



# The software of your dreams

expectations and realities  
in the use of technology  
in music research

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# Abstract

Humans have been described as 'informavores' (Miller 1983). An important aspect of human culture is the ability to capture, process, preserve and disseminate information, and many technologies have been developed to support this ability. Music researchers of all periods have creatively adapted these technologies to their own ends. Today's computer technology provides no exception. Musicologists habitually use internet search, word processing, music printing programs and social media in their daily work. This is not to say that they accept all technology without question. Doubts may emerge and core disciplinary values appear to be at stake, especially in relation to software and resources that might assume a central role in the research workflow.

We study such issues surrounding technology adoption in our project "What do musicologists do all day". Our first study, based on a survey with 600+ respondents, showed that 'access' to online information is seen as the most important benefit of technology (Inskip and Wiering 2015). Yet even this clear benefit is surrounded by an uncomfortable discourse about depth of analysis, selectivity and quality of resources, bias of algorithms and sustainability.

The next step in our research is to acquire in-depth understanding of how individual researchers deal with such unease in their own particular situation. For this we conducted a series of 14 interviews, each starting from the question: 'What would the software of your dreams do for you'. This question was selected in order not only to focus upon the practicalities of daily work, but also to imagine an ideal situation, possibly even how that ideal might come into being. We will present a discussion of the outcomes of the analysis of these interviews, and indicate how these may contribute to the design of new systems that minimally interfere with the disciplinary practices and values of music research.



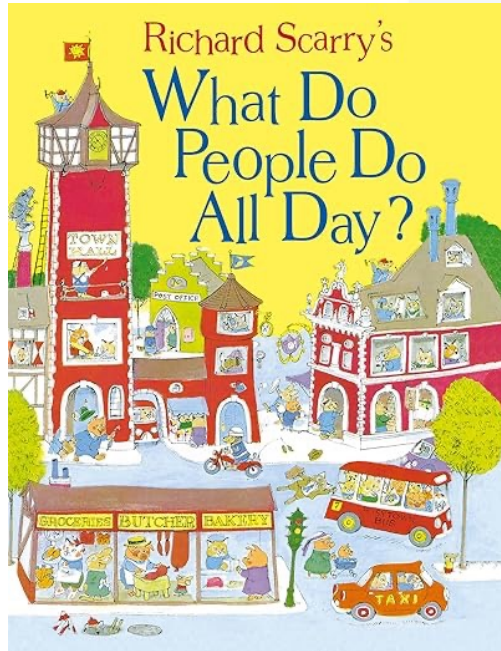
# Overview

- What do musicologists do all day?
- interviews
  - 4 types of dreams
- conclusions and implications



# What Do Musicologists Do All Day?

<https://www.amazon.de/What-People-All-Day-Scarry/dp/0008147825>



Joint work with Charles Inskip,  
University College London

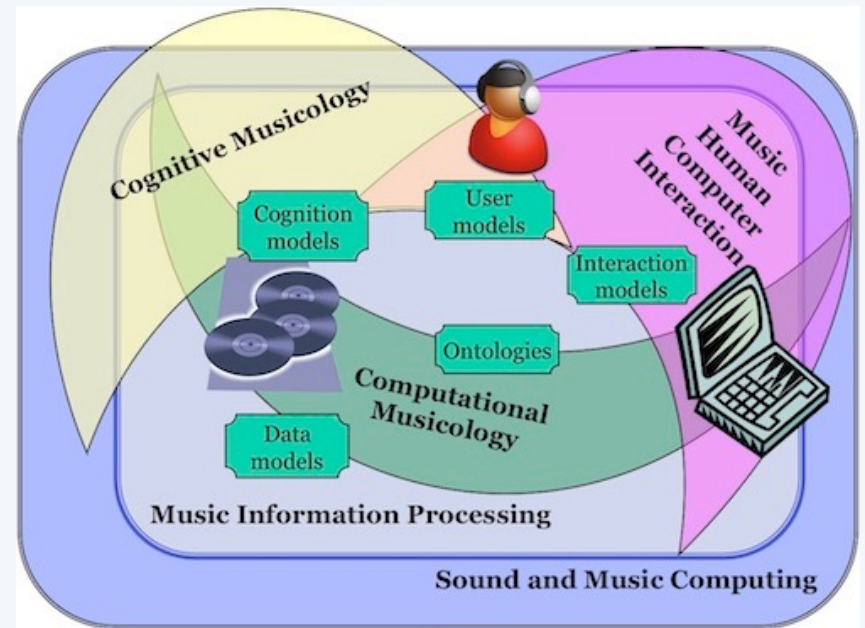
investigates technology adoption in music research

