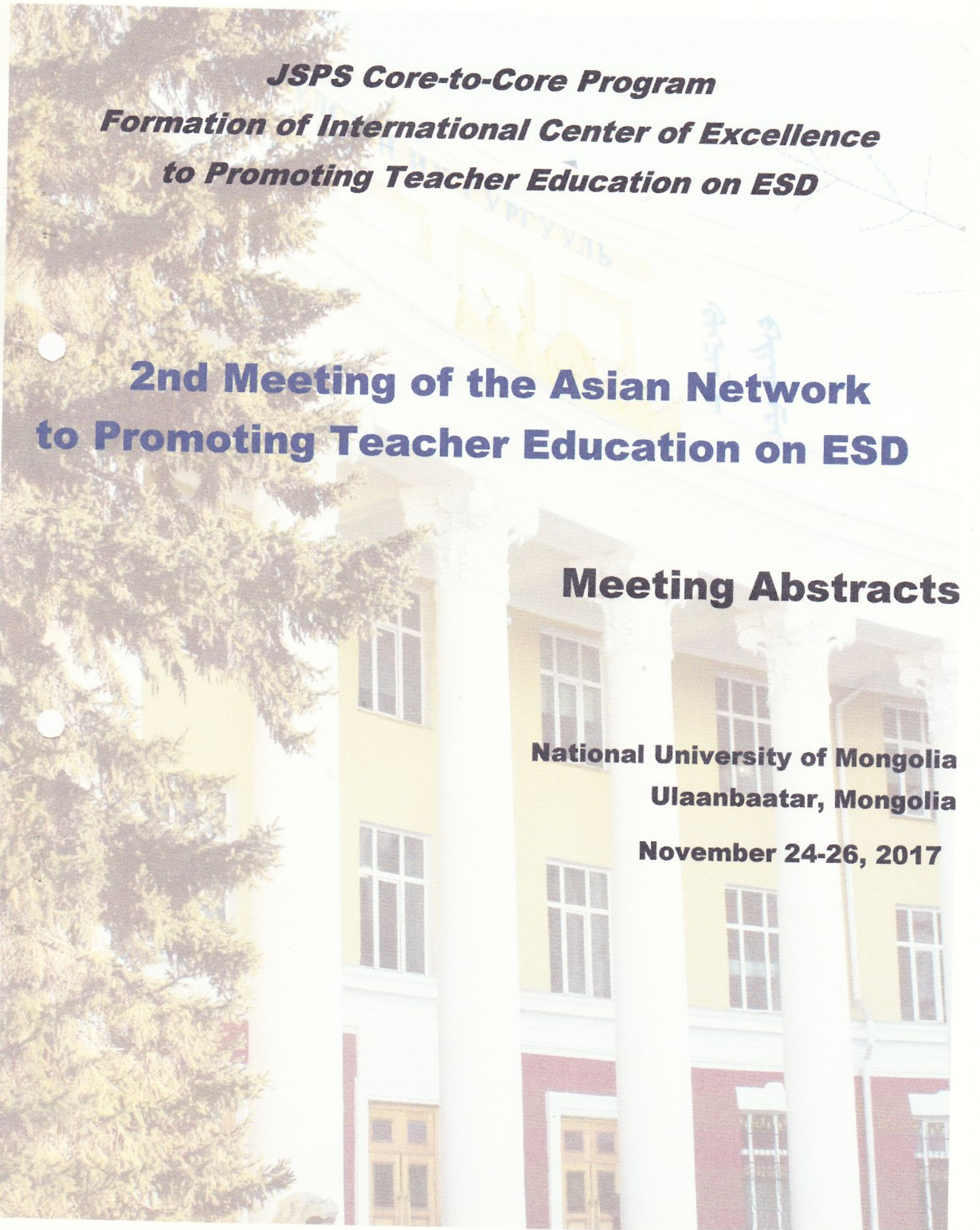

JSPS Core-to-Core Program

Formation of International Center of Excellence

to Promoting Teacher Education on ESD

2nd Meeting of the Asian Network to Promoting Teacher Education on ESD

Meeting Abstracts

National University of Mongolia

Ulaanbaatar, Mongolia

November 24-26, 2017

Welcome Message

Dear professors, colleagues and distinguished guests,

It's a great privilege and big opportunities that we take part personally organizing extraordinary 2nd meeting of the Asian Network for Promoting Teacher Education on Education for Sustainable Development (ESD) our country Mongolia. Welcome to Mongolia!

Since Mongolia became a member of UNESCO on 1st of November, 1962, our country has being reflecting UNESCO concepts and innovations to our policies and this contributes specifically to our country's development. Recently, in the scope of "Transforming our world: the 2030 Agenda for Sustainable Development", we try to reflect the Sustainable Development concepts to each sector of the society and more specifically, we focus to reach sustainable development through education and develop teachers and educators to be a frontline for this actions. In Mongolia, we have many researchers and scientists who focus their research works on the method of improvement of teachers understanding on Sustainable development concepts through pre-service and in-service teacher training, as well as the conduction of ESD into lesson and training, in further.

