

Emerging Technology Tools for Qualitative Data Collection

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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)

Beddall-Hill, N.L., Jabbar, A., & Al Shehri, S. (2011). Social mobile devices as tools for qualitative research in education: iPhones and iPads in ethnography, interviewing, and design-based research. *Journal of the Research Center of Educational Technology (RCET)*, 7(1), 67-89.

Onwuegbuzie, A.J., Leech, N.L., Collins, K.M.T. (2010). Innovative data collection strategies in qualitative research. *The Qualitative Report*, 15(3), 696-726.



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



Drawing

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 . . .



Julie Kimbler

A Comparison of Interview Recording and Transcription Applications



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

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

*Platform version evaluated is in bold



Comparison of Applications (cont.)

Application	Dragon NaturallySpeaking	QuickVoice Pro	Dictadroid Lite
Speech-to-Text Accuracy	99% accuracy	Undetermined – inconsistent	Not applicable
Additional Features and Functions	- Works with seamlessly with other applications such as email applications and word processing programs	- None	- Automatic voice activity detection - Ability to insert into recording - Associate photo with recording
Cost	Varies by Platform, Version, and Specialty; \$75 and higher	Basic – Free Pro – \$2.99	Lite Vers. – Free Full Vers. - \$24.99



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



Bibliography

- Creswell, J. W. (2008). *Educational Research : Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, N.J.: Pearson/Merrill Prentice Hall.
- Kim, K., Bonk, C.J., & Oh, E. (2008). Present and future state of blended learning in workplace learning settings. *Performance Improvement*, 47(8). 5-16.
- Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, ba, and leadership: A unified model of dynamic knowledge creation. *Long Range Planning*, 33, 5-34.
- Onwuegbuzie, A.J., Leach, NJ, & Collins, K.M.T. (2011). Innovative qualitative data collection techniques for conducting literature reviews/research syntheses. *The Sage handbook of innovation in social research methods*, 182-204.
- Richey, R.C. & Klein, J.D. (2007). *Design and Development Research*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Yin, R. K. (2009). *Case study research: Design and method* (4th Ed.). CA: Sage Publications.



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

Advantages	Drawbacks
<ul style="list-style-type: none">• Mobile and compact size support any time and any place access• All-in-one (integrated functionality)• Automatic sync across devices• Multi-modal (used to collect different types of data – textual, aural, visual)• Cloud storage (e.g., Dropbox, Evernote)• Password protected, encrypted, remote deletion	<ul style="list-style-type: none">• Technology limits with user-interface• WiFi or 3G/4G dependence• Ethical issues and confidentiality (stored on server not owned by institution)• Perceptions (i.e., academics to not yet perceive SMDs as a valid/serious research tool)



Reference

Beddall-Hill, N.L., Jabbar, A., & Al Shehri, S. (2011). Social mobile devices as tools for qualitative research in education: iPhones and iPads in ethnography, interviewing, and design-based research. *Journal of the Research Center of Educational Technology (RCET)*, 7(1), 67-89.



