Challenges in Implementing Universal Services in Society
From the Viewpoint of Ethical, Legal and Social Issues (ELSI)

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1. Preface

Various services have become available in recent years to enable people with or without disabilities to enjoy TV broadcasts and other content. NHK has been providing universal services[1] such as computer-generated sign language play-by-play broadcast and play-by-play broadcast/subtitles by robots for part of its sports coverage. With changes of the times, new challenges have emerged such as ethical issues and legal implications that need to be addressed for the social implementation of artificial intelligence-based and other types of new technology. The NHK Broadcasting Culture Research Institute and the NHK Science & Technology Research Laboratories have been conducting a joint study since April 2021 on challenges in implementing universal services in society from the viewpoint of ethical, legal and social issues. This article is an interim report on the study's progress.

2. Universal Services and ELSI

The COVID-19 pandemic and widening wealth gaps have made people physically and psychologically apart, causing our society more fragmented and multi-faceted. Universally providing people with accurate information is a major mission for broadcasters and other media organizations. "Helping to connect a divided, multi-faceted society" is one of NHK's five main missions in its corporate plan for fiscal 2021-2023. Universal services, which deliver program content and accurate information to everyone including people with visual or hearing impairments, senior citizens and foreign nationals, are especially important to connect multi-faced society.

The NHK Science & Technology Research Laboratories has been researching universal services for years. Its projects include automatic play-by-play/commentary technology using audio synthesis for people with visual impairment, automatic subtitle generation technology using speech recognition for people with hearing impairment, computer-generated sign language play-by-play broadcast for people whose first language is sign language and information presentation technology using touch and smell. It is also studying ways to utilize AI technology to further expand universal services.

Meanwhile, "ELSI" is being mentioned more often recently. It is the acronym for Ethical, Legal and Social Issues that refer to all kinds of challenges other than technological ones that could arise during research and development as well as the social implementation of new technology. Studies on ELSI originally developed in the field of life science and medicine in connection with human genome researches. They have since expanded to wider fields including social and natural sciences, and drawn public attention.

As part of efforts to address challenges of ensuring human diversity, legislation banning discrimination based on people's sexual orientation and sexual identity are being created around the world. In Japan, draft legislation calling for promoting understanding for LGBT people[2] is under consideration, reflecting calls for deeper understanding for the rights of LGBTQ+ people. As for universal services, the Tokyo 2020 Paralympic Games helped make legal and academic progress for people with disabilities. The law aimed at ending discrimination against people with disabilities[3], amended in May 2021, obliges private-sector businesses to provide "reasonable consideration" to people with disabilities within three years. To meet social demand, media organizations need to take into account ELSI when providing services. The authors have been studying how media organizations are handling ELSI, especially from the viewpoint of research and development of universal services.

3. Challenges for ELSI Seen from Outside Trend

First, let's look at ELSI trends outside Japan as the first step.

With rapid advancement of AI technology, businesses, universities and research institutions in the United States have been studying ELSI challenges related to utilization of AI. Researches are particularly active in the fields of recognition and classification technology that are used to ensure information accessibility in order to prevent errors and reduce risks. It has been found that existing commercial audio recognition systems have large racial disparities in error rates for speech recognition.[4] Evidence has also been presented for gender and racial biases in commercial facial recognition systems. Deep learning technology is widely used for automatic classification of facial images. There have been cases in which AI mistakenly recognized people of certain races as animals.[5] Service providers are required to fulfill technological accountability and ensure transparency.

Google, Microsoft and other frontrunners in the field of AI have compiled their own basic principles for AI ethics and made them public. In Europe, research and development activities for the social implementation of AI are conducted in line with the Artificial Intelligence Principles set by the Organisation for Economic Co-operation and Development.[6] Global companies, academic societies and the media are forming communities to share challenges in the social implementation of their research results and information on best practice as well as to deepen their studies. "Partnership on AI"[7] has 95 members from 14 countries and territory. The members include nonprofit organizations as well as media outlets such as the BBC, the CBC and The New York Times, reflecting high levels of interest among media organizations.

In Japan, the Cabinet Office drafted the Social Principles of Human-Centric AI[8] in 2019 to incorporate AI into society and share it in a better form. The principles cite "A society that has respect for human dignity," "A society where people with diverse backgrounds can pursue their well-being" and "A sustainable society" as its basic philosophy. The Internal Affairs and Communications Ministry's Conference toward AI Network Society is working to promote "safe, secure and reliable social implementation of AI." The council has released "Draft AI R&D Guidelines for International Discussions"[9] and "AI Utilization Guidelines"[10] among other documents.

The number of Japanese companies utilizing AI for their services and products is surging. Manufacturers have drafted and released their own AI guidelines, while more companies are taking part in AI-related communities and conferences on creating standards. Many media organizations have drafted and released ethics regulations on broadcasts, but they do not seem to be having in-depth discussions on the social implementation of AI technology from the viewpoint of ELSI. As stated before, providing accurate information universally to everyone is an important mission for the media, and using AI and other types of cutting-edge technology is instrumental to deliver them. Media organizations have to address ELSI challenges to expand and sophisticate universal services.

