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Digital Library for the 21-st Century: Tsukuba University Library Digitized Information Public Services (TULIPS)

Hisami Konishi Springer

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DIGITAL LIBRARY FOR THE 21-ST CENTURY:
TSUKUBA UNIVERSITY LIBRARY
DIGITIZED INFORMATION PUBLIC SERVICES (TULIPS)*

Hisami Konishi Springer
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In 1992, at the Japan-U.S. Seminar on Library and Information Science held in Kyoto, librarians and educators had a chance to exchange ideas on library and information services in the next century. At that time Prof. Masaru Harada of the Toshokan Joho Daigaku projected that we will be able to obtain 99% of information in digitized form by the year 2050, given 50 years of cumulative efforts in the public and private sectors in Japan. Already his words have proven prophetic.

Recent progress in document handling technology has affected library and information services significantly. Paper is no longer regarded as a storage medium. Rather, increasingly library users regard paper as simply an interface media for items stored in electronic format. Today, librarians in East Asia collections in North America must deal with this emerging technology and its application and organization in order to provide the highest possible level of service to our users. What this requires of us is knowledge of the creation and organization of multilingual web sites, use of specific search engines and index schemes, subject analysis and classification specific to Internet resources, the use of mark-up languages to facilitate organization and access to materials, and new managerial or administrative approaches to policy and planning. Creation, storage, organization, transmission, retrieval and updating of electronic resources are all now a new part of our responsibilities.

The University of Tsukuba, a leader in technical innovations in our field, made a treat leap forward to the 21st century when on March 18, 1998, they celebrated the opening of their digital library, Tsukuba Daigaku Denshi Toshokan, or TULIPS (Tsukuba University Library Digitized Information Public Service). This culminated a long and concerted effort by the University of Tsukuba that began with the computer processing of book catalogs in 1978. The stages of this 20-year revolution are summarized in Illustration One. The details of the server system are shown in Illustration Two.

At the opening ceremony the President of the University and Nobel Laureate physicist, Prof. Reona Esaki, described the University Library as a sanctuary of intelligence and culture. As such, one of the important services of the Library is to digitize scholarly research products of the University for global transmission via the Internet so that overseas researchers and students may utilize them for their creative research activities. Furthermore, the capability for international

*This paper was originally presented in Washington, D.C. on March 26, 1998, at the meeting of the Committee on Library Technology of the Council on East Asian Libraries, Association for Asian Studies.
sharing of research that digitization of library resources will allow is expected to enhance creative research activities at the University of Tsukuba. The TULIPS system has already begun to attract international attention, the latest being a visit by a team of experts sent from the U.S. National Science Foundation.

Illustrations Three, Four, and Five demonstrate the conceptual map of TULIPS, its home page, and a diagram showing the detailed structure of the web page. The digitized full text resources include those produced by the University, such as University bulletins, dissertations, research projects, including those supported by grants-in-aid for scientific research from the Japanese Ministry of Education, and reports of University affairs, and resources collected by the University, such as are the rare books of the University library.

Examples of the sorts of resources that have been digitized are two journals published by the University, *Gengo bunka ronshu* and *Kenkyuu hokoku*, which will be available in full text beginning with issues published in 1998. In the realm of dissertations, a study on Japanese auxiliary verbs authored by Prof. Yasuo Kitahara and a study on amino acids by Prof. Akira Takada are accessible. In addition, studies on Okinawan history, and Western and Asian legal traditions are also available in full text.

One of the challenges overseas librarians and researchers now face is timely access to Japanese dissertations in the original format. TULIPS helps resolve this challenge, in that not only does it provide the bibliographic citation (Illustration Six) on-line, but it also provides a link to the full text of digitized dissertations. Illustrations 7-1 and 7-2 show the preface of the dissertation by Prof. Kitahara, the former Director of the Library, entitled *Nihongo jodooshi no kenkyuu, A study of auxiliary verbs in Japanese*.

