Abstract of Doctoral Thesis
Title: Effectiveness of Multimedia DAISY Books for People with Reading Difficulties
:Continuous Support from Primary to Higher Education

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This study focuses on the multimedia DAISY books standard, which was developed as a tool to assist people with reading difficulties. It examines how inclusive education can be achieved using multimedia DAISY tools to create an environment in which people with reading difficulties can successfully acquire educational careers and achieve social self-fulfillment. Our goal was to validate DAISY's effectiveness based on scientific investigation and data analysis. In addition, we identified the various social and other factors that may hinder its effectiveness through an empirical analysis of the use of DAISY tools across formal educational institutions from primary to higher education. Additionally, we conducted a comprehensive study on the ideal way to use the DAISY tools, the ideal learning and social environments, and the ideal school education settings.

This study consists of four chapters. Chapter 1 describes the quantitative analysis performed on questionnaire data on multimedia DAISY textbooks to verify their effectiveness in coordination with the Japanese Society for Rehabilitation of Persons with Disabilities. This chapter also presents an analysis of the issues of using multimedia DAISY textbooks. Chapter 2 presents the empirical research methodology used which targeted seven students over a period of one to two years at two sites: one elementary school and one junior high school. We supplemented these data with interviews conducted with eight elementary school and four junior high school teachers in charge of classroom instruction. Based on these survey data, we considered various disincentives to the use of multimedia DAISY textbooks and also how they might be used more effectively. Chapter 3 presents the interview process with four people with reading difficulties who reached the higher education level, and their parents about their experience using multimedia DAISY textbooks. This chapter also analyzed the factors that made it possible for them to overcome their reading difficulties and enter higher education institutions. Chapter 4 describes the use of multimedia DAISY books in higher education institutions by verifying their effectiveness of use by one student with reading difficulties at such an institution. We also conducted an online interview survey of American universities and, based on the findings of this international comparative social research, we summarized the issues for students with reading difficulties at higher education institutions.

In Chapter 1, we identified an important structural problem in the per-grade usage rate curve of multimedia DAISY textbooks. Traditionally, the low use of multimedia DAISY textbooks by first and second graders, as well as junior high students, has been regarded as a problem. However, we documented that a decline in usage rates began with fifth and sixth graders. Once we recognized this as a consistent structural problem, it became the fundamental concern of our study. The shape of the usage curve shown that the number of children in elementary school reached its peak in the third and fourth grades and then began to decrease gradually from the fifth and sixth grades, indicating the current state of special needs education. In particular, what has led to the decline in utilization of multimedia DAISY textbooks among fifth and sixth graders is the fact that their use is limited to the individual instruction framework in classrooms. Another reason may be that children feel reluctant to use textbooks different from those around them. A lack of proper acceptance and understanding of one's difficulties (disabilities) leads to a decline in self-esteem and is one of the causes that hinder the use of ICT tools.

The practical research in Chapter 2 demonstrates that multimedia DAISY textbooks have certain therapeutic effects on reading speed and accuracy. Of course, their therapeutic efficacy depends on the background factors and intensity (difficulty level) of the reading disability, as well as the circumstances

in which DAISY textbooks are used, including the following factors: (1) usage starting from the earliest grades; (2) daily usage; (3) usage combined with vision training, cognitive training, etc.; (4) coordination with parents; and (5) coordination with regular classes. In the future, it will be necessary to verify these results with more detailed case studies that cross-examine the level of reading difficulty achieved and the type of support provided via multimedia DAISY textbooks. However, it is significant that this study demonstrates the therapeutic potential of these textbooks based on scientific data. The effective use of multimedia DAISY textbooks also depends greatly on the start of utilization; ideally, they should be used from the first grade of elementary school, when students begin to learn the "Hiragana". For this reason, it is important to conduct screening tests for reading ability. However, at present, no method for such screening and for subsequent reading support has been established. In this study, we identified the "Response to Intervention" (RTI) model as one such method with high potential for success.

The analysis in Chapter 3 revealed that the survey participants who were able to reach higher education used support networks from an early age and that access to appropriate support and accommodation, including the use of multimedia DAISY textbooks, led to the acquisition of self-understanding and self-advocacy skills by people with reading difficulties. This assumes the recognition and acceptance of the disability by parents. The introduction of inclusive education in special needs education is key in promoting disability acceptance and understanding by parents.

To enable the use multimedia DAISY textbooks in regular classes and for home education, understanding from regular class teachers and student peers is also essential. This further highlights the importance of promoting inclusive education. Universal design digital book standards have become a cornerstone of the efforts to realize inclusive education in a desirable manner in the Japanese society.

To promote inclusive education, it is important to promote coordination among special needs education teachers, other teachers in the school, parents, and the various support organizations. One way to do this is to appropriately incorporate the use of multimedia DAISY textbooks into the "School as Team" policy advocated by Japan's Ministry of Education, Culture, Sports, Science and Technology. This would make the role of the special needs education coordinator even more important. The special needs education coordinator should play a key role in forming a network of various resources, including support organizations, that is centered on children with reading difficulties and their parents. Changing the school education environment could enhance inclusive education so that multimedia DAISY textbooks can be more easily used, even in regular classes.

Beyond reading assistance afforded through multimedia DAISY textbooks, it is also important to utilize them as a reasonable accommodation when assessing students through tests and entrance examinations.

To promote inclusive education, consideration should also be given to students in the reading-difficulty gray zone. This is because in actual educational settings, there are many so-called gray-zone students with developmental disability characteristics who do not meet the diagnostic criteria. Since multimedia DAISY textbooks can be requested with or without a diagnosis, the current situation in which the textbooks are accessible even to students in the reading-difficulty gray zone thus seems a satisfactory accommodation.

Inclusive education is based on the belief that it is essential to realize a symbiotic society, in which people of different backgrounds can live together without discrimination. To achieve this, the accessibility of published materials is essential. This requires the transition to fully accessible digital books with various functions, such as multimedia DAISY textbooks, for all book publishing. Universities and university libraries play a major role in this regard.

In this study, we focused on multimedia DAISY textbooks, examined their effectiveness, and identified social factors that may hinder their effectiveness through empirical research from primary to higher education institutions. We also comprehensively delineated the issues relating to the ideal way to use multimedia DAISY textbooks to facilitate inclusive education, establish ideal learning and social environments and determine ideal school education settings. We hope the results will help build a symbiotic society by further enhancing the effectiveness of multimedia DAISY textbooks and inclusive education.