



Collection of Japanese User Requirements and Gap Analysis between User's Expectation and Current Standards

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Self Introduction



- Yasuhisa Tamura
 - Associate Prof., Faculty of Science & Engineering, Sophia University Tokyo
 - Research area: Learning Technology
 - CV: <http://goo.gl/oCw2z>
- Position
 - Co-editor, ISO/IEC JTC1/SC36 e-textbook project
 - Fellow, JEPA (Japanese Electronic Publishing Assoc.)
 - Director, JeLA (Japan e-Learning Assoc.)

International Trend of Digital Textbooks



- US
 - IEEE to specify Actionable Data Book
 - IMS: ICE project
 - IDPF+ IMS: EDUPUB
- Europe: CEN eTernity Project from 2012
 - EPUB3 is major candidate
- Japan
 - Computerization Vision of Education: 2011
 - Future School Project (MIC)
 - Learning Innovation Project (MEXT)

Problems



- Many stakeholders
 - Ministry, Local school boards, Teachers, Learners, Publishers, Editors, Service providers ...
- Many pedagogical options
 - Lecture (traditional), Active learning support (individual/collaborative/survey/presentation), Learner adaptation, Digital native learner support ...
- Few consensus about functions among stakeholders

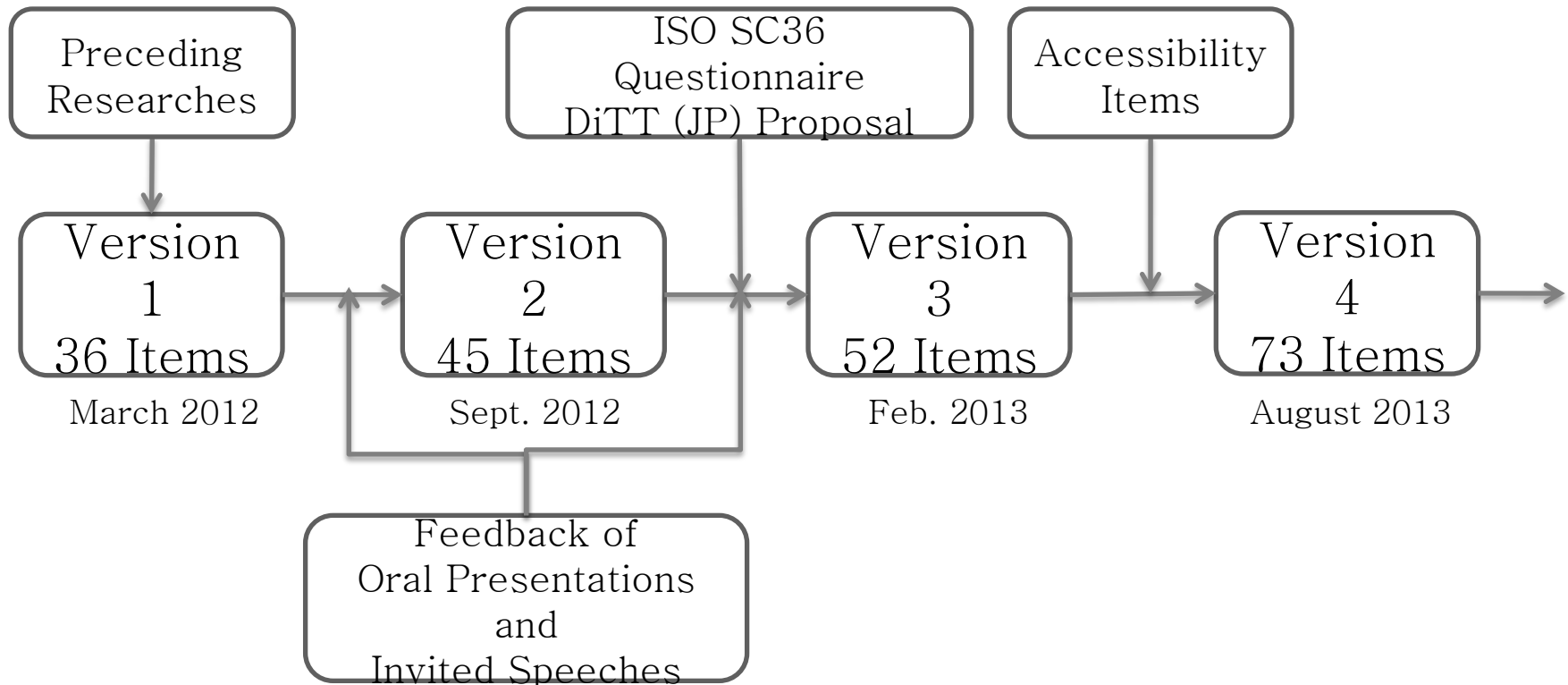


- Clarify common functions required to Digital Textbooks
 - 36 (2012/3) – 45 (2012/9) – 52 (2013/2) – 73 (2013/8)
- Check feasibility of the functions with ePub3 (HTML5+ JavaScript)
 - De Jure standard, good to reduce TOC
 - Some functions beyond ePub3 spec

User requirements of e-textbooks



- User oriented
- Independent from products or specifications





- Preceding Researches
 - Jung, S-M. et al., Leading Future Education: Development of Digital Textbooks in Korea, Proc. 12th UNESCO-APEID International Conference Quality Innovations for Teaching and Learning, 2009
 - Kim, M. et al., An XML-Based Digital Textbook and Its Educational Effectiveness, Proc. Advances in Computer Science and Information Technology, pp. 509–523, 2010
- Proposals
 - DITT, Standard Functions of Digital Textbooks, http://ditt.jp/office/teigenpaper_0316.pdf, 2012
 - ISO/IEC JTC1 SC36, e-Textbook: Questionnaires of Scope and Requirements, http://tamuralabo.info/?page_id=246, 2012

Requirement Database



- Access <http://133.12.192.9/>
- Login as “Guest”, Select “English” from dropdown

Functional Requirements and Related Standard Specifications of e-Textbooks List Japanese

Category Updated ID

Name Serial

Description

Required Function

Data Format

Adaption of Standard Specification http://www.w3.org/TR/WOFF/). Also, EPUB3 allows usage and dynamic download of WOFF fonts."/>

To Do, Note

Standard Specification: Existent ☒ To Be Discussed ☐

6 Functional Categories



1. Accessibility: 17
 - TTS, closed captioning, black-and-white reverse ...
2. Added Information by Learners: 13
 - Learner note, bookmark, link ...
3. Authentication & Copyright: 6
 - LMS authentication, DRM
4. Contents Representation: 14
 - Multimedia, equation ...
5. Learning Support: 19
 - Server transmission, CSCL support ...
6. Related Information: 4
 - Dictionary, reference, Web pages ...