- experiences with technology
- attitudes towards technology
- design guidelines: *Musicology-centred design*



# Motivation: The Gap

- 50+ years of computing in musicology
  - data creation
  - software development
- since 2000, very substantial contribution from Music Information Retrieval
  - [www.ismir.net](http://www.ismir.net)
  - 'supporting music research' often part of motivation
- mismatch between
  - creation of resources and tools
  - uptake in mainstream music research



<http://compmusic.upf.edu/node/26>



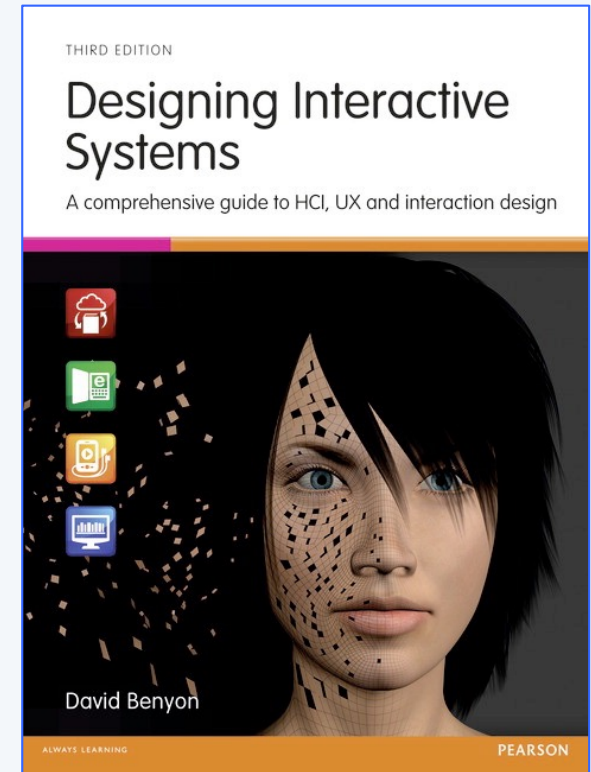
# Explaining the gap

- technophobia is not the main reason
  - historically, strong technological undercurrent in music research
  - enthusiasm for the digital at IAML/IMS 2015
- similar problems exist in other humanities
- and in society at large
  
- very often, it can be demonstrated that there is not a good fit between (work) processes and (professional) values on the one hand and technology on the other



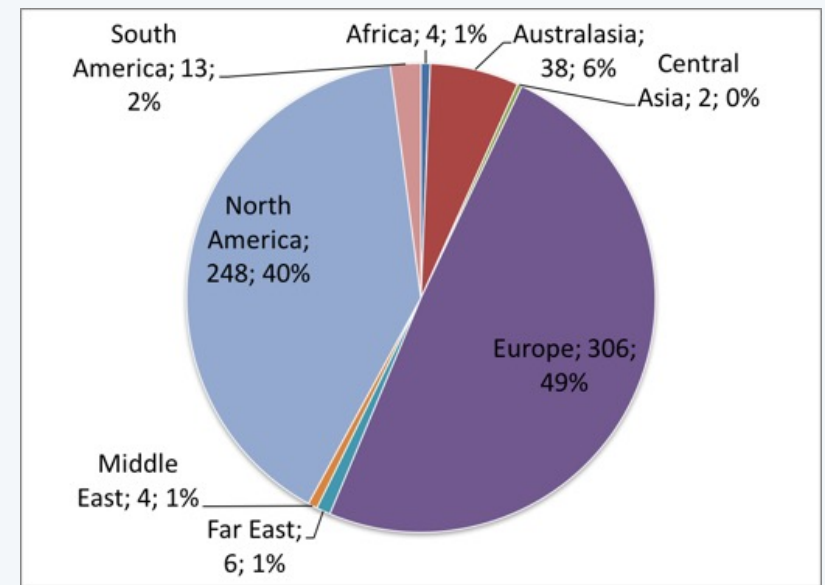
# There is a way out

- Human-centred design (HCD)
  - design of **high-quality** interactive systems, products and services that **fit with people** and their **way of living** (David Benyon 2013)
- HCD-approach starts from the human problem, typically applying
  - **ethnographical methods**
  - **co-design**
- creating technology is the *last step*
- *Musicology-centred design = HCD + music research*



