

Report 4/2022-9/2023 SDS Precollege Education

Part 1: Progress on 5 Main Projects

Leadership team: Diana M. Fisher, VP; Ulkem Yararbas, Associate VP; Emre Göktepe; Özgün Çetinkaya; Meltem C. Alibeyoglu; Sena Yildiz Degirmenci; *Chang-Kwon (Benjamin) Chung; Gaye Ceyhan; Min-Ren (Aaron) Yan; Lin Ya (Matilde) Hong; Sebnem Gezer; Steven Roderick; Ed Gallaher; Donald DeLand; Burcu Gungor Cabbar* (Names in italics are new to the leadership team as of fall of 2023.)

Main Objective (all years): Every student who goes through K-12 knows how to use systems thinking and System Dynamics tools in their daily lives.

Specific projects, tasks, and key results to achieve main objective (2022-2023):

Project 1: Increase audience (SDS members and others interested in ST/SD in pre-college education)

Tasks:

- a. Have a presentation for the beginning of each SIG meeting. (increase diversity of presentations.
- b. Find related groups who might be interested in our ST/SD approach.
- c. Increase value of SIG attendance by having relevant presentations for diverse educators.
- d. Figure out why some people are not attending. (Improve email analytics)

Key Results (to determine if tasks are successful)

- a. Increase the number of SIG pre-college education meetings to 6 per year (i.e., one every other month)
- b. Determine the number of downloads of materials on the SDS webpage for pre-college education.
- c. Determine the number of visits to the SDS SIG webpage for pre-college education.
- d. Work to achieve a 10% increase in Pre-college SIG meeting attendance.

(Progress) We have had SIG meetings on the following topics:

- ST alignment with International Baccalaureate Primary Years Program,
- SIG Goals,
- Economics in K-12,
- Mentoring,
- Best Methods for Implementing ST/SD for Instructional Purposes,
- Using ST to Promote Student Social and Emotional Learning,
- Review goals, presentations by 3 masters and Ph.D. students using ST/SD in theses.

Average attendance at our SIG meetings was about 22, with more people in attendance for the ISDC (2023) SIG meeting in Chicago (but less in Frankfurt (2022), due to scheduling conflict when a plenary ran overtime).

Project 2: Provide webinars to share what educators have done to help spread the use of ST/SD in pre-college education with other educators.

Tasks:

- a. Offer webinars at least 4 times a year. Presentations by people actually associated with pre-college education.
- b. Provide diverse presenters (teachers, administrators, educators from different countries).

- c. Provide diverse topics (pre-school, primary, middle, secondary school, administration, start ST/SD program in school, problems starting ST/SD program in a school, training opportunities, connecting to other interested groups).
- d. Possibly connect with the STEM education training at WPI.
- e. Call for conference/presentations from teachers on their work (when teachers are on breaks).

Key Results (to determine if tasks are successful)

- a. Work to achieve a 10% increase in Pre-college Webinar attendance.

(Progress) We have produced the following webinars:

- Focus on Climate Change,
- Human Body Systems in K-12,
- Teaching Social Studies with Systems Thinking,
- Getting Started on the Right Foot with System Dynamics Modeling,
- Teaching Economics from Kindergarten to Grade 12 (roundtable),
- Model Teaching 1.

We have upgraded our email advertisement app to MailChimp.

Average attendance at our webinars was about 50.

Project 3: Increase SD knowledge and skills of practicing teachers.

Tasks:

- a. Start ST/SD mentoring program for teachers (in the second half of 2022).
- b. Determine the qualifications of an ST/SD mentor.
- c. Specify the needs of a mentee. Identify who can be a mentee (must be related to pre-college teaching or teachers).
- d. Determine the responsibility of the Pre-college SIG for making good matches for mentee and mentor.
- e. Determine the responsibilities of mentor and mentee in each mentee/mentor working session. (Create a reporting document, online, report accomplishments.)
- f. The Pre-college SIG will provide some direction for beginning these sessions.

Key Results (to determine if tasks are successful)

- a. Have 5 mentor/mentee pairs by the middle of 2023.

(Progress) We have attempted to start a mentoring pilot with a teacher in Iran. Unfortunately she felt overwhelmed with her work and asked to postpone the mentoring.

There are four main mentors in the Türkiye Systems Thinking Association. These four help mentor administrators and teachers/professors to: plan school projects, help teachers of the same grade plan a lesson or an individual teacher plan a lesson that coordinates with the curriculum, plan a university course, assist with ST/SD for Mathers or Ph.D theses. There are a total of **64** teachers or academicians who have been mentored as part of this effort within the time frame of this report April 2022 – September 2023.