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

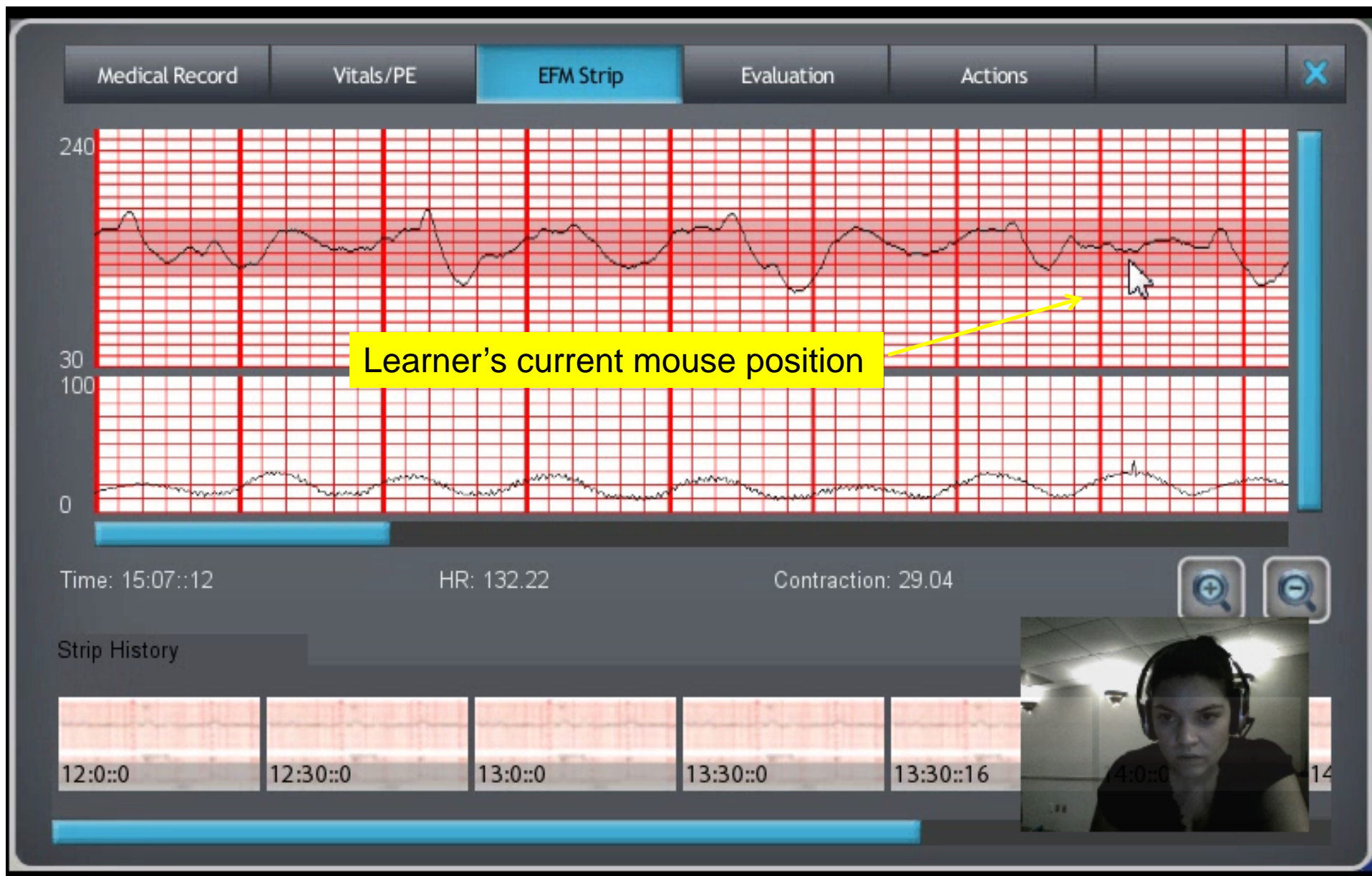


Short Tour of Morae[®] Manager

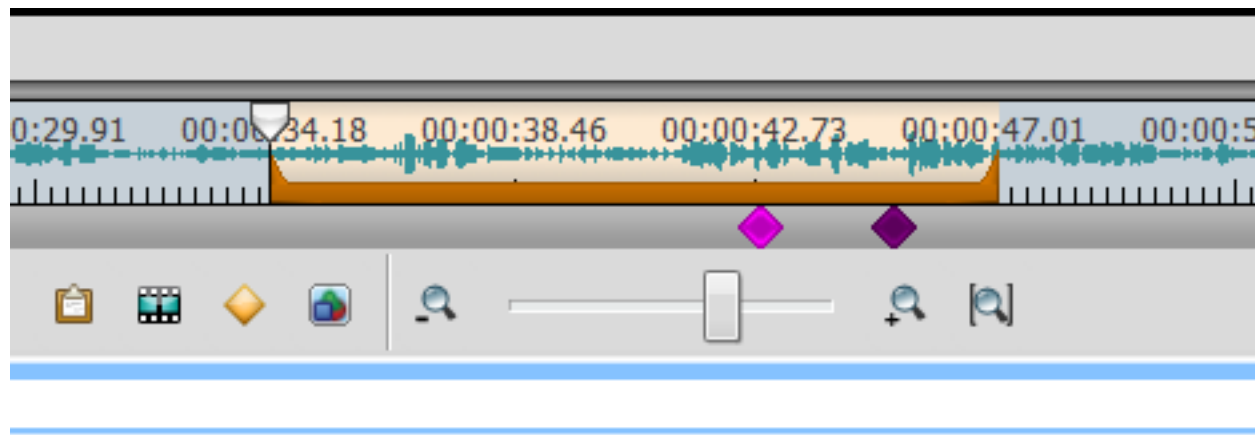
The screenshot displays the Morae Manager software interface. On the left, a task list under 'Analyze - Project' includes items like '6A Strip Baseline', '6A Strip Variability', and '6A Strip Accelerations'. A yellow callout box labeled 'Tasks/Critical Actions Pre-defined & Dynamic' points to this list. The main window shows a 'Recording - EFM3' session with an EFM strip graph. A yellow callout box labeled 'Learner's Activity' points to the graph. Below the graph is a 'Strip History' section with a video feed of a learner, labeled 'PIP, Learner'. At the bottom, a timeline shows markers for various time points, with a yellow callout box labeled 'Timeline -- Markers identify, annotate, critical actions' pointing to it. The interface also includes a menu bar, a toolbar, and a status bar at the bottom.

