



**MOTIVATE Learning: Making Opportunities to Initiate
Valuable Alliance through Experiential Learning**
ISPRS Educational and Capacity Building Initiative 2018
Final Report

A. Investigators

ISPRS Student Consortium (ISPRS SC)

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1. **Dr. Tanita Suepa, Chief of Instructional Media and Curriculum Development Division**
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Supporting Staff

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Note: The names in bold are the principal investigators of the project.

B. Abstract

The ISPRS Student Consortium (ISPRS SC), in collaboration with the Geo-informatics and Space Technology Development Agency (GISTDA), Thailand's public organization leading the country's activities in space technology and geo-informatics applications and the ASEAN Research and Training Center for Space Technology and Applications (ARTSA), organized MOTIVATE Learning: Making Opportunities to Initiate Valuable Alliance through Experiential Learning from August 6 – 20, 2018 in Space Krenovation Park, Chon Buri, Thailand. The project was designed to build the capabilities of students and young professionals in the fields of remote sensing, photogrammetry and spatial information sciences. MOTIVATE Learning was comprised of two programs: (1) ISPRS SC Summer School + Hackathon and (2) The Spatial Exchange Program. The ISPRS SC Summer School followed the conventional design of the summer schools, with the addition of the 2-day hackathon as a challenging activity after the lectures, practical sessions and break-out sessions, which resulted to 4 innovative ideas using geospatial information in tourism, public health, infrastructure and transportation, and emergency response. The Spatial Exchange Program was an 8-day

exchange program for students and young professionals, in which the participants were guided by groups of mentors from different universities and organizations. The research from this program include disaster risk reduction, environmental monitoring, emergency decision support system and carbon stock assessment.

C. Project Introduction

MOTIVATE Learning implemented two programs: (1) ISPRS SC Summer School + Hackathon and (2) The Spatial Exchange Program. Both programs were hosted in Space Krenovation Park (SKP), Chon Buri, Thailand. Lectures, practical sessions, break-out sessions and group meetings were held in Sirindhorn Center for Geo-informatics (SCGI), also located within SKP. The Summer School + Hackathon was held from August 6-10, 2018, followed by The Spatial Exchange Program, which was hosted from August 13 – 20, 2018.

The closing ceremonies were held in the last days of both programs, which comprised of promotional presentations, awarding of certificates and photo sessions. The first presentation was given by Ms. Sheryl Rose Reyes, ISPRS SC Chair, who invited the participants to join the organization and provided an overview of the different student activities. The second presentation was given by Dr. Tanita Suepa, who introduced ARTSA and its various trainings, education and capacity building efforts in collaboration with GISTDA. The awarding of certificates was hosted by Mr. Jakrapong Tawala and led by Dr. Tanita Suepa. The organizers and the participants also had several photo sessions during the last day. The organizers also encouraged the participants from each program to sign the promotional banners to express their gratitude and share their memories of the programs.

The following sections will discuss the two programs in further detail.

1. Summer School + Hackathon

A total of 20 participants from China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines and Thailand participated in the program. The program was divided into 2 parts, (1) the Summer School, which provided the participants with the lectures relevant to sustainable development, remote sensing and spatial information science, and (2) the beginner's Hackathon, which challenged the participants to identify a research problem and design the methodology in developing a web-based tool.



The program began with the welcome remarks from the Chair of the ISPRS SC, Sheryl Rose Reyes, who encouraged the participants to make the most out of the event, to build networks and friendships as well as to take the sustainable development challenge. Mr. Jakrapong Tawala, the Geo-information Outreach and Scientist of GISTDA, provided the course introduction to walk the participants throughout the activities of the week and introduced the lecturers. The participants were welcomed by Dr. Damrongrit Niammuad, Director of Space Krenovation Park and Acting Rector of the GISTDA Academy. He also delivered a keynote presentation on “Geo-Intelligent Platform for Smart Cities.” He emphasized that interconnected information moves beyond borders, both geographical and institutional, and requires collaboration and coordination in order to implement the strategies needed to build smart cities.