We are honored by conducting this conference in Mongolia, which is giving big opportunity to our country's researchers of educational field to get experience the foreign researchers best practices, to introduce own works and to be discussed.
Also, we would like to extend my sincere appreciation to dear professor Hiroki Fujii, a Coordinator of the JSPS Core-to-Core Program "Formation of International Center of Excellence for Promote Teacher Education on ESD", for your dedication and efforts for this "2nd meeting of the Asian Network for Promoting Teacher Education on Education for Sustainable Development" in Mongolia.

Concluding, we wish you a successful and enlightening conference.
Prepare yourself to be challenged, excited and inspired.

Please Enjoy the moment here in Mongolia and this challenging weather of our country.

Sincerely,

Dr. Uuriintuya Dembereldorj
Head of natural science training
department of Institute Teachers
Professional Development of Mongolia

Dulguun Jargalsaikhan
Lecturer of Department of Physics
School of Arts and Sciences, National
University of Mongolia

Welcome Message

Dear colleges and guests,

I am very glad to see the successful launch of the 2nd Meeting of the Asian Network to Promote Teacher Education on Education for Sustainable Development (ESD). The meeting, supported by the Japan Society for the Promotion of Science (JSPS), will be held at National University of Mongolia, from November 24th to 26th, 2017. On behalf of all participants, and in particular on behalf of those who have come from overseas, I would like to thank especially Professor Ms. Burmaa Banzragch, Dr. Uuriintuya Dembereldorj, Ms. Dulguun Jargalsaikhan, and the meeting officers for inviting us and welcoming us to this august international forum.

The purpose of this meeting is to discuss the integration of teacher education with ESD and the development of training programs for teachers. The members of our joint research project from Asian seven countries have developed some guidelines and recommendations to reorient teacher education in Asia to address sustainability. It is hoped that the meeting will both encourage international cooperation and stimulate researchers to conduct research on ESD in Asian countries.

I deeply appreciate your coming to share with us this unique, memorable experience in Ulan Bator, Mongolia.

Sincerely,

Hiroki Fujii
Professor, Graduate School of Education, Okayama University, Japan
Director, Okayama University Education for Sustainable Development Promotion Center
Coordinator of the JSPS Core-to-Core Program "Formation of International Center of Excellence to Promote Teacher Education on ESD"

PROGRAM

Language: Switch English and Mongol

1st Day, 24th November Venue: 3F, №320, Main building of National University of Mongolia (NUM)	
09:00-12:30	Meeting (For members of research project)
12:30-14:00	Lunch time
14:00-14:30	Opening
14:30-15:00	**General Outline of the JSPS Core-to-Core Program** Formation of international center of excellence to promote teacher education on ESD Hiroki Fujii Graduate School of Education, Okayama University, Japan
15:00-15:20	Refreshment
15:20-16:10	**Keynote Speech 1** Trends and Direction of Teacher Education for Education for Sustainable Development Sun-Kyung Lee Cheongju National University of Education, Korea
16:10-17:00	**Keynote Speech 2** The purpose and problems of promoting ESD on the basis of the cooperation of a university and community Toshinori Kuwabara Graduate School of Education, Okayama University, Japan
17:00-17:15	Feedback
17:30-20:00	Banquet at NUM meeting room
2nd Day, 25th November Venue: 2F, Round hall, Main building of National University of Mongolia (NUM)	
09:00-09:50	**Keynote Speech 3** Integrating the concept of Education for Sustainable Development – Global Action program into physics teachers training curriculum ○Burmaa Banzragch*[1] and Dulguun Jalgalsaikhan [1],Uuriintuya Dembereldorj [2] [1] National University of Mongolia, Mongolia [2] Institute of Teachers' Professonal Development, Mongolia
09:50-10:40	**Country Report 1** Implementation form of "Global Action Program" in school ○Uuriintuya Dembereldorj*[1] and Dulguun Jalgalsaikhan [2], Burmaa Banzragch[2], Tuya Alimaa[1] [1] Institute of Teachers' Professonal Development, Mongolia [2] National University of Mongolia, Mongolia
10:40-11:00	Refreshment