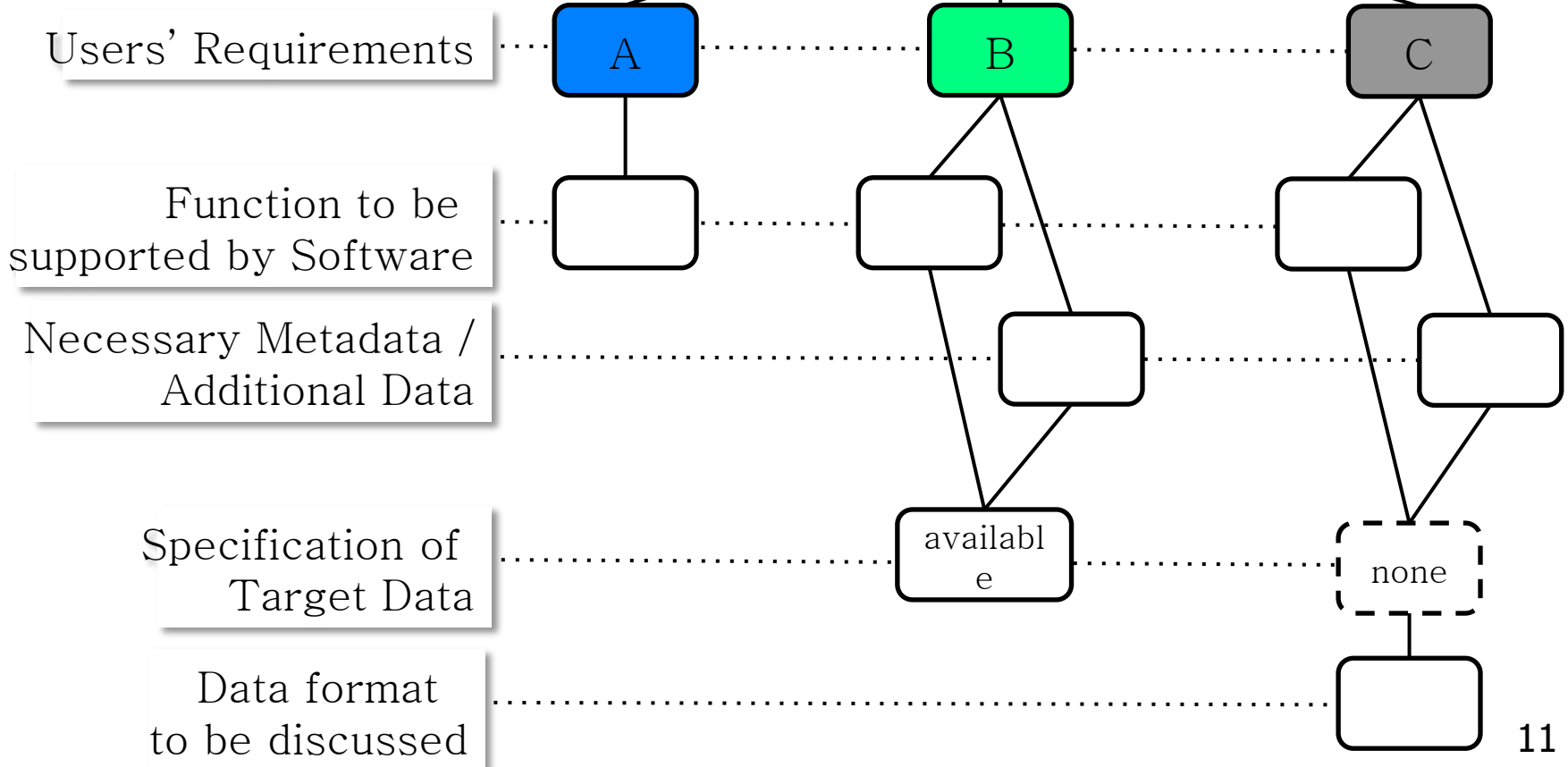
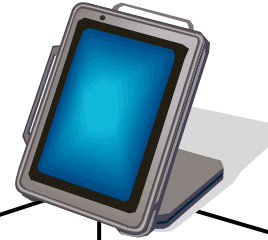
Serial	ID	Name	Exist	TBD	TBD Item
8	ACo8	Metadata of body text for accessibility		X	Braille data format
9	ACo9	Keep layout even expansion of figures, tables or graphs		X	AHL (Advanced Hybrid Layout)
10	AC10	Color configuration for color vision deficiency		X	Color contrast of pictures
15	AC15	Option of all ruby		X	All ruby format
16	AC16	Option of non-ruby		X	Non-ruby format
17	AC17	Double ruby, both-side ruby		X	Double ruby / both-side ruby format
18	Al01	Note to add, modify, delete, and move to body text		X	Learner note data format
19	Al02	Include picture in note		X	Picture data format / linkage from learner note
21	Al04	Search text in notes		X	Learner note data format
23	Al06	Add and delete linkage to references		X	Calling scheme of another application
24	Al07	Bookmark to add, index, delete, or move to body text		X	Bookmark data format
25	Al08	Add and delete underline and highlight		X	Underline / highlight data format
26	Al09	Add and delete linkage to Web		X	Learner note data format (to include Hyperlink)
27	Al10	Add, replay and delete audio memo		X	Learner note data format (to include linkage to audio file)
28	Al11	Text input with speech recognition		X	Learner note data format
29	Al12	Index of added information		X	To follow Al01/Al07/Al08
30	Al13	Time stamp of added information		X	To follow Al01/Al07/Al08
32	AU02	Online authentication		X	Purchase authentication scheme
33	AU03	Offline authentication		X	Purchase authentication scheme offline