# WDMDAD questionnaire (2015)

- what we asked (online):
  - basic demographics
  - specialism and research topic
  - stories about experiences with technologies
- what we got: 621 responses
  - generally both positive and critical about technology



location

## IN THEIR OWN WORDS: USING TEXT ANALYSIS TO IDENTIFY MUSICOLOGISTS' ATTITUDES TOWARDS TECHNOLOGY

Charles Inskip

Frans Wiering

[http://ismir2015.uma.es/articles/171\\_Paper.pdf](http://ismir2015.uma.es/articles/171_Paper.pdf)



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# Benefits of using technology

benefit	occurence
Access to primary and secondary sources	232
Speed, save time	116
Communication	109
Searchability, findability, discoverability	59
Large datasets can be analysed	51



14



19



32



# Risks and limitations

- research
  - uniformity
  - superficiality
  - sustainability
- resources
  - selective digitization
  - quality issues
  - materiality difficult to assess
- software
  - technical limitations
  - search functionality insufficient
  - learning curve

*technology  
puzzles as much  
as it empowers*



# Interviews

- in-depth understanding of individual situations
- opening question
  - what would the software of your dreams do for you?
- recorded and transcribed
- qualitative analysis—exploring variety



# Participants and specialisms

## 15 participants

- 11 at IAML-IMS 2015
- 3 at MedRen 2015
- 1 online (notes only)

## only partial coverage of discipline

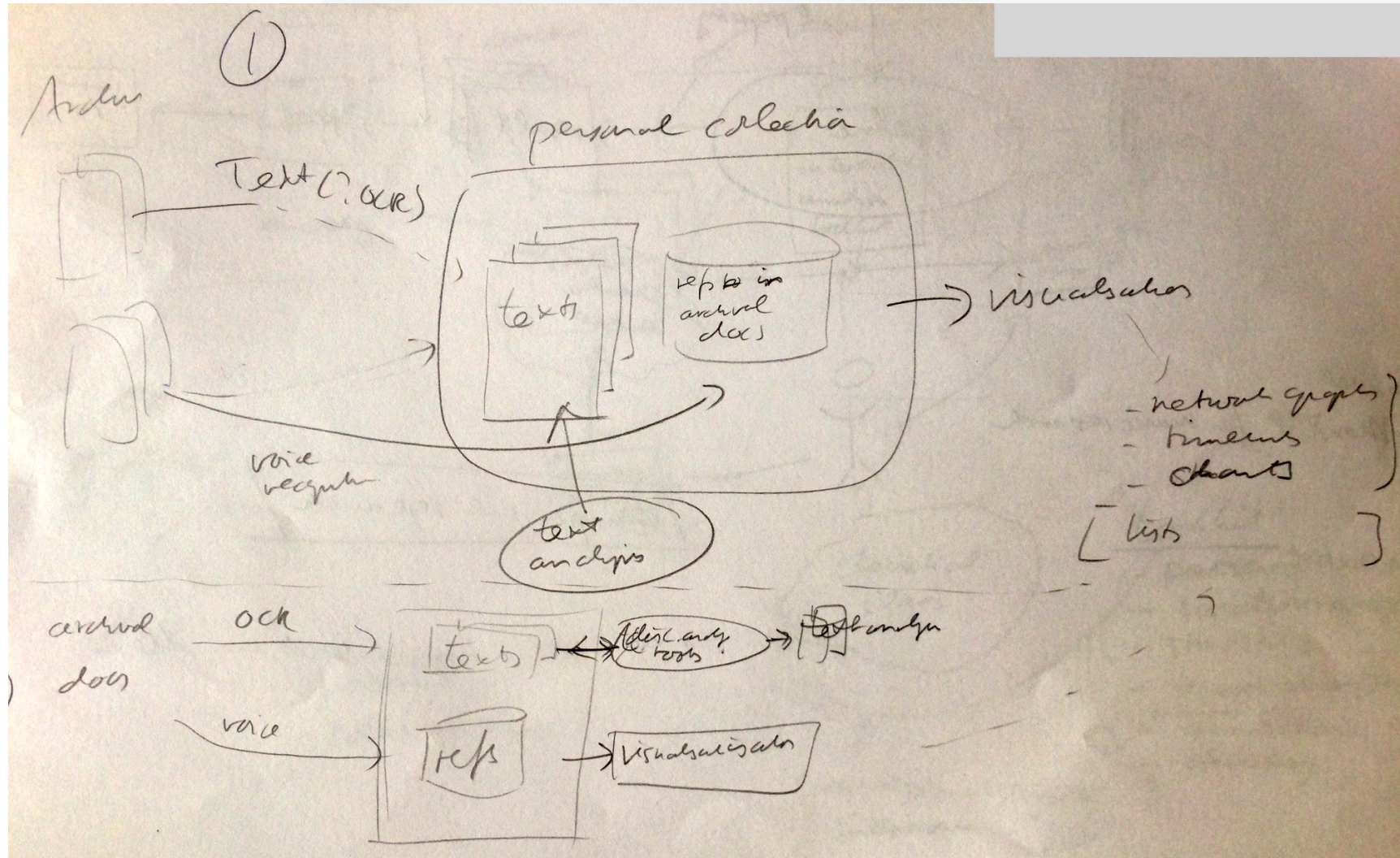
- mainly data/source-driven research
- weak on modelling
  - e.g. theory, psychology

