

The 4th International Workshop on
"Digitization and E-Inclusion in Mathematics and Science 2021"
DEIMS2021

February 18 – 19, 2021, Tokyo (Online)

PROCEEDINGS

The DEIMS2021 Organizing Committee

Preface

A significant number of online journals and e-textbooks, as well as other forms of academic/educational information are now digitized for various purposes. Computerized processing of such information is also being actively studied. Digitization is certainly a keyword in contemporary society, for which "Knowledge" forms its foundation.

We are now in the coronavirus pandemic that is a rare crisis in modern history. Digitization also provides us many powerful tools to get past this serious situation. For instance, digitized content is actively used in online/distance education everywhere in the world.

No matter whether education is face-to-face or distance, digitized documents that are given to all pupils/students should be available in an accessible format. However, digitization of STEM (science, technology, engineering and mathematics) content and its applications have challenges not present in a non-technical field. For example, while many online educational materials are provided in PDF (Acrobat Portable Document Format), the semantic information in mathematical formulas cannot easily be extracted. Formulas are depicted visually as a set of characters/symbols in a two-dimensional layout or an image. Thus, in many cases, it is hard for print-disabled people to read/author those contents although their accessibility is definitely important to achieve a truly inclusive society even in this crisis.

If a non-technical document is inaccessible, it can usually be converted easily into an accessible representation with standard tools such as OCR (optical character recognition) technology. STEM content cannot be so easily converted. Since a STEM document includes many technical characters, symbols and notations such as mathematical expressions, chemical formulas, figures, tables, etc., its conversion into accessible format such as MathML is quite beyond the capabilities of standard tools. STEM-accessibility in education also requires accessible authoring tools and players, learning management systems (LMS), digital libraries and other accessible facilities, not just information conversion tools.

The 4th International Workshop on "Digitization and E-Inclusion in Mathematics and Science 2021" (DEIMS2021) brings together many experts throughout the world to discuss state-of-the-art technologies (research and development), novel activities and future perspectives in fields listed below.

Similar workshops were held in Fukuoka, December 2009, in Tokyo, February 2012 and in Kanagawa, February 2016. DEIMS2021 is planned to be the fourth one of this series of international workshops. For more-than-20 years, the Infty Project, (The primary organizers of this workshop) has been also organizing a series of annual domestic workshops on scientific-information processing and its accessibility. DEIMS2021 is also regarded as one of this series. To view information on the previous international workshops in this series, please visit the DEIMS2016 home page:

<http://workshop.sciaccess.net/DEIMS2016>.

The main topics of the workshop includes, but not be limited to,

- * Digitizing and processing printed documents in STEM (science, technology, engineering and mathematics): technology / practice,
- * Digital libraries for STEM,
- * Accessibility of STEM documents, accessible PDF (e.g. PDF/UA) for STEM documents,
- * Accessibility of tables and figures,
- * E-learning and online services in scientific fields,
- * Accessibility in online STEM education,
- * Accessibility in a learning management system (LMS) or other groupware,
- * Assistive tools for disabled people,
- * Services and technologies for an inclusive environment,
- * Higher education for disabled students,
- * Other related topics.

We believe that your experiences and practical trials through this coronavirus pandemic should have great potential to bring about marked progress in these fields.

February 2021
DEIMS2021 Organizing Committee

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