As an example of a mentoring session: Emre starts with a model or an activity he prepares after an initial meeting with a teacher. Other teachers in same grade and school try to observe the SD lesson. Teachers who are part of the same grade and school then debrief the SD lesson and update the lesson. Emre often has the teacher present (providing help on designing slides and speaker notes) at the annual ST/SD teacher symposium.

Project 4: Create statistical support for the value of the use of SD in K-12 education

Tasks:

- a. Set up ST/SD Concepts vs Grade Level matrix by the end of June 2022.
- b. Fill in most of the ST/SD Assessment Question matrix by the end of August with the current (about 235) ST/SD questions.
- c. Identify missing questions to work on starting in September 2022 and create a plan to fill in missing questions.

Key Results (to determine if tasks are successful)

- a. Have a functional matrix of concepts and questions for ST/SD assessment for K-12 by January 2023.

(Progress) We have had the first (internal), second (internal), and third (external) review of our 236 ST assessment questions. We will go over the 3rd reviewers' suggestions in November and December 2023. Third pass reviewers provided significant feedback.

Project 5: Start working with interested persons in different countries to develop pre-college education ST/SD infusion strategy.

Tasks:

- a. Provide a webinar to illustrate an overview of infusing ST/SD in pre-college education (based on success in Türkiye).
- b. Develop a strategy packet for aiding people who want to start ST/SD infusion in pre-college education in their countries.
- c. Develop a book of sample lesson activities for teachers (created by teachers) to use to infuse ST/SD at different grade levels.

Key Results (to determine if tasks are successful)

- a. Have active participation by members in at least 5 countries (different from Türkiye), by mid 2023.

(Progress) We made an effort to work with an SDS consultant in Italy who wanted to promote ST/SD in K-12 but it did not progress. This effort is no longer active.

We are currently working with Min-Ren (Aaron) Yan and Lin Ya (Matilda) Hong from Taiwan. Taiwan has ST as a major educational standard. Funding has been provided by the Taiwanese government to establish an SD education field study center in the central area of Taiwan supported by National Science and Science Council this November/December (2023). They have 3 school currently onboard for training and anticipate another 60-70 within the next year. The SDS Precollege SIG will work with Aaron and Matilde to move this work forward.

We are starting to populate our SDS Pre-college SIG webpage with student lessons and worked with Meagan Colvin to get the children's ST Billibonk books published by the SDS (One book is available and 3 are in process).

Part 2: Reports of ST/SD Activities in Precollege Education from Individuals or Groups

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Main Objective (all years): Every student who goes through K-12 knows how to use systems thinking and System Dynamics tools in their daily lives.

Work being done separately by SDS Precollege members/organizations (4/2022-9/2023)

Creative Learning Exchange: <https://clexchange.org>

Over the past year and a half, the CLE has concentrated on several initiatives. The major one has been the successful launching of *Now What?* a comprehensive curriculum for introducing sustainability education utilizing the concepts and tools of system dynamics and systems thinking. Publication of the book has been followed up by a blog written by the author, Alan Ticotsky, which brings a systems approach to current events. In the publication realm we have also updated *Model Mysteries*. Both books are available now in pdf format as well as print. The other initiative has been a start on a revision and updating of the Road Maps series. We are working closely with the SDS to create a more modern and user-friendly format for this classic learning path. The initial module corresponding the Road Maps 1 and 2 should be out within the next few months.

Systems Thinking Association in Turkey: <http://egitimdesistemdusuncesi.org/>

Numerous resources for ST/SD in pre-college education - mostly in Turkish.

They provide all their resources (training, lessons, etc.) for free to any teachers who are interested. *See details of activities at the end of this document.*

From Sena Yıldız Değirmenci (leadership team of SDS Pre-college SIG)

We have established a connection with an educator, Rolf Jucker, who has expertise in the field of outdoor education and education for sustainability and is also the writer of the book "Can we cope with the complexity or reality?". We discussed the potential for collaboration on a position paper to advocate for integrating system dynamics into pre-college curricula. The paper is planned to include an introduction to why we need better mental models to understand the world better, a summary of what system dynamics is and can do in this context, and in-depth examples of using SD in teaching different subjects.