- history
  - ME-Ren: 4
  - 18-20<sup>th</sup> c: 7
  - unspecified: 1
- library: 4
- analysis
  - score: 2
  - audio: 1
- editing: 1
- ethnomusicology: 1

1-2 options / participant

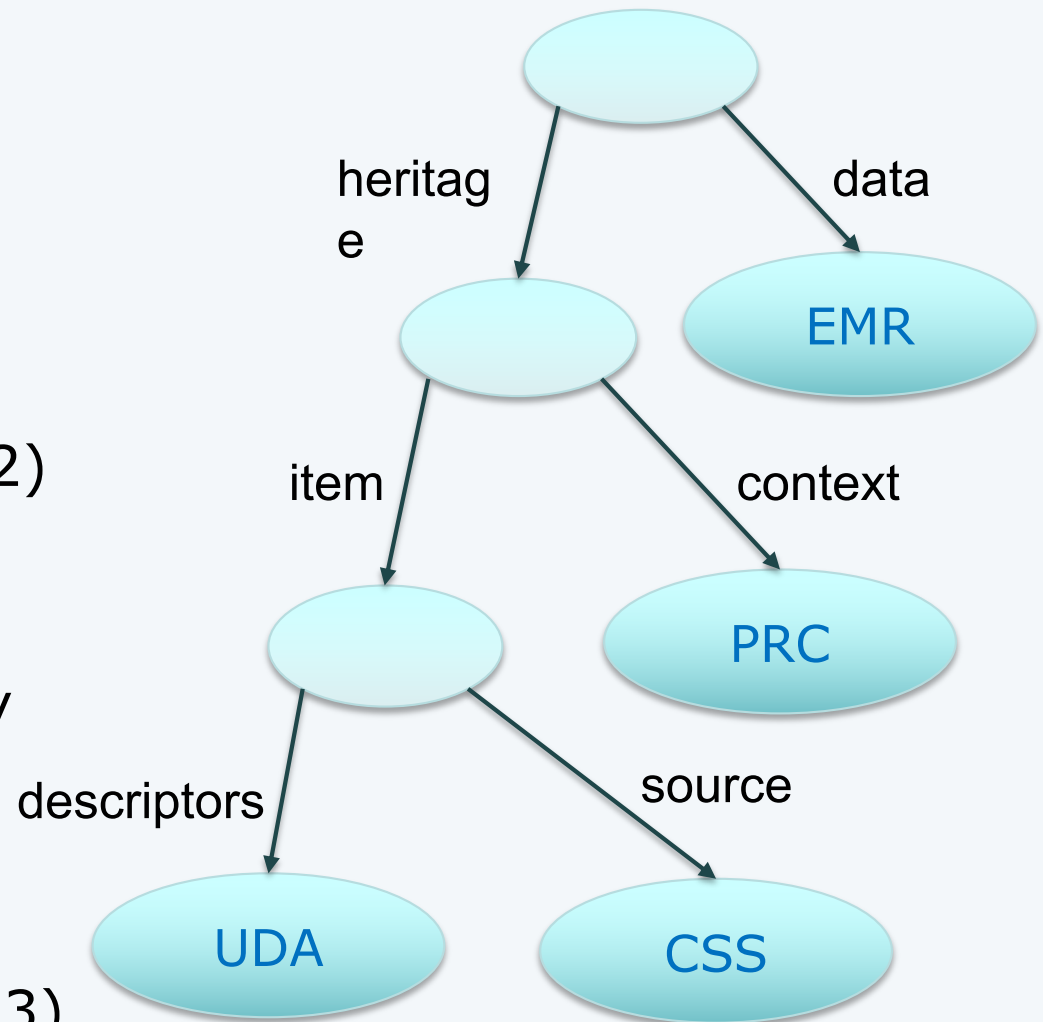


# Individual dream sketch



# Dreamed systems

- Unified Deep Access (7)
  - dream: *access*
- Personal Research Cloud (2)
  - dream: *collect*
- Collaborative Source Study (3)
  - dream: *process*
- Empirical Music Research (3)
  - dream: *prove*



typology of digital research objects



# Quotes for Unified Deep Access

- 'ok, I want Beethoven's 9th Symphony' and it would immediately find the places, digitally, on the network, that would actually have digital images of that. Now Google does that to a certain extent... (10)
- My study is just one single manuscript, but I study others that are related to mine and I end up using different softwares as well, and some are much more difficult, for example, I think, the Bodleian library (2)
- ...if it was possible to 'relevantise' information. If you tell it that you want to study something it doesn't give you 100,000 things that are not relevant to this one thing that you're trying to study (10)