34	AU04	Digital right management		X	DRM scheme
35	AU05	Usage restriction in case of copyright violation		X	DRM scheme
42	CR06	Interactive media representation		X	Options of interaction: HTML5? JS?
47	CR11	Equation expression with markup language		X	Equation data format: MathML, Tex, or another?
54	LS04	Sensor data utilization in tablet PC		X	Navigator API of HTML5 should be provided
55	LS05	Link to or call another application		X	Calling scheme of another application
57	LS07	Update of e-Textbook contents		X	Version control scheme?
58	LS08	Notice board		X	Calling scheme of another application?
59	LS09	Discussion board		X	Calling scheme of another application?
60	LS10	Q&A board		X	Calling scheme of another application?
61	LS11	Time table		X	Calling scheme of another application?
63	LS13	Archive of learning achievement and history		X	Data format of learning history
65	LS15	Assist of adaptive and self-regulated learning		X	Data format and necessary function of Javascript?
66	LS16	Material customization by teachers		X	Customization scheme
67	LS17	Organization and management of learner groups		X	Learner group data format
68	LS18	Screen sharing and file exchange		X	Calling scheme of another application
70	RI01	Dictionary, linkage from/to body text		X	Calling and returning scheme of/from another e-book
71	RI02	References books, linkage from/to body text		X	Calling and returning scheme of/from another e-book
72	RI03	Selection of dictionaries and reference books		X	Calling and returning scheme of/from another e-book