Diana Fisher: activities related to ST/SD in pre-college education:

Activity Name	Date Completed	Time presenting
Present (virtual) workshop for middle and high school teachers in Turkey (various cities) •Building Systems Models to Understand Dynamics in Mathematics and Science	2/4-6/2022	Five 2-hr workshops over 2.5 days
Presented at the National Science Teaching Conference in Houston, TX	April 2, 2022	1 hour

• Students Build Systems Models to Study Climate Change		
Thread Co-chair for the Learning & Teaching thread for papers submitted to the ISDC	March/ April 2022	25 hours
Presented SD modeling concepts to three Environmental Economics classes at Cal Poly Humboldt	April 26 and again April 28	
Attended ISDC in Frankfurt, Germany Presented Plenary “Creating a Model-Building Lesson on Global Warming and Potable Water Availability for a High School Science Class” and gave workshop: “Building Models from the News”	July 19-22	
Attended Meetings in Izmir Turkey. Presented “Current Status and Global Vision for Systems Thinking and System Dynamics in Pre-College Education	July 23-24	
ICTMA (virtual): Presented “Potential Models Secondary School Students Could Have Built to Start Response to 2019 IMMC Problem”	Sept 24-27	
Latin American SD Conference Presentation (virtual): Creating a Model-Building Lesson on Global Warming and Potable Water Availability for a High School Science Class	Sept 28-30	
Northwest Regional Math Conference in Tacoma, WA: 3 presentations: 1.”A New, Dynamic Representation of Functions and New Applications for Algebra”, 2. “Creating a Model-Building Lesson on Global Warming and Potable Water Availability for a High School Pre/calculus Class”, 3. “Learn to Build New, Dynamic Representation of Functions & Application Models for Algebra”	Oct. 13-15	
Presented SD modeling concepts to three Environmental Economics classes at Cal Poly Humboldt	Nov 29 and Dec 1	
SDS VP Pre-College Education	All year	
Taught two 10-week SD courses online: 1. Basic Models, 2. More Advanced Models	June - August	

2023

Activity Name	Date Completed	Time presenting
Published Paper: Systems Thinking Activities Used in K-12 for Up to Two Decades. Frontiers in Education	Published in February	
NCTM (virtual) national presentation: “A New, Dynamic Representation of Functions and New Applications for Algebra”	March 29-31	

Thread Co-chair for the Learning & Teaching thread for papers submitted to the ISDC	March-April	
Published Paper: Global Understanding of Complex Systems Can Start in PreCollege. Springer (ICTMA)	Published March	
Thread Co-chair for the Learning & Teaching thread for papers submitted to the ISDC	March/April 2023	25 hours
Presented SD modeling concepts to three Environmental Economics classes at Cal Poly Humboldt	April 25 and 27	
Two 3-hour introduction to SD workshops for Hong Kong teachers (virtual) (also created 4 online class sessions)	May 5 and 19	
Provided webinar (virtual) presentation for teachers in Türkiye: “Systems Thinking Activities Used in K-12 for Up to Two Decades: The High School Section”	June 14	
Took an “Introduction to Teaching High School Economics” online 4-day course to learn more about economics so I could help build some SD econ models for the SIG.	July 10-13	
Attended ISDC in Chicago Gave workshop: “Building Models from the News,” Presided at SDS Pre-college SIG meeting	July 23-27	
Latin American SD (virtual, for me) conference. Presented video “Systems Thinking Activities use in K-12 for up to Two Decades”		
ICTMA Japan: (co-presentation)”Modeling Uncertain Futures: Problems, Methods, Tools” and workshop “Building a Small Human Carrying Capacity For Earth Model in Free Stella Online”		
SDS VP Pre-College Education	All year	
Taught one 10-week SD courses online: 3. Building Models from the News	June - August	

Benjamin Chung: <https://system-leadership.org> South Korea

September 2023

- The Hwaseong City Talent Development Foundation's Education Cooperation Support Division has selected 'System Leadership Education' as a pilot project of the Korea Vocational Competence Research Institute or KRIVET.
 - ◆ Implication 1: official support from organizations of local government(The Hwaseong City Talent Development Foundation)
 - ◆ Implication 2: only one selected project by a government organization in South Korea, aka. KRIVET out of 235 Career Experience Support centers for pre-college students nationwide
 - ◆ Implication 3: pilot education project to be expanded after next year
 - ◆ Details as below
 - ⇒ News translated into English: <https://bit.ly/3PZT46c>

⇒ News in Korean: <https://bit.ly/48yNsam>

- **May 2023**

- Launching AI for a personal tutor answering any questions about System Dynamics and Systems Thinking, including K-12 education SD/ST
 - ◆ Korean version: <https://bit.ly/system-leadership>
 - ◆ English version: <https://bit.ly/System-Leadership-En>
 - ◆ Implication: I aimed to provide some assistance to those who have a vague curiosity and thirst for SD&ST, including K-12 SD&ST education. It is free of charge, and, in the case of the English version, questions and answers operate in the native language.

