Emerging Technology Tools for Qualitative Data Collection

Julie Kimbler, Diana Moore, Manon Maitland Schladen, Bruce Sowers, and Marti Snyder

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Background

• Existing and emerging technology tools enable the collection of multimodal data (e.g., textual, visual, aural, spatial, and temporal).

• Given many of these tools were originally developed for other purposes, there is still much to learn about how they can be used in qualitative research (Beddall-Hill, Jabbar, & Al Shehri, 2011; Onwuegbuzie, Leech, & Collins, 2010)


Qualitative Data Collection

• **Four primary methods** (Marshall & Rossman, 2011, p. 137)
  - Participating in the setting
  - Observing directly
  - Interviewing in depth
  - Analyzing documents and material culture

Purpose

Describe the uses, advantages, and drawbacks of emerging technology tools used for collecting data within the context of qualitative research in instructional design and technology (IDT)
IDT Research Group

- Julie Kimbler
  - A Comparison of Interview Recording and Transcription Applications
- Diana Moore
  - Use of Social Mobile Devices (SMDs) for Preliminary Research
- Manon Maitland Schladen
  - Using Morae® to Capture Learner Interactions with Virtual Patient (VP) Scenarios
- Bruce Sowers
  - Using Skype to Collect Verbal and Non-Verbal Interview Data
Your Name:

**Now:** One thing I know about using technology for data collection is . . .

**At the end of this session:** One thing I learned about using technology for data collection is . . .
Research Focus

• A blended learning professional development program that leverages a knowledge management (KM) model
  • Facilitation of just-in-time training and support for adjunct faculty who teach undergraduate students in a face-to-face environment
  • Aid instructors in becoming more efficacious in their classrooms
• Design based upon SECI KM model
Software Applications

Dragon NaturallySpeaking
- Developed by Nuance as speech recognition software that uses voice to create and edit documents or capture thoughts and ideas and transcribe them to instantly visible text

QuickVoice
- Developed by nFinity Inc. to record interviews, meetings, voice memos, dictation, or lectures

Dictadroid
- Developed by SoftEight to record interviews, voice dictations, or other audio for sharing
Evaluation Criteria

- Platform
- Audio formats
- Ease of use
- File transfer/sharing
- Sound quality
- Speech-to-text accuracy
- Additional features and functions
- Cost
## Comparison of Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Dragon NaturallySpeaking</th>
<th>QuickVoice Pro</th>
<th>Dictadroid Lite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Platform</strong>*</td>
<td>PC, Mac, <strong>iPad</strong>, iPod, iPhone, Android</td>
<td>PC, Mac, <strong>iPad</strong>, iPod, iPhone</td>
<td><strong>Android</strong></td>
</tr>
<tr>
<td><strong>Audio Formats</strong></td>
<td>Varies by version; .wav is an input available across all platforms, but not versions</td>
<td>.caf, wav</td>
<td>.wav</td>
</tr>
<tr>
<td><strong>Usability</strong></td>
<td>Medium</td>
<td>Easy</td>
<td>Easy</td>
</tr>
<tr>
<td><strong>File Transfer/Sharing</strong></td>
<td>Not designed to share audio; text sharing via email and word processing documents</td>
<td>Audio sharing via email as a .caf file; text sharing via email in pro version</td>
<td>Audio sharing via Email, Google Drive, MMS, FTP/FTPS, or Dropbox</td>
</tr>
<tr>
<td><strong>Sound Quality</strong></td>
<td>Fair</td>
<td>Good</td>
<td>Fair</td>
</tr>
</tbody>
</table>

*Platform version evaluated is in bold*
## Comparison of Applications (cont.)