The NHK Broadcasting Culture Research Institute and the NHK Science & Technology Research Laboratories are working together to draw up what would serve as guidelines for the social implementation of universal services. The progress on the work will be introduced in the following chapters.

4. Learning from Past Examples

As part of the work to compile materials that would serve as guidelines, the authors studied past cases and took example from "Path to gender-equal society: Guidelines" published by the Tokyo Metropolitan Government in 1995. The authors interviewed Muramatsu Yasuko, president of the Japan Association for Women's Education, who helped draft the guidelines.

She recalled that the most important task was to identify challenges. Those involved in compiling the guidelines said they compiled the document to "enable people to understand and review discriminatory mindset, custom and behavior -- which are hard to notice and hard to tell -- by presenting concrete examples in everyday life."[11] This shows that identifying challenges that are "hard to notice and hard to tell" was important.

They also studied overseas cases and found four common characteristics among many overseas guidelines: a) Clarity; b) Plainness; c) Concreteness; d) Practicability[12]. Muramatsu pointed out that in addition to overseas case studies, surveying the latest studies in Japan was also important.

She said the guidelines focused on "family," "school," "community," "workplace" and "language, expressions and media" and listed concrete examples in these five situations and provided explanations to reflect the four characteristics (clarity, plainness, concreteness and practicability).

Surveying the drafting process of the Tokyo Metropolitan Government guidelines helped the authors understand methods to identifying challenges. The authors plan to continue surveys to acquire more knowhow for identifying challenges.

5. Identifying Challenges from Current Situation

The authors' aim is to propose guidelines for addressing challenges of the social implementation of universal services from the ELSI standpoint. In order to do so, the authors surveyed past cases as stated in Chapter 4, and identified "formed agreements" from cases that had been resolved, and "remaining challenges" from cases that have not been resolved. From these cases, challenges that need consideration should be assumed. Then guidelines will be compiled based on identified challenges. The authors decided to start with gathering internal cases, and interviewed mainly researchers at the NHK Science & Technology Research Laboratories who are studying universal services and others to hear challenges they are facing, as well as challenges they think will arise in the future. This report does not go into details, but classifying collected cases have led the authors to conclude that challenges in each case can be classified into the following categories.

(1) Responding to users' diversity and individuality
(2) Obligations required for NHK (Accuracy)
(3) Considerations for privacy as well as personality and image rights
(4) Ensuring fairness and reliability of AI
(5) Ensuring sustainability
(6) Gaining understanding for services
(7) Responding to standardization
(8) Timing to collaborate with users during research process

(1) is a challenge concerning users' circumstances and tastes. (2) is a challenge concerning users' tolerance to AI output that cannot be technically 100% accurate. (3) is a challenge concerning the handling of personal data contained in collected learning data. (4) is a challenge concerning so-called AI ethics. (5) is an operational challenge concerning the implementation of services for minorities. (6) is a challenge concerning promoting users' understanding for services. (7) is a challenge concerning guaranteeing quality and ensuring safety and security. (8) is a challenge concerning ways to incorporate opinions of prospective users. The authors plan to team up especially with prospective users of universal services and outside experts on universal services and ELSI to collect more examples and identify challenges. Results will be published later.

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[1] Technology used for broadcasting and other purposes to deliver information to all users, including people with visual or hearing impairments and foreign nationals.

[2] The official name is "Draft legislation concerning the promotion of understanding among the public on the diversity of sexual orientation and sexual identity."

[3] The official name is "Act for Eliminating Discrimination against Persons with Disabilities."

[4] For details, refer to: https://www.pnas.org/doi/pdf/10.1073/pnas.1915768117

[5] For details, refer to:

https://www.forbes.com/sites/mzhang/2015/07/01/google-photos-tags-two-african-americans-as-gorillas-through-facial-recognition-software/

[6] OECD (2019), Recommendations of the Council on Artificial Intelligence:

https://legalinstruments.oecd.org/api/print?ids=648

[7] "Partnership on AI" Website: https://partnershiponai.org

[8] Cabinet Office (2019), "Social Principles of Human-Centric AI":
https://www8.cao.go.jp/cstp/ai/aigensoku.pdf

[9] Internal Affairs and Communications Ministry (2017), "Draft AI R&D GUIDELINES for International Discussions":
https://www.soumu.go.jp/main_content/000499625.pdf

[10] Internal Affairs and Communications Ministry (2019), "AI Utilization Guidelines: Practical Reference for AI Utilization":
https://www.soumu.go.jp/main_content/000658284.pdf

[11] Tokyo Metropolitan Government Bureau of Citizens and Culture (1995), *Danjo Byodo heno Michisuji: Gaidorain*, p.3.

[12] For details, refer to descriptions by Tanaka Kazuko, who surveyed overseas cases. Tanaka Kazuko (1997), "Danjo Byodo Shakai heno Michisuji: Tokyoto no Gaidorain Zukuri", Yuasa Toshihiko, Takeda Haruko ed., *Tabunka Shakai to Hyogen no Jiyu; Susumu Gaidorain Zukuri*, Akashi Shoten, pp.85-96.

All websites were last visited on February 10, 2022.