Feel free to get acquainted with System Dynamics & Systems Thinking with the help of AI. I hope you enjoy the dialog with your mother language.



One of the great things about AI is that it will never take offense to your constant questioning and will answer sincerely. So go ahead and ask your questions. The GPT-4.0 is learning from **selected literature I input** on System Dynamics and Systems Thinking. A closed GPT A.I. **answers based on what it's learned. It will get better and better because I am diligently training it.**

GPT-4.0 is very good at recognizing languages so that you can use **your native language.**

However, don't forget **epoché (epoché, epokhē, εποχή).** Suspend judgment on the AI's answers - be skeptical and think twice. Use it with an attitude of acceptance until you develop better logic, and you'll be amazed at what you can accomplish. Now, try **clicking the dialog button** below. It's not convenient on a smartphone.

- ◆ [Ⓢ \[GPT-4.0\] slow but more reliable](#) [Ⓢ \[GPT-4.0\] faster but relatively reliable](#)
- ◆ The AI is still learning from me.

- **March 2023**

- Launching the K-12 SD/ST education lecturer training program and initiating an education program sponsored by a local government-affiliated organization
 - ◆ local government-affiliated organization: Gyeonggi Youth Training Center, an affiliated organization of Gyeonggi Province
 - ◆ program: World Climate Simulation Game (3 hours class)
 - ◆ target: 30 high school classes

- **December 2022**

- Publication:
 - ◆ Chung, Chang-Kwon (2022) 『Ecological Literacy and Systems Thinking Game』 In Incheon Metropolitan City Office of Education, Department of Creative Talent Education (Eds.) 『2022 Handbook of Transformative Pedagogy for Climate

Change, Ecological, and Environmental Education』 Incheon: Incheon Metropolitan City Office of Education.

- ◆ Implication: Despite being non-mandatory and elective, it has been officially published as a primary school textbook for the first time in Korea.
- ◆ eBook link <https://bit.ly/sl-EcoSystemsThinking> Korean text




● September 2022

- MOU with Gyeonggi Youth Training Center, an affiliated organization of Gyeonggi Province
 - ◆ Implication 1: First time in Korea, a local government-affiliated agency signed an MOU to promote System Dynamics for K-12 education
 - ◆ Featured on SD Society social media: <https://bit.ly/3UVf8hv>

KOREAN CHAPTER NEWS

Promotion of environmental education and System Dynamics for K-12 in Korea



- **Historic MOU with Gyeonggi Youth Training Center**, an affiliated organization of Gyeonggi Province
- First time in Korea a local government-affiliated agency signed an **MOU to promote System Dynamics**
- Since 2021, various System Dynamics resources, such as World Climate Simulation Game and Fishery Game, were provided free to **over 589 students in 26 schools**

korean@systemdynamics.org

Dr. Aaron Yan and Dr. Matilde Hong Taiwan
(Note: Dr. Yan is the president of the SDS Taiwan chapter.)

1. Education for Sustainable Development and System Dynamics for K-12 and Higher Education in Taiwan
 - a. For the first time in Taiwan the government supported an educational program promoting System Dynamics and Sustainable System Development.
 - b. More than 15 universities and 122 schools were connected to the education resources at the National Chengchi University.
 - c. Key competencies for sustainability (for education in Taiwan)
 - i. Systems thinking competency: The ability to recognize and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.
 - ii. Anticipatory competency: The ability to understand and evaluate multiple futures – possible, probable and desirable; to create one’s own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.
 - iii. Normative competency: the ability to understand and reflect on the norms and values that underlie one’s actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs.
 - iv. Strategic competency: the ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield.
 - v. Collaboration competency: the ability to learn from others; to understand and respect the needs, perspectives and actions of others (empathy); to understand, relate to and be sensitive to others (empathetic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.
 - vi. Critical thinking competency: the ability to question norms, practices and opinions; to reflect on one’s own values, perceptions and actions; and to take a position in the sustainability discourse.
 - vii. Self-awareness competency: the ability to reflect on one’s own role in the local community and (global)society; to continually evaluate and further motivate one’s actions; and to deal with one’s feelings and desires.
 - viii. Integrated problem-solving competency: the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development, integrating the above-mentioned competencies.
2. Drs. Yan and Hong will work with the SDS Precollege SIG to facilitate best practice in infusing ST and SD in Taiwan’s precollege education classes.