The lectures started in the afternoon of the first day. The first 2 lectures were delivered by Sheryl Rose Reyes, who is currently studying in United Nations University – Institute for the Advanced Study of Sustainability (UNU – IAS), Tokyo, Japan. She provided an overview of sustainability and the

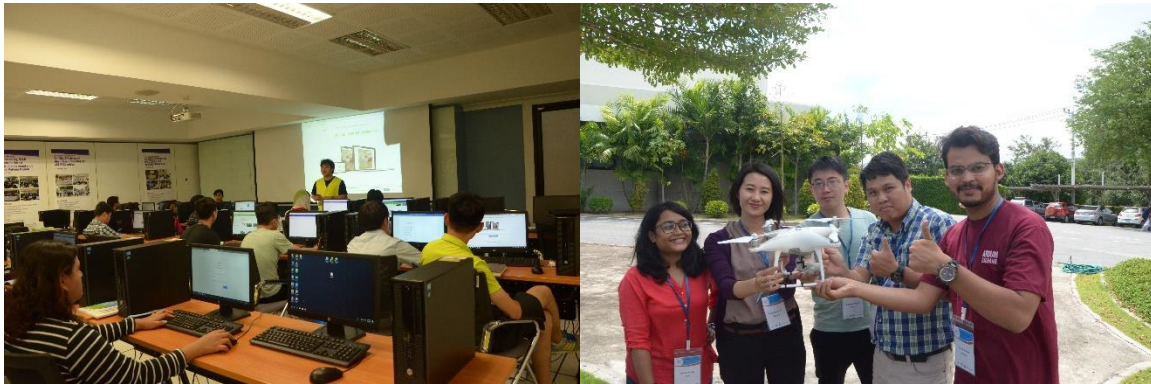
United Nations' 2030 Agenda, more popularly known as the Sustainable Development Goals (SDGs). This lecture was followed up by the SDG Game, made by the United Nations to help disseminate and improve people's knowledge about the different SDGs. The second lecture focused on the role of geospatial information in sustainability. The participants were assigned into 4 groups and were challenged to think about research problems which can be addressed using geospatial information and to connect these research problems to the SDGs. The icebreaker session was held in the evening, with Dr. Kitsanai Choroenjit and his students from Burapha University challenging the participants to make the small drones land on a specified target. The participants formulated different strategies to win against each other and enjoyed the rest of the evening getting to know each other.



The second day started with a technical visit in Space Krenovation Park, which hosts GISTDA's technical facilities. The participants learned about Thaichote, Thailand's satellite, and the flight dynamics, mission planning and data processing from the engineers. Then, a visit to the GISTDA's Aerospace Laboratory of Excellence and Innovation (GALEXI), allowed the participants to see state-of-the-art facilities for building different kinds of equipment.



The lectures for the second day focused on field methods in sustainability science, specifically on mapping using Unmanned Aerial Vehicles (UAVs). The lectures and practical sessions were handled by Dr. Kitsanai Choroenjitt from Burapha University and he showcased the various applications of UAVs, from terrestrial to coastal applications. The participants were assigned to 4 groups for a mapping exercise in the afternoon, where they learned about the basics of using a drone, flight planning and capturing images for data processing.