<table>
<thead>
<tr>
<th>Application</th>
<th>Dragon NaturallySpeaking</th>
<th>QuickVoice Pro</th>
<th>Dictadroid Lite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speech-to-Text Accuracy</strong></td>
<td>99% accuracy</td>
<td>Undetermined – inconsistent</td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Additional Features and Functions</strong></td>
<td>- Works with seamlessly with other applications such as email applications and word processing programs</td>
<td>- None</td>
<td>- Automatic voice activity detection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Ability to insert into recording</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Associate photo with recording</td>
</tr>
</tbody>
</table>
Next Steps

• Continued review of audio recording and transcription software and tools available

• Final selection of a audio recording software or tool

• Final decision on the use of an automated transcription tool or contracting a transcription service


Diana Moore
Use of Social Mobile Devices (SMDs) for Preliminary Research
Research Focus

• **Phase: Coursework**

• **Research interests:**
  
  – Fostering a community of interest through mobile technologies
  
  – The relationship between social presence, student satisfaction and retention in online programs
What are Social Mobile Devices?

SMDs (e.g., smartphones and tablet computers) are commonly used in research; however, an understanding of how they are used by individual researchers as qualitative data collection devices is not as well known (Beddall-Hill, Jabbar, & Al Shehri, 2011). The integration of following apps are being used in this instance to support data collection and storage during doctoral course work.
Apps

- Safari
- Mendeley
- PDFExpert/ AnnotatePDF
- Dropbox
- Evernote
Use

- **Safari**
  - Preliminary academic research in the literature
  - Accessing the databases

- **Mendeley**
  - Managing references and quick review of pdfs

- **PDFExpert / iAnnotatePDF**
  - Reading and annotating pdfs

- **Dropbox**
  - Backup of pdfs
  - “Watch folder” – places new research directly into Mendeley
  - Quick access via PDFExpert or iAnnotatePDF
Use

• Evernote
  • Memoing, journaling, note-taking
  • Capturing textual, aural, visual, and temporal data
# Advantages and Drawbacks

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile and compact size support any time and any place access</td>
<td>Technology limits with user-interface</td>
</tr>
<tr>
<td>All-in-one (integrated functionality)</td>
<td>WiFi or 3G/4G dependence</td>
</tr>
<tr>
<td>Automatic sync across devices</td>
<td>Ethical issues and confidentiality (stored on server not owned by institution)</td>
</tr>
<tr>
<td>Multi-modal (used to collect different types of data – textual, aural, visual)</td>
<td>Perceptions (i.e., academics to not yet perceive SMDs as a valid/serious research tool)</td>
</tr>
<tr>
<td>Cloud storage (e.g., Dropbox, Evernote)</td>
<td></td>
</tr>
<tr>
<td>Password protected, encrypted, remote deletion</td>
<td></td>
</tr>
</tbody>
</table>

![Images of various technological devices and illustrations related to data collection and analysis.](image-url)
Reference

Manon Maitland Schladen
Use of Social Mobile Devices (SMDs) for Preliminary Research

Morae®
Toward an Instructional Design Theory of Virtual Patients

• Problem –
  – Medical trainees’ experience with many and varied patient cases is increasingly limited (Graber, 2007).
  – Virtual patients (VPs), online interactive patient scenarios, may help bridge the gap (Cook & Triola, 2009).
  – There exists no instructional design theory to guide virtual patient development and use.

• Goal –
  – Develop an instructional design theory of VPs in clinical education

• Method – Formative research
  – A type of case-based design research (Reigeluth & An, 2009)
  – Elaborates of an existing theory, Goal-based Scenarios (Schank, Berman, & Macpherson, 1999)
  – Uses existing VP instance as point of departure for theory-building
    • VP designed to teach electronic fetal monitoring data interpretation to clinical trainees in Labor and Delivery

• Process –
  – EXAMINE the extent to which elements of GBS are present in the EFM VP, in scenarios created using both game and branching logic technologies, and what features of the EFM VP are not accounted for in GBS;
  – ANALYZE what aspects of the EFM VP worked and didn’t work with learners;
  – PROPOSE refinements to GBS to extend its usefulness for design of instruction in intrapartum EFM data interpretation.
Tool for Data Collection: Morae®