Jon Darkow – Biology Teacher at Seneca East High School in Attica, Ohio

Created/creates many SD simulations and publishes them on the Isee systems Exchange webpage (exchange.iseesystems.com)

Over the past year, his work has centered around enhancing and diversifying system dynamics applications. A key achievement was his contribution to the development of Model Builder for HHMI BioInteractive. This web-based educational tool, accompanied by a comprehensive User Guide, Pedagogy Guide, and a rich library of about 50 models, significantly aids science educators in creating, managing, and evaluating various models, including conceptual, causal, and stock and flow models. Its features, such as automated grading and self-assessment, have been designed to optimize classroom learning experiences. He had the honor of showcasing Model Builder at the 2023

International System Dynamics Conference. Alongside this, he has expanded his focus to include physics models, enriching the offerings on his website and in Insight Maker. Additionally, he has been refining a series of system dynamics models aimed at teaching evolution through natural selection, further broadening the educational impact of his work.

Model Builder, <https://www.biointeractive.org/classroom-resources/model-builder>

Model Builder User Guide, <https://www.biointeractive.org/sites/default/files/media/file/2023-04/ModelBuilder-UserGuide-tool.pdf>

Model Builder Pedagogy Guide, <https://www.biointeractive.org/sites/default/files/media/file/2023-06/ModelBuilder-PedagogyGuide-tool.pdf>

Model Builder Catalog of BioInteractive Models for

Educators, https://docs.google.com/spreadsheets/d/19eCQfsqNUDKXtku7UHkKWdpT_Fs6My3fzrtaDAAF-J8/edit?usp=sharing

Jon Darkow's Website, <https://sites.google.com/site/biologydarkow/physics>

Jon Darkow's Models on Insight Maker, <https://insightmaker.com/user/2QEcbr3eJyC7L82mUesoE1>

Systems Thinking Association in Turkey: Detailed activities.

September 2023

- Systems Thinking in Education Implementer Training: Various public and school-specific trainings were organized.
 - The Health and Education Foundation (SEV) schools (İzmir and Tarsus), August 2022
 - Darüşşafaka Schools, October 2022
 - Public, September 2022

● July 2023

- *Translation of "Systems Thinking in Education" textbook into English:* In 2022, a textbook having basic system thinking concepts and system dynamics tools with examples from in class implementations was written by Systems Thinking Association members and published with support of UNDP. The textbook is translated into English and **the pdf version** will be freely available on the association's website after reviewing the content.
- *Participation in ISDC2023:* Four presentations are made in ISDC2023 (2023 International Conference of the System Dynamics Society, Hybrid)
 - Paper: **An Educational Program Design - Human Body System with Systems Thinking**
 - Work in progress: **Systems Thinking in Psychological Counseling- A Pilot Study in a Middle School**
 - Poster: **Effect of Systems Thinking Approach on 2nd Grade Students' Reading Comprehension in Turkish Lessons**
 - Poster: **Equation is not Causation**

● June 2023

- *Systems Thinking in Education Faculties of Universities:* In the faculties of education of various universities, systems thinking courses were opened at undergraduate and graduate levels or systems approach was used in the courses.

- Systems Thinking in Education, Graduate School of Social Sciences Learning Sciences Master Program, MEF University
- Education for Sustainable Development, elective graduate course for in Education (Necatibey) Faculty of Balıkesir University
- Systems Thinking in Education, elective graduate course for in Education (Necatibey) Faculty of Balıkesir University
- Developmental Experiences in Mathematics and Science, undergraduate course, Department of Primary Education, Boğaziçi University
- Systems Thinking in Education, elective undergraduate course, Department of Mathematics and Science Education, Boğaziçi University
- Climate Change Education, summer school undergraduate course, Department of Mathematics and Science Education, Boğaziçi University

- **May 2023**

- *Pre-college education SIG webinars:* Systems Thinking Association members gave presentations at four webinars organized by the SDS Pre-College SIG (Focus on Climate Change [May 2022], Human Body Systems in K-12 [October 2022], Teaching Social Studies with Systems Thinking [January 2023], Teaching Economics from Kindergarten to Grade 12 [May 2023]).
- *Systems Thinking in Education Competency Development Training:* Between February 7 and May 9, 15 weeks of STiE Competency Development training were organized, consisting of 90-minute lessons each week. A total of 11 question sets were solved individually and in groups during the course and the answers were discussed and evaluated afterwards.
- *STiE Experience Sharing Symposium:* The symposium, which was held at TAKEV Schools and included 50 oral and poster presentations based on the presentations of previous symposia, was attended by 196 people.