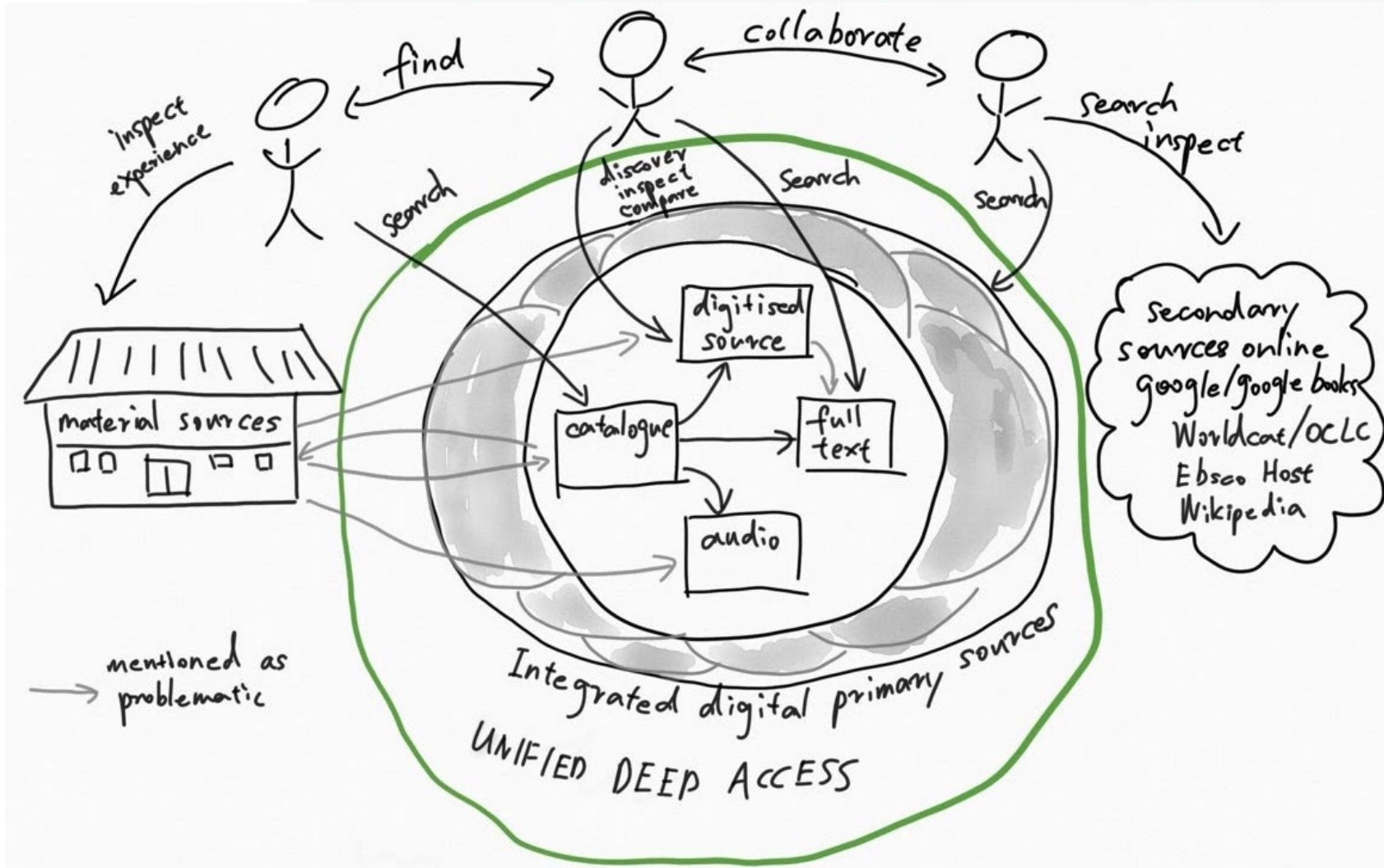


## More quotes for UDA

- If manuscripts were ever to be able to be made searchable, the text in the manuscripts themselves, that would be a dream, but I don't see how that is going to be possible anywhere in the near future. (2)
- what we need is cooperation as well as more materials on the internet (8)
- the danger to me is that there are going to be people who think that this is 'good enough'. And that you take away the desire to actually be there. (9)