11:00-11:40	**Country Report 2** Current situation and future plan of ESD teacher training in Myanmar Yin Mar Win* and San San Maw Sagaing University of Education, Myanmar
11:40-12:20	**Country Report 3** Embedding curriculum to address sustainability at Bankeun Teacher Training College, Lao PDR Sompong Siboualipha* and Chanhthamala Southamavong Department of Science Education, Bankeun Teacher Training College, Lao PDR.
12:20-14:00	Lunch time
14:00-14:40	**Country Report 4** ESD literacy development through in-service and pre-service teacher programs in Indonesia Wijaya, A. F. C. [1]* and Hariyono, E.[2] [1] Universitas Pendidikan Indonesia, Indonesia [2] Universitas Negeri Surabaya, Indonesia
14:40-15:20	**Coutry Report 5** An approach to ESD teacher training through the interdisciplinary climate education connecting between natural environment and cultural understanding Kuranoshin Kato [1]*, Haruko Kato [2], Koji Uno [1] and Kazuo Otani [3] [1] Graduate School of Education, Okayama University, Japan, [2] Faculty of Education, Gifu Shotoku Gakuen University, Japan, and [3] Graduate School of Natural Science and Technology, Okayama University, Japan (Present affiliation: TV Setouchi Broadcasting Co., LTD., Japan)
15:20-15:40	Refreshment
15:40-16:40	**Poster Presentation from Mongolia**
	Poster Presentation 1 Integrating the ESD concept into social networks Tsogbadrakh.B*, Batkhuu.I, Nyamsuren.B, Dulmaa.G, Enkhzaya.B E-learning department, Institute of teacher's professional development
	Poster Presentation 2 Secondary teachers' perceptions and opinions related to a sustainable development in Mongolia Oyuntungalag Orsoo [1]*, Davaajav Purevjav[2] [1]Institute of Teacher's Professional Development, Ministry of Education, Culture Science and Sports, Mongolia [2]Doctoral School of Education, University of Szeged, Hungary

	Poster Presentation 3 Sustainable Development in Teacher Education Boldsuren Bishkhorloo Department of Education and Psychology, National University of Mongolia, Mongolia
	Poster Presentation 4 Sustainable Development and Mongolian Language Tuition Byambakhand Chuluundorj Department of Mongolian Language and Linguistics, National University of Mongolia
	Poster Presentation 5 Improving Grade 8th Students' Conceptual Understanding of Water Pollution via Environmental Education Munkhjin.O[1]*, Badam.B[2], Bayartungalag.B[3] [1, 2] Master degree student, Department of Physics, National University of Mongolia [3] Center for ecology suitable development, Mongolian University of Science and Technology
	Poster Presentation 6 Integration of Lesson Study in Education for Sustainable Development Oyun-Erdene.Ch[1]*, Dulguun.J[2] [1]Physics teacher, Oyunii Ireedui Complex School, Darkhan-Uul province [2] Department of Physics, National University of Mongolia
	Poster Presentation 7 Some results of utilization of ket vector method for high school Battsetseg.D[1]*, Ulam-Orgikh.D[2], Gunsendorj.N[2] [1]Orchlon International High School [2]National University of Mongolia
16:40-17:00	Closing
17:30-20:00	Dinner
3rd day, 26th November	
09:00-16:00	Excusion on ESD, Genghis Khan Equestrian Statue and the attached Museum and *etc.*

Keynote Speech 1

Trends and Direction of Teacher Education for Education for Sustainable Development

Sun-Kyung Lee
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UN declared in 2015 to pursue to achieve SDGs (Sustainable Development Goals) by 2030 for the sustainable future as a succession of the MDGs(Millennium Development Goals), and various sectors of the countries tries to find ways to promote sustainability of the world. Education, presented as the fourth goal of SDGs, becomes a crucial cross-cutting arena that enables both individual and integral achievement of SDGs. However, it is difficult to find consensus to apply uniform method to conduct ESD over each sector and country as it is near impossible to present global guideline that is unaffected by cultural and political contexts. Thus, application and conducting of education for sustainable development in accordance with the local context is crucial.

Teacher education is a key area in conducting education for sustainable development. The quality of education can not exceed the quality of teachers. Therefore, teacher education has become a priority in the process of implementing education for sustainable development in many countries. In particular, the GAP (Global Action Program for ESD), a follow-up program of UNESCO's DESD (Decade of Education for Sustainable Development, 2005-2014), selected 'Educators' as one of 5 priority areas, which will contribute to the core for conducting education for sustainable development. In fact, not only the educators, the school itself forms connection to the GAP's top priority areas such as policy, educational environment, educators, youth, and local. Teacher education can be done in various ways including pre-teacher education and in-service training. In this presentation, the efforts to strengthen teachers' competencies in Korea and other countries to explore teacher education for sustainable development education will be explored.

Teacher education can be the first approach when there is a new educational trend in Korea and other countries. In many cases, teachers participate personally in trainings and become agents in distributing the contents of the training among teachers or students. The model used at this instance can be referred as 'train-the-trainers models'. However, ESD, which involves various stakeholders, emphasizes contexts, and highlights not only the individual change but also the change of the society, requires social learning. In this case, the appropriate way of teacher education is to develop competences of teachers within the school or in the system, which is done in the form of professional development systems or teachers' professional learning communities.

This presentation will outline and explore the meaning of the current and tendencies of various teacher education, and also factors and competences that should be emphasized in teacher education for education for sustainable development.

Keynote Speech 2

The purpose and problems of promoting ESD on the basis of the cooperation of a university and community

Toshinori Kuwabara
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I would like to talk about my projects that I worked on in Okayama and my experience that I had while I pushed forward the projects. I will introduce two projects. The first is the project to protect the species being in an extinction crisis that we did in an elementary school. The second is the project to solve the problem of the local community under the cooperation of high school students and the local citizens.