- **Morae®**
  - Well-known in the commercial usability world
  - Novel in instructional design formative research
  - Optimized for gathering data about how a user interacts with an online product
  - Three components
    - **Recorder** – captures user navigation, “think aloud” comments, facial expressions
    - **Observer** – allows remote, real-time observation and coding of user interaction
    - **Manager** – Integrates recorder sessions, provides same tools as observer for after-the-fact analysis of interaction

- **Key to usefulness in virtual patient research**
  - “Tasks” reframed as “Critical Actions”
Plan of Use for Morae®

- Mobile, laptop-based station
  - Morae® software, on-board camera, headphones with mic, high-speed wireless

- Deliver, capture, first-cut analysis of hour-long learner interaction with learning scenarios: navigation path, “think aloud” verbalizations, changing facial expression
  - EFM interpretation skills pre-test
  - Interaction with EFM VP learning scenarios
  - Semi-structured debriefing interview

- Added trustworthiness element: also captures investigator interactions with learner
Short Tour of Morae® Manager

**Tasks/Critical Actions**
- Pre-defined & Dynamic

**Learner’s Activity**
- PIP, Learner

**Timeline**
- Markers identify, annotate, critical actions
Learner Activity Close-up: finding the fetal heart rate baseline
Close-up of Timeline and Markers
Close-up of Critical Actions List with Markers, and Annotations
Details - 6A Strip Baseline

Name:
6A Strip Baseline

Text Notes:
Want to not have to click through all the numbers to get to 140

Score:
Completed with ease

Task Duration:
0:00:13.01

Recording:
EFM3

Start Point:
0:00:34.12

Detail View of Critical Action Listing
Learner Segment

Hovers almost solicitously with mouse pointer
Advantages and Drawbacks

Advantages

• Provides a single platform for capture and working analysis of all data
• Accommodates on-the-fly modification of codes
• Accommodates import of video captured outside the system
• Key is translation of usability concept of “task” to “critical actions” in navigating a virtual patient scenario

Drawbacks

• Expensive: ~$1200 for educational edition
• Does not readily accommodate analysis of repeated actions in a single session (requires work-around)
• Does not readily accommodate import of audio only files (requires work-around)
Or as a single slide maybe?
Next Steps

• Currently in the “sandbox” stage, analyzing 5 pilot learner sessions captured in Morae®

• Systematize data reduction and display procedures to facilitate drawing conclusions (Berkowitz, 1997)
References


Research Focus

• Examine how expert instructional designers in higher education design technology-enhanced instruction.

• Determine whether the use of schemata, gambits, and precedent (Lawson, 2004) can be applied to effectively categorize these design decisions.

• Identify what gaps exist between instructional design theory and practice with regard to the design of technology-enhanced instruction in higher education.
Tools

Skype and Evaer Skype video recorder

- Popular Voice over Internet Protocol (VoIP) technology
- Uses high-speed Internet connectivity
- Provides both audio and video capabilities
- Integrates with recording applications
- Popular voice and video recorder for Skype
Use

- Conduct video interviews with expert instructional designers regarding design decision-making
- Use collected qualitative data for an Interpretative Phenomenological Analysis
Advantages

• Expense
• Availability and Ubiquity
• Usability
• Immediacy and Social Cues
• Richness of Content
Drawbacks

• Bandwidth Requirements
• Hardware Requirements
• Technical Difficulties
• Social Cues and Self-Consciousness
Next Steps – Further Research

• Video Transcription
• Coding and Annotation of non-verbal behavior
• Data Analysis
Bibliography


How will the “10\textsuperscript{th} moment” be defined?

- Onwuegbuzie, Leech, and Collins (2010) propose a tenth historical moment* in the history of qualitative research where the 10\textsuperscript{th} moment (from 2008 - ?) represents “utilization of innovative approaches to reflexivity and the latest technology and computer-mediated communication” (p. 698).

*The first nine moments were identified by Denzin and Lincoln (2005) in The Discipline and Practice of Qualitative Research
Time for Our Drawing

Your Name:

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At the end of this session: One thing I learned about using technology for data collection is . . .
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