Out of 6,000 rare books owned by the Library, 771 titles have been digitized, including the two titles in Illustrations Eight and Nine. Since 1995, TULIPS has allowed access to the Max Besson collection of books on Japonica published in the 15th and 16th centuries. The most notable among the books of the collection is a small booklet published in Goa, India, in 1588, *Oratio habit a Farad Martino*. This booklet is the first Western language publication printed by a Japanese national, Constantinus Dourat*Iaponius*. Farad Martino was one of the four young Japanese Christians sent to Rome by feudal Christian lords in 1582 who were given an audience with the Pope on March 23, 1585.

TULIPS is one of the two initiatives recently funded by the Ministry of Education in Japan. The other initiative is the digital library at the Kyoto University. The digital library in Tsukuba marks an important milestone in the development of global resource sharing in the information society of the next century.

Our colleagues at Tsukuba have provided overseas scholars and librarians with the opportunity for real-time access to their resources through their web page: URL (http://www.tulips.tsukuba.ac.jp). It is hoped that we in North America will reciprocate and participate actively in global digital resource sharing by building on our existing strengths and by building strong niche collections.
**Illustration 1**

**History of the Digital Library System**

1978 Computer processing of book catalogs was started.
1981 Online book holdings retrieval services were started. (300,000 of 1,200,000 holdings.)
1988 Science Information Processing Center was connected to Catalog Information Services.
1990 Stand-alone CD-ROM services (MEDLINE) became available.
1991 Digital Library Promotion Special Committee and Digital Library System Research Group were convened under the University Senate.
The first term (’92～’94) Digital Library Construction Plan was made.
LAN in the Library was connected.
1992 Library's own computer system was installed.
Networked CD-ROM services (BIOSIS, MEDLINE) became available.
1993 Online holdings retrieval services over the Internet was started. (900,000 of 1,800,000 book holdings and 16,000 periodicals.)
1994 The University of Tsukuba Library WWW home page was opened.
The second term (’95～’97) Digital Library Construction Plan was made.
Digital Library Promotion Special Committee was convened in the Library.
ATM campus-wide LAN was connected.
1995 Digital Exhibition over the Internet was started. ("Tensho Young Delegates and Address of Martino Hara").
Networked CD-ROM services were expanded. (Current Contents, New York Times, etc.)
1996 Library's own computer system was replaced. (UNIX system.)
Started to input catalogs of holdings of Ex-Tokyo University of Education into database. (Plan for '96～'98: 200,000 in total.)
Digital Exhibition was expanded. ("Uno Collections" and "Life and Education in Meiji Era").
Full-text database (pictures) of rare books was prepared. (Approx. 400.)
1997 "Concept of the high-technology dispatch-only digital library" was published.
"Copyright in the University of Tsukuba Digital Library" was prepared.
LAN in the Library was expanded.
1998 High-technology dispatch-only digital library became operational.
CD-ROM-database integrated retrieval system was installed.
Digital Library Special Committee was convened under the Library Steering Committee.
Illustration 2

**TULIPS**

**Full-text database server system**
- Full-text database/retrieval server
  - UltraEnterprise 3000
  - SPARCstorage Array (125GB)
  - SPARCstorage DLT4700
- Image database server
  - UltraEnterprise 3000
  - SPARCstorage Array (252GB)
  - SPARCstorage DLT4700
  - Pioneer DRM-5004X

**CD-ROM databases**
- Integrated retrieval system
  - UltraEnterprise 2
  - Multi-disk pack (25.2GB)
  - SPARCstorage Array (151.2GB)

**NSCDNet**
- PRIORIS XL Server 5100
- Meridian Data CD NetROM

**CA on CD**
- SPARCstation 20
- Unipack (5GB, 2GB x 2)

**Video on demand system**
- Ultra2 Model 2200
- Multi-disk pack (54.6GB x 3)
- SPARCstorage DLT4700

**Cataloging/circulation/acquisitions server**
- UltraEnterprise 3000
- SPARCserver 20

**Data processing and editing system**
- Data processing / editing server
  - UltraEnterprise 3000
  - Multi-disk pack (54.6GB)
  - SPARCstorage DLT4700
  - MO drive
- Data processing / editing PC
  - FMV6266T7 x 8
  - Data processing equipments
  - Image scanner (color / monochrome)
  - Face-up image scanner
  - Film scanner
- Data processing / editing WS
  - MO drive
- Ultra1 Model 170E x 10
  - CDR drive