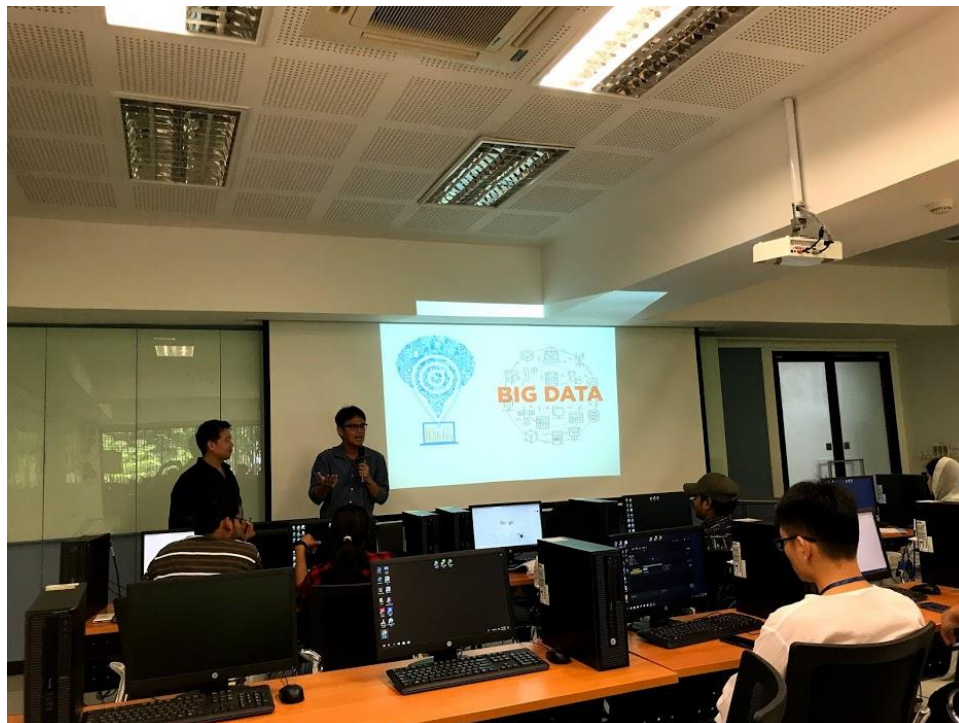
Engr. Jose Don De Alban from the National University of Singapore introduced the synergistic approach to mapping using remote sensing and geographic information systems (GIS) on the third day. He demonstrated a case study done by his research group in Myanmar about land system change and provided a short tutorial on using Google Earth Engine.



The participants further explored the use of the platform together with Quantum GIS using the data set provided by the lecturer. In the afternoon, the participants were taken to a short field trip to Space Inspirium. A visit to Pattaya followed, then a delicious dinner in great seafood restaurant and finally, the participants went shopping at the night market.



The fourth day was led by Dr. Narut Soontranon and Dr. Kulsawad Jitkajornwanich from King Mongkut's Institute of Technology Ladkrabang (KMITL). In order to prepare the participants for the hackathon, they gave lectures on big data and machine learning. The participants were again divided into 4 groups, each deciding on their topics and giving short presentations in the afternoon. The hackathon began with the participants developing their ideas and designing their tools, as well as defining their goals and expected outputs.



The last day of the event was the presentations of the groups for their hackathon ideas. The first group presented the project entitled, “Missing Child and Elderly Identification Using Face Recognition and Alert System,” which aims to aid in the search of missing people, particularly children and the elderly, using biometric face recognition technology. The second group’s presentation was “Network-Based Location Analysis for Expanding and Diversifying Tourist Products in Albay, Philippines,” focuses on developing story maps that will showcase local products and attractions by creating 3D walkthrough videos. The third group’s project was “Web Based Public Health Information System,” envisions a tool that can help residents identify the nearest public health facilities that offer specific health services depending on the needs of the patients. Lastly, the fourth group presented “Participatory Mapping for Road Damage Assessment in Chon Buri, Thailand,” where people can report road damages by submitting photos through the website or the mobile application so that the local government can take the necessary actions in warning the public and implementing repairs.



2. The Spatial Exchange Program

The Spatial Exchange Program was a 2-week exchange program for students and young professionals, in which the participants were guided by visiting researchers and GISTDA personnel. The topics of the program include (1) Mapping Using UAVs, (2) Synergistic Approach to Mapping Using Remote Sensing and GIS: Disaster Monitoring, (3) Synergistic Approach to Mapping Using Remote Sensing and GIS: Environment, and (4) Geo Big Data for Disaster Management. A total of 16 participants from India, Indonesia, Myanmar, Pakistan and Philippines joined the event.



The first day of the program started with an opening remark from the ISPRS SC Chair, Sheryl Rose Reyes, followed by a course introduction by Mr. Jakrapong Tawala. The course introduction also provided the participants with their group assignments, which were determined through their choices during the application and the requirements of the event. The group of mentors were comprised of the lead mentor, assistant mentors and 1 GISTDA staff. For the topic “Mapping Using UAVs,” Dr. Dr. Kitsanai Choroenjit from Burapha University led the group, supported by the Dev Drone Mappers and Weerawat Chantawong. The “Synergistic Approach to Mapping Using Remote Sensing and GIS: Disaster Monitoring” was led by Mr. Khaled Mashfig from the UNITAR Operational Satellite Applications Programme (UNOSAT), assisted by Youjin Choe (UNOSAT) and Yoothapoom Potiracha (GISTDA), and aided by Sutinee Sihirunwong. Dr. Kanchana Nakhapakorn from Mahidol University was the lead mentor for the group on “Synergistic Approach to Mapping Using Remote Sensing and GIS: Environment,” supported by Dr. Supet Jirakajohnkool from Thammasat University and Dr. Khruewan Chanpangern of GISTDA and assisted by Suriyaphon Saensuriwong. Lastly, the “Geo Big Data for Disaster Management” was mentored by Dr. Kanoksri Sarinnapakorn from the Hydro and Agro Informatics Institute (HAII), assisted by Dr. Kulsawad Jitkajornwanich of KMITL, with Natthaphong Khaengkhan.





