and the ICASE network strives to support their future accomplishments.

PHOTOS FROM ICASE EVENTS-I

JANCHAI YINGPRAYOON

ICASE Symposium in Argentina (1997)



ICASE Meeting in Paris, France (1973)

ICASE Asian Conference Diliman-Philippines(1979)

ICASE Asian Conference Bangkok-Thailand (1994)

ICASE World STE Conference Kuching-Malaysia (2003)

ICASE World STE Conference Tartu-Estonia (2010)

ICASE Asian Symposium Hong Kong (1982)

ICASE Asian Symposium Singapore (2006)

ICASE International Teacher Seminar Bangkok-Thailand (2012)

ICASE World STE Conference Kuching-Malaysia (2013)

ICASE World STE Conference / Pattaya-Thailand (2019)

PHOTOS FROM ICASE EVENTS-II

ICASE World STE Conference, Antalya-Turkey (2016)

ICASE at UNESCO Education for Sustainable Development Conference, Sweden, 2016

ICASE-RISE Workshop, Guilin, P.R.China, (2015)

ICASE at UIA, Dublin, Ireland (2014)

ASE (2015)

Chemistry Live by D. Kennedy (2014)

IOC at planning meeting for 2023 World Conference in Dubai (2022)

International Council of Associations for Science Education

www.icaseonline.net

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