

@Science Workshop Summary

27 February 2008, Paris

- Preparing
 - 6 statements
- Reading
 - 4 statements
- Doing
 - 3 statements

Preparing: dealing with notation

- G. Weber: since 1994,
 - how much conceptual progress did we make?
 - are we doing same things over?
- G. Gupta & D. Archambault: notation conversions
 - external wrappers
- C. Strobbe: Open standards & tools
 - OpenOffice vs Office2007
- M. Zacherle: Daisy,
 - the richer the storage format, the more portable it is
 - Save-as-DAISY
- T. Kanahori: alternative input modalities, OCR.....pen-based

What makes a standard succeed?

Reading, exploration support

- N. Soiffer:
 - MathPlayer
- E. Pontelli:
 - Moodle and tools for doing exploratory math
- A. Kashmer:
 - Manipulatives, blocks for exploration
 - Self study – monitoring by computer?
- C. Bernareggi & L. Parasiliti:
 - graphs

Doing

- L. Ricq and C. Chung
 - menu-based calculator for PC and braille editor
- E. Bortolazzi:
 - Content-driven editing/browsing/symbolic manipulation
- K. Miesenberger:
 - Summary in his slides
 - Investigate methodologies strategies

Invasive approach

Preparing

G. Weber: Early Developments for Access to Maths

Multimodal systems review

- Coherence (contextual info) . I/O modality tracks focus

- Exploration (spatial/hierarchical): matrices fractions

- support metaphors : verbalize names, braille symbols & rules or non verbal sound

- Learnability: apply Braille & speech

- Adaptability: allow extension

No encoding (6,7,8 dots, Latex, speech) currently supports all these features

EU-TIDE (1994-1997)

SGML editor Grif with WYSIWYG + WinDOTS screenreader integrates GUI, magnification, Braille I/O, speech input representation was SGML

speech output: prosody for DE/EN, 16 pitch, pauses

problem: how to navigate the expression? 150 mnemonics (show, next+maths terms: fraction, ...)

dynamic Braille input: collapse/expand terms

SGML was the key supporting all of the above

-- lack of acceptance of editing maths

how much does a markup language control you in writing maths?

C. Strobbe: Access to Mathematics in OpenDocument Format and OpenOffice.org

Accessibility Issues:

writer: loses alt text for formula obj between saves
also for img

not output alt attr. on img for formulas if not avail.

Archive contains xml files

formulas stored as object referred from xml: binary however it corresponds to mathml

exports: to MML1.01! But not from save or export

 must unzip ODF to recover, select formula, double click etc ---

export as XHTML is 1.0 Strict no XHTML+MathML

 formulas not exported, images exported with incomplete path

export as PDF

 JAWS will read alt text if avail. Otherwise reads chars in formula

M. Zacherie: Digital Multimodal Mathematics Books – New standards, Possibilities

Mathematics is the bridge to occupational success.

What about emath. Lit from publishers p.o.v?

TODAY: Storage=Presentation: what is stored is presented: reuse impossible, blind have to learn multiple math notations, communication with sighted is difficult (sighted must know Marburg code)

IDEAL: single-storage=MathML -> mult. Presentations (latex, ams, marburg, etc)

STORAGE != PRES

Use tools and produce DAISY/NISO 2005 with MML ext. (1 year old)

Daisy-players: mathml-unaware, basic mml player, adv. mml player will allow reader to adjust how math is read

Daisy-tools: DAISY pipeline, save-as-daisy from MS, tools on daisy.org: but none of the above does MML

NEED

- examples of docs with maths
 - DAISY MML guidelines
 - content validator
 - training material
- production tools

G. Gupta: Accessibility through Notation Translation

TransBraille (nemeth->print): from scanned Braille to pdf via latex.