- **April 2023**

- *Systems Thinking Association webinars:* Systems Thinking Association organized two webinars titled as “Climate and Environment with Systems Thinking” and “Article Introduction: 20 Years of Experience”.

- **February 2023**

- *Oh my! Greenfiles:* The story written by Gülnaz Çağlayan, a preschool teacher and member of the Systems Thinking Association, was published by Yakın Publishing House in February 2023 with the support of the United Nations Development Program (UNDP) Turkey Acceleration Laboratory. The story tells the story of ecosystem relations through the eyes of the protagonists named Doğa and Mina.
- *First international article authored by the Association:* The article, Systems thinking activities used in K-12 for up to two decades, was published on February 2, 2023 in Volume 8, Issue 2023 of Frontiers in Education. The authors are Diana Fisher and the K-12 Working Group of the Systems Thinking Association. The aim of the article is to give a brief introduction to systems thinking and then to show that systems thinking can be adapted to

the whole education system by giving examples of applications at preschool, primary, middle and high school levels.

- **October 2022**

- *System Thinking in educational literature (in Turkish):*
 - Interdisciplinary Approaches and Applications in Science Education
- *Systems Thinking in Education Implementer Trainings:* Various public and school-specific trainings were organized.
 - Beyaz Balon kindergartens and TAKEV schools, August 2022
 - Darüşşafaka Schools, September-November 2022
 - Public, September 2022
- *Systems Thinking in the Ministry of National Education:* "Systems thinking" approach was included in the report of the Workshop on Integration Climate Change Awareness into Basic Education, organized by the General Directorate of Basic Education of the Ministry of National Education.

- **August 2022**

- *Systems Thinking in Education (STiE) Strategy Planning Workshop:* “Yesterday Today Tomorrow - STiE” Workshop was hosted by Bir Arada Yaşarız Foundation (BAYETAV) and supported by the United Nations Development Programme (UNDP) Turkey Accelerator Lab in Izmir, Turkey. Thirty people attended the face-to-face and online workshop, where participants evaluated what has been done in Turkey to implement systems thinking in schools and what can be done until 2050.

- **July 2022**

- *Participation in ISDC2022:* A presentation titled **An Educational Program Design: Environmental Education with Systems Thinking and the World Climate Game Project** was made in the conference.

- **June 2022**

- *Research in education sciences:* Two master's theses, "**The effect of using systems thinking tools in education on deep reading in work analysis in Turkish language and literature course**" by Aysun Çelikten and "**Examination of Turkish story books taught in IB schools with systems thinking approach**" by Dilek Boyraz, were published as part of Maltepe University Graduate School of Education, Department of Educational Sciences.

- **Ongoing activities:**

- *Educational resources:* As of the end of July, there are 281 lesson/activity plans designed, implemented (updated if needed) and published in Systems Thinking in Education web site. (Resource development starts with the request of an implementer teacher. By this way, consistence with Turkish education system is assured)
- *Systems Thinking in Education - Activity Book for Preschool and Primary School:* An activity book containing sample activities and lesson plans for preschools and primary schools level as a complementary resource to the “Systems Thinking in Education” textbook

is being prepared. Like the textbook, the activity book will also be print published with the support of UNDP and online published on the internet site of the association.

- *Mobile application for sending messages*: A mobile application is being developed as a precaution against the problem of emails sent to the system thinking contact list being mistaken by email servers as junk e-mail and sent to different folders, resulting message not being read.
- *Economics in K-12 education*: Under the leadership of the System Dynamics K-12 Special Interest Group, efforts are being made to adapt economics to the K-12 education curriculum.
- *Systems Thinking in Education Wiki site*: Site's purpose (in line with the Wikipedia) is to benefit readers by containing information on all branches of knowledge about Systems Thinking in Education. Hosted by the Systems Thinking Association, it consists of free content (editable by association's members), whose articles also have numerous links to guide readers to more information. The site is under construction and is planned to be launched in 2023.