Each lead mentor delivered a lecture focusing on their specific topics to help the participants develop their research throughout the week. These lectures were given at the first session of each day. Supplementary lectures were also presented. The first supplementary presentation was given by Mr. Daniel Powell from the Office of Communications of the United Nations University (UNU) on research and science communication. This was followed by a short lecture on research writing by Sheryl Rose Reyes.

The participants started brainstorming on the very first day of the event, meeting and pitching ideas with their mentors. A proposal presentation was also required from each group on the second day, so that the other participants and mentors can provide feedback and comments to help improve the research questions, methodology and objectives. After the lectures in the morning, the participants can work on their research and were given their designated working spaces within the Sirindhorn Center for Geo-informatics. Furthermore, the participants were encouraged to develop their manuscript using the ISPRS manuscript guidelines.



A short break was prepared for the participants through a visit to the GISTDA technical facilities and Space Inspirium. The participants went on an excursion to Pattaya on Saturday morning and had lunch by the beach.



The final presentations were made by the participants on the last day of the event. All mentors and two ISPRS SC board members, Sheryl Rose Reyes and Angelica Kristina Monzon (online through Google Meeting) as well as the Chair of the Working Group V/5, Krzysztof Sterenczak (online through Google Meeting) provided feedback on the research of each group and their presentations. The first presentation was on the “Use of Geo-Big Data for Disaster Management: A Mini Project in Bangkok, Thailand,” which aims to develop a decision support tool on flood risk mapping and evacuation route planning. The second presentation was about an “Emergency Decision Support for Dam Break Incident in Lao PDR,” which uses Sentinel 1 & 2 data together with secondary base map information and field data for an enhanced emergency response. The third group presented on “Urban Transformation and Environmental Consequences: A Study of Delhi and Chandigarh City of India,” which analyzes land cover changes in the study area and calculates the value of the SDG indicator on sustainable cities and communities. The final presentation was about “Carbon Stock Assessment Using UAVs” that used actual field data from the nearby Khao Sam Muk Hill in Chon Buri to calculate above ground biomass.



D. Outcomes

1. Increased capacity of the students exhibited through the presentation of the design ideas for applications/tools developed through the hackathon

With only a few participants who are capable of programming, the organizers decided to change the second part to a beginner's hackathon. The design ideas of the participants were excellent and to ensure the feasibility of these ideas, the organizers decided to include a manuscript indicating data sources and feasibility parameters for the ideas presented by the participants. In addition, instead of developing the tool, the organizers decided to require the participants to develop a paper describing each group's innovative ideas to further support their presentations.

Table 1 summarizes the titles of the design ideas for the web-based applications/tool from the hackathon.

Table 1. The design ideas of the different groups for the ISPRS SC Summer School + Hackathon.

	Title	Group Members
1	Missing Child and Elderly Identification Using Recognition and Alert System	Zhi Feng Chen (China) Kelvin Kang Tang Wee (Malaysia) Hexela Franca (Philippines) Sreerama Naik S. R. (India)
2	Network-based Location Analysis for Expanding and Diversifying Tourist Products in Albay, Philippines	Charlene Mae Cipriano (Philippines) Ishita Manna (India) Wei Li (China) Sukanya Phunsen (Thailand)
3	Web-based Public Health Information System	S. Abdul Rahaman (India) Seema Rani (India) Shwe Sin Ko Ko (Myanmar) Liang Xia (China)
4	Participatory Mapping for Road Damage Assessment in Chon Buri, Thailand	Dirga Sumantri (Indonesia) Sohail Ahmed (Pakistan) Nargs Shabnam (India) Fu Zhou Weng (China)

2. Strengthened collaboration among participants and professional networks of the Summer School + Hackathon and the Spatial Exchange Program

See sections E and F.