Timeline -- Markers identify, annotate, critical actions

Learner Activity Close-up : finding the fetal heart rate baseline



Close-up of Timeline and Markers



Analyze - Project

- 6A Strip Baseline
- 6A Strip Variability
- 6A Strip Accelerations
- 6A Strip Decelerations
- 6A Strip Contractions
- 6A Strip Category
- 6A Submit
- 6A Non-Critical Check EMR
- 6A Order Terbutaline
- 6A Stop Oxytocin
- 6A Non-Critical Check EMR 2
- 6A Non-Critical Give O2
- 6A Non-Critical Turn Patient
- 6A Non-Critical Check Cervix
- 6B Look at Strip
- 6B Strip Baseline
- 6B Strip Variability
- 6B Strip Accelerations
- 6B Strip Decelerations
- 6B Strip Contractions
- 6B Strip Category
- 6B Submit
- 6B2 Look at Strip
- 6A2 Strip Baseline
- Video Clips

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

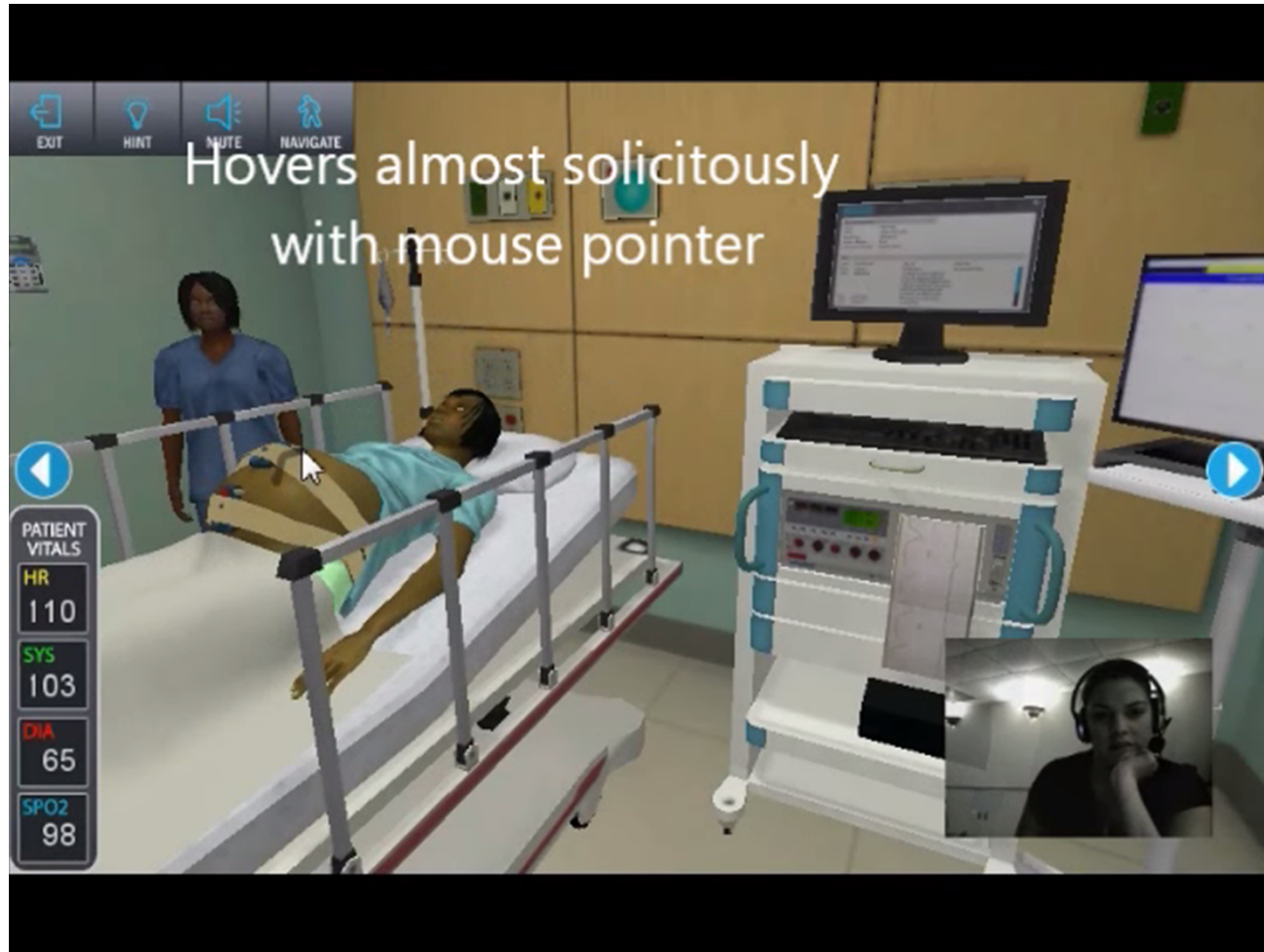
Task Duration:
0:00:13.01

Recording:
EFM3

Start Point:
0:00:34.12

Detail View of
Critical Action
Listing

Learner Segment



Advantages and Drawbacks ^{mms5}

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)