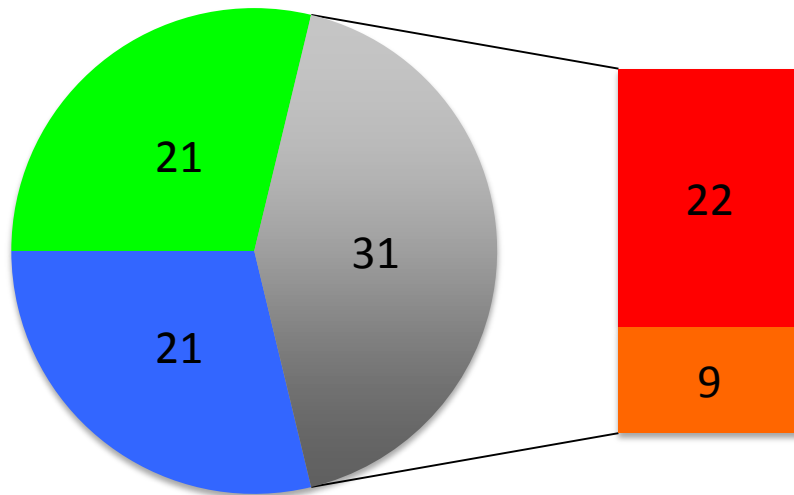
3 Groups According to Necessary Data



Learners'
Digital Textbooks



Classification due to Standards



- Software Function
- Specification Existent
- Specification to be Discussed
- IMS QTI to Expand

- Example Existent Standards
 - W3C WOFF font
 - W3C SMIL
 - W3C TTML
 - IDPF CFI
 - Dublin Core
 - ADL Experience API
- Up-to-date Detail
 - <http://goo.gl/tsZE8f> (Google Drive)



Feasibility of the Functions

- Trial development of ePub3 materials including proposed 52 functions (2013/2 version)
 - 8 functions not yet implemented
- Verified functions and actions on 6 software

ePub Software	Device (OS)	Advantage
iBooks3	iPad (iOS)	• JavaScript
Reader by SONY	Xperia Tablet S (Android)	
Himawari Reader		• JavaScript
Readium	PC (Windows)	• JavaScript
Calibre		• JavaScript
Kindle	Kindle	

Feasibility Check Example on EPUB3: Latitude / Longitude (LS04)



iBooks3:OK

ライブラリ

現在の位置情報を表示

緯度: 35.68185488999998
経度: 139.73297233999995
緯度経度の精度(単位: m): 1414
高度: null
高度の精度(単位: m): null
方角(3GSのみ): null
対地速度: null

この地点に近い住所を表示する(Finds.jp)

この地点に近い住所を表示する(Yahoo)

Radium:OK

現在の位置情報を表示

緯度: 35.6834035
経度: 139.7321436
緯度経度の精度(単位: m): 44
高度: null
高度の精度(単位: m): null
方角(3GSのみ): null
対地速度: null