3. Information, education, communication (IEC) materials to communicate science

a) Videos and Presentation Slides of the Summer School Lectures

Table 2. Titles of the lectures available from the Summer School + Hackathon program.

	Title	Lecturer
1	Geo-Intelligent Platform for Smart Cities	Dr. Damrongrit Niammuad, Rector of GISTDA Academy
2	Overview of Sustainability Role of Geospatial Information in Sustainability	Ms. Sheryl Rose Reyes, United Nations University – Institute for the Advanced Study of Sustainability
3	Innovation of Drones for BIM Using Aerial Drone Imaging for FMIS	Dr. Kitsanai Charoenjit, Burapha University
4	Understanding Land-System Change Dynamics in Myanmar	Engr. Jose Don De Alban, National University of Singapore
5	Big Data Hackathon	Dr. Narut Soontranon, Dr. Kulsawad Jitkajornwanich, King Mongkut's Institute of Technology Ladkrabang (KMITL)

Two of the lectures from the summer school was recorded and steamed live via the ISPRS SC Facebook account. These lectures were delivered by Dr. Kitsanai Charoenjit from Burapha University and Engr. Jose Don De Alban from National University of Singapore.

b) Manuscripts from the two programs

Table 3. Title of the manuscripts with the names of mentors and authors from the Spatial Exchange Program.

	Track	Title	Mentors	Group Members
1	Mapping Using UAVs	Carbon Stock Assessment Using UAVs	Dr. Kitsanai Choroenjit, Burapha University Dev Drone Mappers Weerawot Chantawong	Rohit Singh (India) Aung Myint Myat (Myanmar) Shrawani Sunil Sable (India) Ashwani Kumar Agnihotri (India)
2	Synergistic Approach to Mapping Using Remote Sensing and GIS: Disaster Monitoring	Emergency Decision Support for Dam Break Incident in Lao PDR	Mr. Khaled Mashfig, UNITAR Operational Satellite Applications Programme (UNOSAT) Youjin Choe, UNOSAT Yoothapoom Potiracha, GISTDA Sutinee Sihirunwong	Dirga Sumantri (Indonesia) Padam Jee Omar (India) Sreerama Naik S.R. (India) Nargis Shabnam (India)
3	Synergistic Approach to Mapping Using Remote Sensing and GIS: Environment	Urban Transformation and Environmental Consequences: A Study of Delhi and Chandigarh City of India	Dr. Kanchana Nakhapakorn, Mahidol University Dr. Supet Jirakajohnkool, Thammasat University Dr. Khruewan Chanpangern, GISTDA Suriyaphon Saensuriwong.	Sohail Ahmed (Pakistan) S Abdul Rahaman (India) Ankit Knumar Umesh Bha Sikarwar (India) Ishita Manna (India)
4	Geo Big Data for Disaster Management	Use of Geo-Big Data for Disaster Management: A Mini Project in Bangkok	Dr. Kanoksri Sarinnapakorn, Hydro and Agro Informatics Institute (HAI) Dr. Kulsawad Jitkajornwanich, King Mongkut's Institute of Technology Ladkrabang (KMITL) Natthaphong Khaengkhan	Vincent Louise Azucena (Philippines) Alifya Ikhsani (Indonesia) Jeny Raviz (Philippines) Kshitija Shrimant Suryawanshi (India)

The first presentation was on the “Use of Geo-Big Data for Disaster Management: A Mini Project in Bangkok, Thailand,” which aims to develop a decision support tool on flood risk mapping and evacuation route planning. The second presentation was about an “Emergency Decision Support for Dam Break Incident in Lao PDR,” which uses Sentinel 1 & 2 data together with secondary base map information and field data for an enhanced emergency response. The third group presented on “Urban Transformation and Environmental Consequences: A Study of Delhi and Chandigarh City of India,” which analyzes land cover changes in the study area and calculates the value of the SDG indicator on sustainable cities and communities. The final presentation was about “Carbon Stock Assessment Using UAVs” that used actual field data from the nearby Khao Sam Muk Hill in Chon Buri to calculate above ground biomass.