The outline of the first project is as follows.

1) In this project, students tried to protect the fish designated a national monument inhabiting the neighborhood of their school.
2) The elementary school teacher asked to cooperate with some people out of the school, for example, the staff of the city hall, the member of the environmental protection group and farmers near the school.
3) Finally, we instructed the students to think of what they should do to protect the fish being in an extinction crisis when they became an adult after about ten years later.

The outline of the second project is as follows.

1) In this project, the high school students tried to solve the problem, the revitalization of economy of the town along the rail road near their school.
2) We had the workshop to talk about the method of solving the problem. The high school students and local inhabitants participated in our workshop together.
3) The university students acted as the facilitator of the workshop.
4) Finally, they made the catch phrase of the town along the rail road and the scenario of the commercial of TV.

I talked about the purpose and problems of promoting the ESD projects on the basis of the cooperation of a university and community.

Keynote Speech 3

Integrating the concept of Education for Sustainable Development – Global Action program into physics teachers training curriculum

Burmaa Banzragch*[1] and Dulguun Jalgalsaikhan[1], Uuriintuya Dembereldorj [2]

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ESD-GAP is a 10 years continue of the ESD. For this reason, based on experience and best practices of 10 years, it is achieved to implement ESD-GAP goals. Examples of best practice.

Reform of the physics education standard and curriculum for the learners' development knowledge and competence in order to contribute sustainable development (Rio Summit, Chapter 36 of Agenda 21)

Mongolia's traditional curriculum was **input-oriented**, which means it was oriented to certain science contents and guided teachers what subject and topic should be taught. But instead of this, we developed an **output-oriented** new curriculum and standard which is focused on learning outcomes, where it focuses more on what learners would know after study and oriented to learning achievement and its outcomes. Authors took definition of competence from OECD "Definition and selection of competencies (DeSeCo): Theoretical and conceptual foundations. 2002." and chose the model of competences such as;

(Areas of competence) (The content domain) (Levels of competence)

4 areas of the competence are: Knowledge of physics, cognition method of physics, information communication and, evaluation/assessment.

While developing a curriculum for physics subject, in order to incorporate the concept of ESD into it, authors have integrated the ideas from "ESD competence" by prof.Gerhard Han of Germany in it.

Integration of "Physics didactic" lesson into curriculum for pre-service physics subject teachers

Any issues of the SD cannot be solved only by certain science range. Learning physics and teaching activities cannot be said physics, but "physics didactic" is considered as an inter-discipline science which consists of pedagogy, didactic, psychology and many more. We have included the "physics didactic' into curriculum for pre-service physics teachers, syllabus and textbook development, for the first time in Mongolia's upper-secondary education section. According to the concept of physics education standard, the physics didactic lesson contains following issues, such as, goal of physics study, its content, methodology, learning tools and assessment system as well as how to develop syllabus/curriculum of physics subject and how to conduct/implement it.

Proposed goals for the implementation of ESD-GAP

First of all, we will focus only at 1st goal of ESD-GAP. .("to reorient education and learning so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development"). As we all see, a concept of "education and learning" is together for the first time. Sustainability is in a dynamic state and it shows the goal of being developed continuously. It does not mean to be stopped when we reach sustainability, but it is a continuously changing process and its achievement method, a "Sustainable development" must be discussed, always.

For this reason, an every word and meaning in this first goal must be certain and known for how people are understanding in recent days.

In 2016-2017, our team had implemented a project called "Implementing the GAP concept in secondary schools", and its result showed that, any policies of education must be sustainable for the implementation of ESD-GAP in school level, and alongside of that, it is almost impossible to implement without researchers and financial supporters. Also, it showed that, teachers' didactic knowledge and skills are different. When we reform the physics' didactic subject curriculum, we will focus more on the certain issue which teachers could integrate into their teaching with ESD concepts and get some ideas.

Country Report 1

Implementation form of "Global Action Program" in school

Uuriintuya Dembereldorj* [1] and Dulguun Jalgalsaikhan [2],
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The global future of social development is defined as "sustainable development". As for Mongolia, everyone including a president is discussing about Sustainable development. There are multiple activities and several documents are conducted/developed by UNESCO in 2013-2015 regarding ESD. Implementing activities of the concepts of those documents a

As of Mongolia is a member of UN and UNESCO, we are responsible to participate those activities and to contribute world's sustainable development. As for schools and teachers, they are front facing on the implementation of goal which is focused to cultivate each child to have proper knowledge and skill which can make a contribution to SD. To create the suitable environment for students' development, teachers face to demands to have proper knowledge on ESD as well as implementing skill of it. Most importantly, teachers needs to change their teaching methods regarding the ESD concepts. In order to provide teachers with research studies based proper information of how to integrate ESD concepts into lesson, we have implemented a project at school #65 of Ulaanbaatar where locates rural area of city, which supports teachers' teaching activities and provide teachers with technical and theoretical advices. Following activities are done, such as;

1. Training
    a. 17 SDGs
    b. Global action program
    c. Road map
    d. Teachers action and global action program
2. Joint programs / activities
    a. Research on teachers' previous assumptions
    b. Research on students' previous assumptions
    c. Projects
        - Incorporating/integrating school curriculums into sustainable development
        - Incorporating/integrating syllabus into sustainable development
        - Focusing to develop students to have have skills of sustainable development competencies through school training

Results of projects could be divided into following levels, such as;

In teachers' level: Teachers got theoretical knowledge of global documents regarding SD and got technical knowledge on the incorporation/integration of sustainable development issues into their teaching.