この地点に近い住所を表示する(Finds.jp)

この地点に近い住所を表示する(Yahoo)

Himawari:

センサ情報

NG

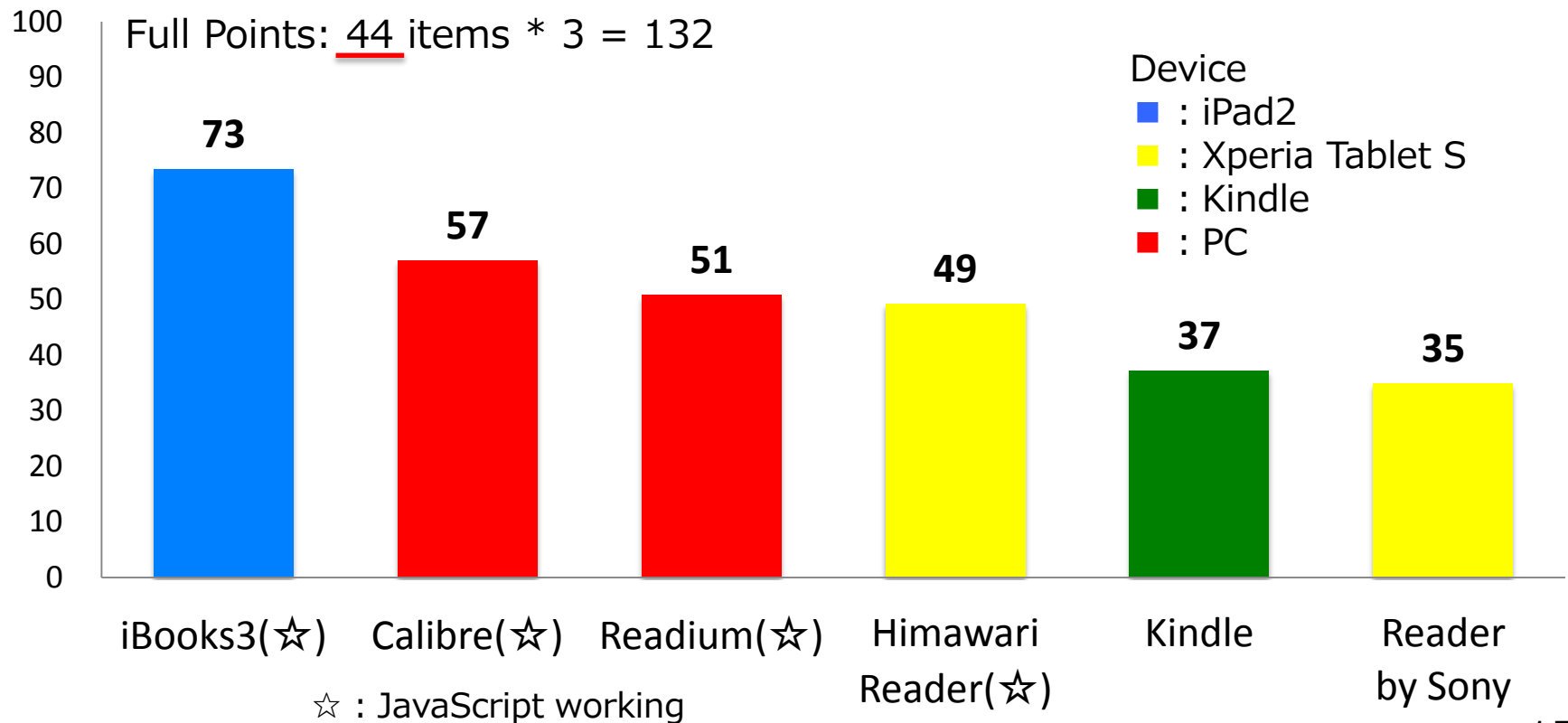
現在の位置情報を表示

lat, lng, accuracy

Evaluation Summary



- No Full-point EPUB software
- Reason: Functional Insufficiency / Performance Lack
- Findings: Both hardware and software should be improve





Thank you

Comments & Questions,
contact ytamura@sophia.ac.jp