E. Lessons Learnt

Nowadays, to further support the personal development of future scientists, trainings in geo-informatics are crucial mechanisms for developing not only technical skills but as well as social skills. which are essential for cooperation, in contributing to a better world and achieving the SDGs. The course development needs to consider a balance between the technical and social skills that will be incorporated in the program. It is also very important to conduct meetings among the organizers and all experts involved in the program to properly communicate the purpose of the events and the expected outcomes. Challenges during the registration were encountered, including last minute cancellations. The organizers suggest that either an advanced registration payment must be made, or a registration deposit must be collected to ensure the attendance of the participants.

After each program, the organizers circulated an evaluation form to obtain the perceptions of the participants regarding the program(s) they joined and their suggestions for improvement.

The Summer School + Hackathon received great feedback from the participants in terms of achieving the goals of capacity building, communicating science through their design ideas, collaboration with international researchers and understanding the concept of hackathon. All the participants also agreed that aside for the objectives of the program, their personal learning goals were also met. Feedbacks regarding the learning environment, lectures, lecturers and the hosting of the program were also excellent. Participants indicated that they liked the overall structure of the program, with mentions of the UAV practical session, tutorials on Google Earth Engine and the group activities.

Suggestions for improvement of the Summer School + Hackathon include sessions to help participants learn or improved their programming skills, exposure to new technology and more practical sessions. Future topics that were suggested include terrestrial laser scanning, hydrology, geomorphology, groundwater vulnerability, 3D urban flood modelling and geography.

The Spatial Exchange Program also received good feedback for achieving the goals of capacity building, collaboration with international researchers and learning exchange. Similar to the previous program, feedbacks regarding the learning environment, lectures, lecturers and the hosting of the program were also great. Most of the participants mentioned that the best part of the program was the collaborative research and working with mentors. With majority of the participants coming from India, the only challenge was to provide good vegetarian food.

Suggestions for improving the program include extending the number of days to have more time to work on the project, interactive and practical sessions and additional audience to provide comments and suggestions for the research. Some suggested topics for the future include oceanography and coastal zone management.

The addition of the hackathon in the summer school made enhanced the program and interaction among the participants. Given the time limit for the design ideas, the organizers were impressed by the group presentations and manuscripts submitted by the participants.

For some participants in the Spatial Exchange Program, there were expectations of in-depth lectures and practical sessions, which were clearly not indicated in the promotion of the program because the focus was on doing the research project and collaboration. Furthermore, the schedule of this program must be decided in such a way that students will be able to leave their university for at least 2 weeks (e.g. during semester breaks).

F. Summary of Recommendations

MOTIVATE Learning was successfully organized and pioneered the first back-to-back events of the ISPRS SC. It also marked a great collaboration with GISTDA and ARTSA, 2 of the leading organizations in education and capacity building for space technology and applications. The participants were very engaged and many of them indicated the usefulness of the event for their current studies and future careers. This event also showcased the capabilities of young researchers in coming up with innovative ideas and implementing good research in a short period of time. The group exercises and the introduction of the lectures on sustainability and science communication also proved to be important in improving the approaches to research and technical presentations.

G. Summary of Expenses

Receipt Number	Item and Description	BHT	JPY	CHF
GISTDA / ARTSA				
62G2SI0040	Accommodation	147,022.11		4,550
	Food	114,709.56		3,550
Subtotal		261,731.67		8,100
ISPRS SC				
7358062076472	Airfare (Bangkok – Tokyo, Sheryl Rose Reyes) To attend meeting with GISTDA to prepare for MOTIVATE Learning		14,174	123..22
7366413381019	Airfare (Tokyo – Bangkok – Manila, Sheryl Rose Reyes) To attend MOTIVATE Learning		69,146	601.11
7367060528784	Airfare (Manila – Bangkok, Vincent Louise Azucena) To attend MOTIVATE Learning – The Spatial Exchange Program		23,100	200.82
Subtotal			106,420	925.15
TOTAL				9,025.15

H. Attachments and Links to Resources

Receipts corresponding to the expenses indicated in section G are included in the submission of this report via email.

IEC materials, including presentations from lecturers, manuscripts and lecture videos, and photos from the project can be downloaded from this link: <http://bit.ly/2FJb9RK> [MOTIVATE Learning Report]