In primary education students' level: Primary-level students got to know Mongolian traditional yurt ger's effect for its resident and nature and its economical feature. And students got to know how to utilize its ventilation and insulation of room.

In secondary education students' level: Students learnt about what can we do to live in healthy and safe environment, as well as about a rehabilitation of earth and nature.

Country Report 2

Current situation and future plan of ESD teacher training in Myanmar

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In 2005, the United Nations (UN) Decade of ESD was launched to enhance the role of education in promoting sustainable development. In orienting education towards sustainability, it is needed to focus on one aspect of education, teacher education. Currently, institutions of teacher education are three universities of education and 25 education colleges in Myanmar. Pre-service teacher trainings are mainly offered by these institutions of teacher education. It is found that the Ministry of Education (MOE) offers in-service teacher training programs in cooperation with international organizations such as JICA, UNICEF, UNESCO, besides the programs offered by the institutions of teacher education. ESD in-service teacher training program was initiated as Disaster Preparation and Response Education (DPRE) in cooperation with UNESCO after Cyclone "Nagis" hit severely in May, 2008. At that time, Education for Sustainable Development (ESD) was introduced as adjectival education such as Disaster Preparation and Response Education.

In 2016, the ministry of education and UNESCO in partnership with Panasonic launched "Strengthening Schools for Education for Sustainable Development" (SSESD) project in Nyaung U Township, Myanmar. The project aims to empower Myanmar's learners to lead and promote sustainable lifestyles as socially responsible global citizens and leaders of the future. 400 in-service teachers joined trainings on teaching materials to integrate education for sustainable development (ESD) into the basic education curriculum. Seven school regions in Nyaung U township, Mandalay Region, Myanmar hosted three-day trainings for teachers from all grade levels from 20-27 August 2017.

The goal of the project is to pilot greater integration of sustainable development perspectives into the education system in Myanmar, both in what content that is taught as well as how it is taught, in order to empower Myanmar's learners to rise to both the opportunities and challenges of the 21st century.

To sum up, it is still necessary to promote the role of institutions of teacher education in orienting education towards sustainability in Myanmar. For this reason, based on the experiences and results of the previous ESD teacher training projects, we intend to develop pilot pre-service science teachers training project integrated with ESD in our university, SUOE.

Country Report 3

Embedding curriculum to address sustainability at Bankeun Teacher Training College, Lao PDR

Sompong Siboualipha* and Chanhthamala Southamavong
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The political, economic, social, and ecological challenges have caused by the environmental changes as well as hazards of global warming, the shortage of natural resources, the loss of biodiversity, global poverty, an increasing restriction of political rights and civil liberties in many parts of the world.

Lao curriculums, especially in science, many topics inherent to sustainability are already part of the formal education curriculum but have not been identified and contributed to the larger concept of sustainability. Therefore, it's important to examine the mandated curriculum for existing contributions to ESD through the curriculum analyzing or reorienting that needs to look for concepts that are related to the spheres of sustainability.

One of an analyzing or reorienting is the embedding into serving more socially and globally purpose. Thus, the recent report is to state an implementation of embedding to address sustainability by using a successful guide for "embed ESD in textbooks-led curriculum" which developed by UNESCO MGIEP, 2017.

The practices have purposed to map an existing curriculum, embed and demonstrate a less planed in a classroom for Secondary Teacher Education Program in Bankeun Teacher Training College, Lao PDR, since the beginning of semester (October, 2017). The program stages consist of: 1) curriculum mapping, 2) identify and associate issues with curriculum requirements, 3) identify curriculum opportunities for embedding ESD, and 4) connect identified issues with learning outcomes and demonstrate a lesson plan.

In mapping, a curriculum for secondary teacher education program (major in biology) was mapped in order to college's calendar and provided into parts of essential questions, contents, skills, and assessments. Each, we have tried to investigate ones for foundation to or more sustainability concepts as well as the significance of animals and relationship among them in an animal classification subject. For embedding, we have used the potential of the STSE model. At this point, we compared the original learning outcomes with the suggested ESD learning outcomes for example using classification system to group animals and identifying relationship among them (including role, importance, impacts to human and/or environment to response with issue in health consumption).