Slide 33

mms5

Or as a single slide maybe?

manon, 12/9/2012

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

- Berkowitz, S. (1997). Analyzing qualitative data. In J. Frechtling & L. S. Westat (Eds.), *User-friendly handbook for mixed methods evaluations*. Washington, DC: Directorate for Education and Human Resources, National Science Foundation. Retrieved from http://www.nsf.gov/pubs/1997/nsf97153/chap_4.htm.
- Cook, D. A., & Triola, M. M. (2009). Virtual patients: A critical literature review and proposed next steps. *Medical Education*, 43, 303-311. doi: 10.1111/j.1365-2923.2008.03286.x
- Graber, M. L. (2007). Perspective. *Web M&M: Morbidity & mortality rounds on the web*
- Reigeluth, C. M., & An, Y.-J. (2009). Theory building In C. M. Reigeluth & A. A. Carr-Chellman (Eds.), *Instructional-design theories and models, Volume III: Building a common knowledge base* (pp. 365-386). New York: Routledge.
- Schank, R. C., Berman, T. R., & Macpherson, K. A. (1999). Learning by doing. In C. M. Reigeluth (Ed.), *Instructional-design theories and models, Volume II: A new paradigm of instructional theory* (pp. 161-181). Mahwah, NJ: Lawrence Erlbaum.



Bruce Sowers

Using Skype to Collect Verbal and Non-Verbal Interview Data



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 Ever 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

- Abrilian, S., Devillers, L., & Martin, J.C. (2006). *Annotation of emotions in real-life video interviews: Variability between coders*. Paper presented at the 5th Int. Conf. on Language Resources and Evaluation (LREC 2006), Genoa, Italy.
- Bertrand, C., & Bourdeau, L. (2010). *Research Interviews by Skype: A New Data Collection Method*. Paper presented at the Proceedings of the 9th European Conference on Research Methodology for Business and Management Studies.
- Creswell, J. W. (2008). *Educational Research : Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, N.J.: Pearson/Merrill Prentice Hall.
- Cross, N. (2011). *Design thinking: Understanding how designers think and work*. London: Berg Publishers.
- Devers, K. J., & Frankel, R. M. (2000). Study design in qualitative research-2: Sampling and data collection strategies. *Education for Health*, 13(2), 263-271.
- Hay-Gibson, N.V. (2009). Interviews via VoIP: Benefits and Disadvantages within a PhD study of SMEs. *Library and Information Research*, 33(105), 39-50.
- Lawson, Bryan. (2004). Schemata, gambits and precedent: Some factors in design expertise. *Design Studies*, 25(5), 443-457. doi: 10.1016/j-destud.2004.05.001



Bibliography (cont.)

- Le Maistre, C. (1998). What is an expert instructional designer? Evidence of expert performance during formative evaluation. *Educational Technology, Research and Development*, 46(3), 21-21.
- Novick, G. (2008). Is there a bias against telephone interviews in qualitative research? *Research in Nursing & Health*, 31(4), 391-398.
- Onwuegbuzie, A.J., Leach, N.J., & Collins, K.M.T. (2011). Innovative qualitative data collection techniques for conducting literature reviews/research syntheses. *The Sage handbook of innovation in social research methods*, 182-204.
- Ryobe, I. (2008). *The effects of Skype-based video chats with volunteer Filipino English teachers (II): Discovering the superiority of video chat*. Paper presented at the Proceedings of the WorldCALL 2008 Conference: CALL bridges the world.
- Saumure, Kristie and Lisa Given. "Using skype as a research tool: Lessons learned from qualitative interviews with distance students in a teacher librarianship Program." Retrieved from http://lrsv.umd.edu/abstracts/Saumure_Given.pdf on 2012 December 10 @ 20:25 GMT.
- Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Los Angeles, CA: Sage.



How will the “10th moment” be defined?

- Onwuegbuzie, Leech, and Collins (2010) propose a tenth historical moment* in the history of qualitative research where the 10th 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:

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 . . .



Thank You!

Emerging Technology Tools for Qualitative Data Collection

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