**PACS terminals**
- PC for TULIPS
  - (Total 181)
  - Central Lib. 102
  - Art & Physical Education Lib. 34
  - Medical Lib. 29
  - Otsuka Lib. 16
  - Educational computer system
  - (Total 60)
  - Central Lib. 19
  - Medical Lib. 41
筑波大学電子図書館

新しい情報（1998年3月13日更新）

- 文献情報
  学内蔵書検索（WWW版OPAC | telnet版OPAC | 全文表示機能付WWW版OPAC（暫定版） | 雑誌所蔵リスト | 予約種目目録 | 電子資料リスト | 新着図書リスト | 主要文庫・コレクション etc.)
  学外蔵書検索（NACSIS Webcat etc.）
  学術論文情報データベース（Current Contents/Medline検索[学内のみ] | 本学記要目次検索 etc.）
  レファレンスデスク

- 全文情報
  筑波大学収集・生産資料 | オンラインジャーナル etc.

- リンク集
  世界の図書館 | 筑波大学 | サーチエンジン etc.

- 筑波大学附属図書館のご案内
  お知らせ | 概要 | 利用案内 | 館報 | 電子展示 etc.

- 筑波大学電子図書館のページ構成及びページ検索
- 筑波大学電子図書館の著作権及びリンクについて

(c)筑波大学附属図書館  ご意見をお寄せ下さい
Last updated: 1998/03/20
筑波大学電子図書館WWWページ構成

● 新しい情報（What's new）

● 文献情報
  ○ 学内蔵書検索
    □ OPAC（オンライン蔵書目録）
    □ WWW版
    □ Telnet 版
    □ 雑誌所蔵簡易リスト
    □ 予約雑誌目録（1997）
    □ 電子資料リスト
    □ 新着図書リスト
    □ 主要文庫・コレクション
    □ 国際交流コーナー・地域情報コーナー配架資料リスト
  ○ 学外蔵書検索
    □ 全国大学図書館蔵書検索（NACSIS Webcat）
    □ 日本書籍総目録
    □ Library of Congress（米国国会図書館）
    □ British Library（英国図書館）
  ○ 学術論文データベース
    □ Current Contents・MEDLINE検索サービス
    □ 本学紀要目次検索
    □ CAPCAS（Computer Aided Production of Current Awareness Services）
    □ CARL Uncover（WWW I telnet）
  ○ レファレンスデスク

● 全文情報
  ○ 筑波大学収集資料
    □ 貴重書等
  ○ 筑波大学生産資料
    □ 研究成果報告
    □ 学位論文
    □ 紀要
    □ 学術報告書等
  ○ オンラインジャーナル

● リンク集
  ○ 世界の図書館
  ○ 筑波大学
  ○ サーチエンジン
図書目録情報

書誌

・書名
日本語助動詞の研究，1
・著者名
北原保雄
・出版事項
[桜村]：北原保雄，1980
・形態
458p；26cm
・注記
筑波大学文学博士学位論文・昭和56年3月25日授与
・著者情報
北原，保雄（キタハラ，ヤスオ）
・日本十進分類
DB00057

所蔵

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ページイメージ

日本語助動詞の研究，1

文法は実に体系的

文法は実に体系的

整理分類し、助動詞を個別的に

いかがかろう}

いかがかろう

どういう点を

どういう点を

いかがかろう
Illustration 7-2

研究をするのに興味を持った文献を総体的に捉え、それを語詞とはどのようにものであるか体系を有するものであるかにすることができるものである。

資料, 研究, 進めたことによる

一般的なものである。古代語の

次ページへ
ÉMILE,
O.U
DE L'ÉDUCATION.
Par J. J. Rousseau,
Citoyen de Genève.

Sensibilité aggravée malheur, qu'importe aux enfans.
L'amour naturel, il érigea veulent, jouira.
Son âge est LXXI ère.

TOME PREMIER.

A LA HAYE,
Chez Jean Néaulme, Libraire.

M. DCC. LXII.
Avec Privilege de Nosseign. les Etats de Hollande & de Westfisle.