The specified issue about health consumption encountering in Lao public health is "*Liver flukes, flat worm (Phylum Plathyhelminthes) are common parasites found in central and southern Laos and constitute a major public health problem in the country*". From this identified issue, we have used STSE diagram to develop a lesson plan entitle *"Increasing of liver flukes constitutes a major public health problem in the country"*.

From an implementation of a lesson plan, we found that students engage understanding of and attitudes towards good health consumption. They demonstrated a classification of animals' groups and evaluated about their role, importance and be aware for their long lives and ready to explore experiences when they have to teach their future students.

Keywords: embedding, sustainability, live flukes, STSE model, secondary teacher education, Lao PDR.

Country Report 4

ESD literacy development through in-service and pre-service teacher programs in Indonesia

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Expanding on the concept of Education for Sustainability Development (ESD) that according to the community's problems and the geographic conditions of Indonesia is indispensable now. This is considering the rhythm of the threat to not only climate and geological but also social and economic disasters are an increase, that so the people more vulnerable to dealing with it. Therefore, equipped society being ready with those situations should be initiating started from education. In line with the orientation has been published on the first meeting, Universitas Pendidikan Indonesia (UPI) and Universitas Negeri Surabaya (UNESA) will collaborating start the action through two different ways, which are in-service teacher and pre-service teacher program. Furthermore, in-service teacher program, will focus on the identification and mapping of ESD's theme and learning material in science junior secondary school curriculum. Moreover, enrichment ESD materials to the Earth and Space Science SEAMEO QITEP Science training program content is already implemented on 1 – 10 of August 2017. On the other hand, the pre-service teacher program, which has a goal to reorient of Physics and Science pre-service curriculum for the prospective teacher, the Volcano Learning Project (VLP) as an innovation in project-based geoscience learning is the focus on this program. This program not only supports the strengthening of geoscience knowledge but also emphasizes how prospective teacher students can contribute to solving problems related to volcanic phenomena in Indonesia. Students are given the opportunity to interact with the environment and society in solving environmental problems associated with the volcano. The three main pillars of VLP: think critically, reasoning logically, and create productively.

Country Report 5

An approach to ESD teacher training through the interdisciplinary climate education connecting between natural environment and cultural understanding

Kuranoshin Kato [1]*, Haruko Kato [2], Koji Uno [1] and Kazuo Otani [3]
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Education on climate system sciences including the climate variability is very important for the scientific backgrounds for the individual ESD activities (studies on environment, disaster prevention and climate variability). Furthermore, the climate education seems to contribute greatly also to promoting the students' or teachers' "ESD-like viewpoints", such as thinking of various complex relations within or among the ESD targets. This is because that the climate and weather systems generally present the multi-scale structures with various interactions among the different time and spatial scale phenomena. The non-linearity of their systems is also very significant, i.e., the climate systems show various feedback or interaction processes. It is also noted, for example, that the day-to-day variations superposed on the seasonal mean states sometimes characterizes the essential seasonal features. Such features would provide the study materials for promoting the students' or teachers' information literacy.

On the other hand, the climate systems and their variations present rather close relationships to the various targets in ESD. For example, climate is one of the important backgrounds of generating the life and culture, and their diversity. Thus the joint activity of the climate education to the cultural understanding one would be also important for ESD. Especially in the middle or higher latitude region, although the significant seasonal cycle is seen, it presents rather different characteristics from region to region. Thus seasonal cycle and "seasonal feeling" there could be one of the key topics for such joint activity. In addition, land-ocean contrast and mountains distribution as the results of the plate tectonics also control the climate environment.

Our activities on ESD teacher education are based on the above concepts. In this presentation, we will mainly introduce our joint activities at the Faculty of Education on the two topics; (1) the seasonal cycle and seasonal feeling around North Europe, and (2) the climate around Japan with the variety of the seasonal cycle and its relation to the geological history of the continents formation. As for the topic (1), we chose the target not in East Asia, in order to advance the students' deeper understanding and imagination based on the careful examination of the climate data and the students' deeper appreciation of the seasonal feeling as if they have been there, even for what the students have not experienced. This would contribute greatly to promoting the students' ability to understand or sympathize with the other cultures or people there, which is basically important in ESD.

Poster Presentation 1

Integrating the ESD concept into social networks

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Social network is the chaos system which is independent from anybody. Chaos system works as how you access on it, it reacts just as. Thus, teachers and students must be careful using chaos system, otherwise it might threat danger to teacher/student himself and others.

Any feedback on the social networks are becoming more unpredictable. This paper is proposing the idea of the importance of integrating sustainable development main concept as how to access this system.

Authors suggest to appeal the positive attitude on the social networks and to disseminate the concept to teachers and students. Teacher to students, students to parents and parents to public- we aim to teach the ethical attitude by accessing/integrating education for sustainable development in the usage of "Social networks".

Keywords: Social network, chaos system, education for sustainable development, feedback, systematical thinking

Poster Presentation 2

Secondary teachers' perceptions and opinions related to a sustainable development in Mongolia

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The quality of education in school's core improvement factor is teachers' professional development.