Math accessibility as notation translation among Braille <--> print

Problems :

- contracted Braille for mixed text

- Nemeth code

- Meaning is context-dependent (compiler tech does not work, use prolog)

- Notation arbitrarily mixed: text&math, disambiguate by heuristics

- Input not avail. in eformat: optical recognizer=> error sources multiply

T. Kanahori: Infty system

Processing Scientific Documents aka

- Recognizing (InftyReader ->IML)
- Authoring (InftyEditor ->IML, MMML, Latex)
- Reading Aloud (ChattyInfty)
- Translate to Braille (InftyBraille)

Systems can be combined, eg, ∞Reader+∞Editor+∞Braille+UMCL

Next: figures

D. Archambault: Universal Maths Conversion Library

- 56 different Braille codes just for maths
- Tools exist but for specific codes (eg labrador Latex->Marburg) – same with projects
- GOAL: generic framework to embed converters to a single API
- It's an IGUMA effort:
 - interoperability of all our converters
 - Usable in 3rd-party apps and progr.language
 - Based on common language- Canonical MML
- UMCL
 - input : (Latex, Mar) X_i -> MML
 - output: MML-> X_i (Can-MML, FR, I, Mar, British, Nemeth)
 - Main Module API: fct such as TranslateBraille, Transcribe, Exist_Braille_Table

Reading

N. Soiffer: MathPlayer, Math Accessibility using Mainstream Software

- Target:
 - Blind: speech, navigation, Braille
 - Low Vision: Magnification, Foreground/background, Speech Navigation
 - Learning Disabilities: speech synch navigation
- Important issues: flexibility, flexibility, flexibility
 - People want to use known: Word+MathType, X+MathPlayer
 - Speech must be tailored to listener (open/closed vs left/right paren): do we have SMIL notation for MML CDs?
 - Low math Braille literacy
 - Navigation: (principle: keep it simple stupid)
 - Synch highlighting (what level?)

E. Pontelli:

Accessible elearning environments

- New project at Mexico State U
 - Explore issues of learning&teaching maths for students with learning disabilities:
 - Exploration of maths
 - Accessibility of VLE
 - Build on exist. Tech.
 - Principles:
 - Active learner: task-oriented
 - Analytic & explorative view of Maths
 - OOXML format
 - Multimodal presentation (aural, haptic)
 - VLE activities: term-paper writing, question answering, knowledge acquisition -> how to support cognitive tasks? Aural+ontology-based navigation, social bkmarking

A. Karshmer: Back to basics, teaching math to the visually impaired using manipulative objects

- Paucity of
 - math teachers for K-12, approx 90% not trained
 - special ed teachers, few with Braille, fewer with math-Braille
- Mainstreaming: vi-students introduced in normal curriculum: low success
- MathGenie uses multi-pronged tech-based approach: for students/teachers/parents
- AutOMathic Block system:
 - Available Braille Math Blocks are manipulatives but require expert supervision
 - GOAL: combine braille blocks with CA supervision
 - Self-study
 - Future: use CAS to generate feedback (domain solver)

C. Bernareggi, L. Parasiliti: A multimodal interactive system to create & explore graphs structures

- Support graph perception, manipulation, reasoning and communication for VI/B
 - (audio) tactile, audio-haptic
- Virtual space is a 3d discrete grid

Doing

L. Ricq, C. Chung: ReadMaths

- Menu-based mathematics editor/calculator for laptops and PC
- Also for braille displays but no calculator

E. Bortolazzi: the LAMBDA system

- Now commercial
- Editor – allows reading, writing, manipulating
- Linear notation with block structure
 - Select, next
 - Compensative functions to overcome linearization blowup: level display
- Vocal synthesis or Braille display
- Content-driven: how will one be able to read notation based documents?
- Future: add OCR, add CAS, add graphs

K. Miesenberger: Doing mathematics

- Challenges:
 - Access
 - Navigation (collapse7expand, jump, scan)
 - Presentation/Communication/Co-operation (notation transformation, synchronize)
 - Doing (beyond authoring): analyze solving methodologies
- New trend: INKML (a step backward?)