Professional development for a teacher of science is a continuous, dynamic process. In response to increasingly complex challenges today, such as adapting to a rapidly changing technology-based environment, teaching many varied student populations. Formerly, in-service teacher training (IST) in science highlighted instructional skills rather than decision making, pedagogical knowledge, and reasoning (e.g., Guerrioro, 2017). Also, teacher knowledge and reflexivity may differ as a function of several cultural and personal factors, which also affect teacher behaviour in general, and attitudes to in-service training (IST) in particular. Therefore, this study identified similarities and differences

Perceived professional knowledge levels and inclusion in formal ITS in a close representative sample of Mongolian teachers by gender, work experience and school level taught. In addition, this study collected information on the opinions of teachers regarding their own professional development needs related to a sustainable development in a unit and recurrent lessons. Finally, this study provided information for Mongolian teacher trainers and educational policy makers

Purevjav & Molnár (2017) current study found that Mongolian teachers' perceptions significantly different ($p<.001$) between men and women on teacher knowledge levels and the perception of the importance of knowledge components in everyday teaching practice. Their findings revealed that the differences among teachers may call for diverse motivational strategies and learning instructional activities ITS programs.

The instrument was self-developed, based on previous empirical studies. This paper discusses three questions from the study. The data come from survey of 203 Mongolian secondary school teachers, who were administrated a paper and pencil questionnaire, and they rated 20 components of teacher knowledge (five-point Likert scale items) from two aspects (present knowledge levels, and inclusion in IST). Demographic information was also solicited. Data collection took place in 2017, before the national training sessions.

Keywords: sustainable development, professional development, Mongolian teachers, perceptions, teacher knowledge,

Poster Presentation 3

Sustainable Development in Teacher Education

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There is no argument about how education plays major role in achieving sustainable development goals, especially if we are aiming at a long term, sustainable and big impacts. Therefore, in this study we investigated integration of sustainable development in to teacher education in higher education, specifically in an instance of National University of Mongolia. To do this, we analyzed curriculums, study plans, syllabuses and teaching strategies and methods of teacher education programs and looked-for progress and good practices in integration of sustainable development.

We've chose content analyses and interview as our research mothed, covered 8 teacher education programs and 10 teachers of National University of Mongolia. After some thorough investigations, we could say that at least 20 percent of all learning credits contain sustainable development education at the curriculum level, which is big defending ground. Also, there are more advancements in teaching strategies and mothed integration in science education (Chemistry, Physics, Mathematics and Geology) teacher programs. But there are a little or more less integration and notions in the learning goals and objectives of teacher education major and minor syllabuses. It is because of non-existence of sustainable development goal integration in the curriculum and syllabus requirements of National University of Mongolia. Therefore, more effort, influence and support needed for more greater integration of sustainable development concept at the syllabus level.

Interview with the teachers reveal that, there haven't been enough or no intervention about sustainable development education through system of National University of Mongolia. A few teachers have been attended such training through non in-house trainings and programs. In the end, all our findings lead to our main recommendation, proclaims that, there are greater need of training about sustainability and its integration method and strategies through teaching. It could be organized by the Department of Faculty Development Department. Also including sustainable development goals in to the curriculum requirements would be helpful, which is under the supervision of the Commission of Programs.

Poster Presentation 4

Sustainable Development and Mongolian Language Tuition

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"Sustainable development goal -2030" policy documentation covers three areas: social, economic and environmental. Therefore, the core coverage of the sustainable development is the human being itself. This is identified in the sustainable development objective motto by the "NO-ONE left behind" slogan. This is related to the notion that one of the foundations of the sustainable development of human kind is the education which is especially addressed in the "Sustainable development goal– 4".

Although on one hand the 4th objective of the Sustainable development policy contemplates in detail only the educational field, on the other hand this field will develop in correlation interdependent with other objectives of the Sustainable development policy.

The main communication tool between humans is the speech. Therefore, it can be said that social communication enhancement matter of the human beings is the language. The language bears the communication and cognitive functions. Besides the its own internal structure and configuration, the one matter that has the important impact on the current situation of the language, its evolution, change and development are the non-linguistic factors or the existence environment of the language, the society itself. Subsequently the fact that it acts as an instrument of describing this environment and in turn expressing it, is the determining factor of a language society's features. Therefore, in this research of the 4th objective of the Sustainable development policy, which is education and within it the native language, are particularly addressed.

1. In the teacher training course of a general education school the three step experiment was conducted in "Mongolian language class". These included:

- Prospects of incorporating Mongolian language curriculum, content, methodology and preparation of the educational inventory, into the Sustainable development policy, in direct or indirect forms.
- Students trying and performing the acquired knowledge during practice period.
- Acquire the orientation on integrating the Sustainable development policy into Mongolian language lessons, discussed the erroneous and optimal solutions and organized the debates on the future improvement dispositions and deliberated the results.

2. Also, within the 4th objective of the Sustainable development policy, conducting the experiment on the core and general education subjects of an academic institutions' curriculum, it appeared that not only it was suitable for the everyday life of the students, but also the learning attitude became more effective.

Judging from this, the absorption of the Sustainable development policy into teacher training program of the academic education institutions gives students opportunity to rehearse their acquired theoretical knowledge during the practice period. This is the part of the teacher training process and also it shows that it is possible to reflect the Mongolian language curriculum, plans and consequently the policy documentation within it. Also, incorporating these into the fundamental lessons curriculum of core and general education institutions marks the start for preparation of skilled professional for the future knowledge based society.

Poster Presentation 5

Improving Grade 8th Students' Conceptual Understanding of Water Pollution via Environmental Education

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Global Sustainable Development has required every citizen of the world to have enough education to be involved in the creation of the new society. In connection with this demand, education sector has faced a new challenge, in other words, education will be a gateway to the sustainable development of the world. Therefore, educational sector will be expected to offer such education, particularly, natural science subjects reflect aspects of the sustainable development.

In fact, more and more people died of serious diseases caused by the drinking water which hasn't met standards of water safety and hygiene. The quality of the waters in the world is getting bad to worse every year, which threatens the health of the people and ecosystem.

Today the most striking issues faced the world is "to be provided safe drinking water and sanity equipment" as it specified in the 6th objective of the sustainable development.

Although this issue has been mentioned in the textbooks of chemistry, physics, geography and biology from the scientific point of view, neglects its application, ecosystem, everyday life and sustainable development.

Consequently, it's essential that we reflect this issue in the curriculum of natural science subjects of the secondary school so that I have conducted an experimental lesson and researched how we reflect Sustainable Education Development in the curriculum of the secondary education.

In the experimental lesson, I revealed students' background knowledge of water and discussed the factors cause water pollution, estimated the drops of water from the tape, how they contribute to the decrease the loss of water, make some signs on the walls of WC in the schools and organize cleaning campaigns around the school.

Poster Presentation 6

Integration of Lesson Study in Education for Sustainable Development

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In the frame work to improve education quality become really important issue to consider to be base of sustainable development of education, to develop our next generation, to study in livelihood ways, to live keeping pace with present period and make changes in thought of living. In connection with that general education purpose is changed and make correct decision for problems that is happened with their life and give orientation to be able to use their earned knowledge and skills for making suitable decision. So, to be improved quality and effectiveness of education we need study each lessons regularly, improve activity, participation and teaching methodology of teachers and need regular improvement participation of students organized activity in two stages for the purpose "Lesson study in the year of children" in primary school of "Oyunii Ireedui" Complex School since 2016. Here involved 17 lesson studies of primary and fundamental education and teachers more than 60 and students more than 1670. In organizing this event, selecting the concepts and methodology of the course to be selected as the main methodology for the purpose of supporting Sustainable Development Education for the purpose of achieving its goals under the category of "Tradition", "National Language Culture", "Energy efficient use" and "Safe learning environment" were selected for the 4th quarter of 2016-2017 academic year and the 1st quarter of 2017-2018 academic year.In the course of the survey, the team members are able to work together with the ability to work together, motivate them to develop themselves, and reflect on the process of innovation, experience and contents of success in the teacher's workshop was visible. Based on the results of this work, it is planned to organize more training on the achievement of other goals in education policy until 2030 and to support the students' scientific skills. From this perspective, the work carried out by the methodology of the study is a positive step toward improving the learning environment, training the students in intelligent energy use, and improving the teacher proficiency.

Poster Presentation 7

Some results of utilization of ket vector method for high school

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Overcrowded curriculum is one of the main reasons that makes difficult to introduce contents for sustainable development in high school [1]. Therefore, development of a new teaching methodology of difficult inter-disciplinary contents as vector methods is always the main goal of curriculum developers and teachers. We present theoretical and didactic basis and utilization results of a new methodology named ket vector method. The teaching practice shows that the ket vector method turns out to be universal and elementary method developing student's self-confidence and love of physics and related subjects via visibility, real life experience and excitement.

The results of general physics examinations and national physics olympiads show insufficiency of vector concept among high school students [2]. Questionnaire survey during on-site training among the physics and mathematics teachers reveals that many teachers delay or avoid vector methods due to method complexity in textbooks and limited teacher's ability [3]. On the other hand, we have initially adjusted and utilized famous Dirac's ket vector notation [4] in preparation of gifted students for International Physics Olympiad. At our surprise, the youngest students of age 11-13 years more interested in the ket vector method saying physics is a really fun. Upon this notice we have experimented utilizing this new methodology for students who do not like math at all. More surprising finding was that passion and love of physics and mathematics is developed for attendants gradually improving their self-confidence. We present the observations how their handwriting and drawings become more neater with tidy notebooks and how they show amazing problem solving techniques. Inter-disciplinary and inter-level teacher collaborations of the new methodology is needed.

The developed by us effective teaching method not only supports of life-long learning knowledge and ability but also allows to shorten time devoted to more difficult contents allowing more time and possibility of introducing sustainable development contents.

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