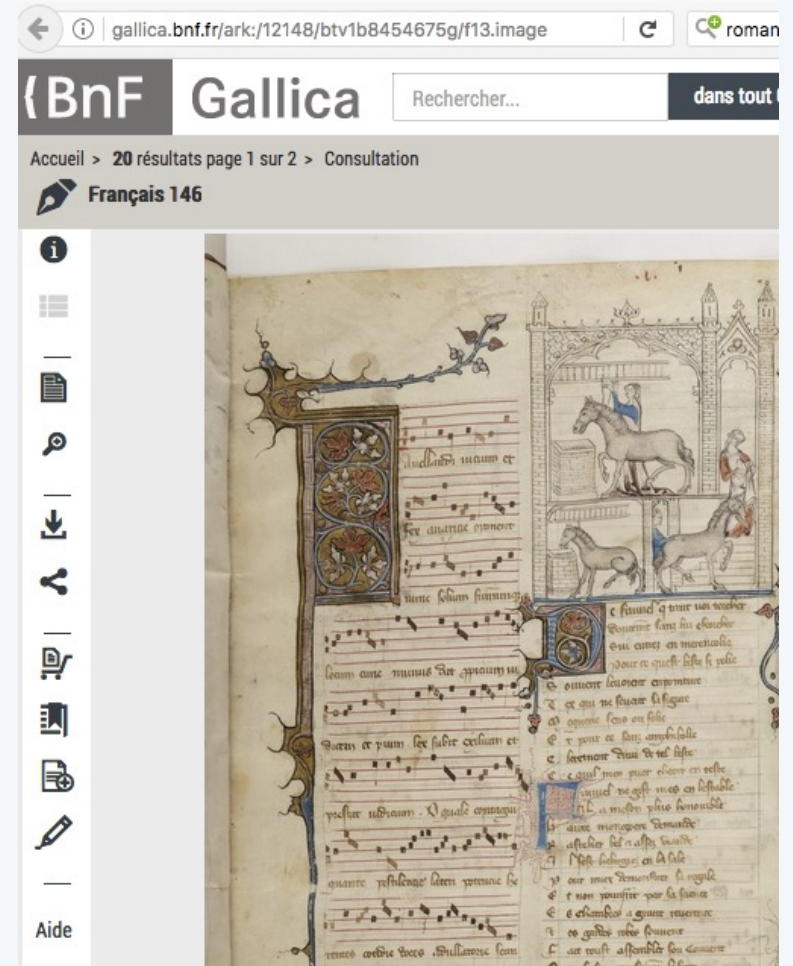


# Unified Deep Access: visualisation



# Unified Deep Access

- essence
  - discover sources
  - retrieve, inspect, compare
- model: Gallica
- bottlenecks
  - incompleteness
  - deep access to content
  - different tools for each collection
- important properties
  - interoperability, unification
  - relevance
  - invite collaboration
- music-specific features rarely mentioned

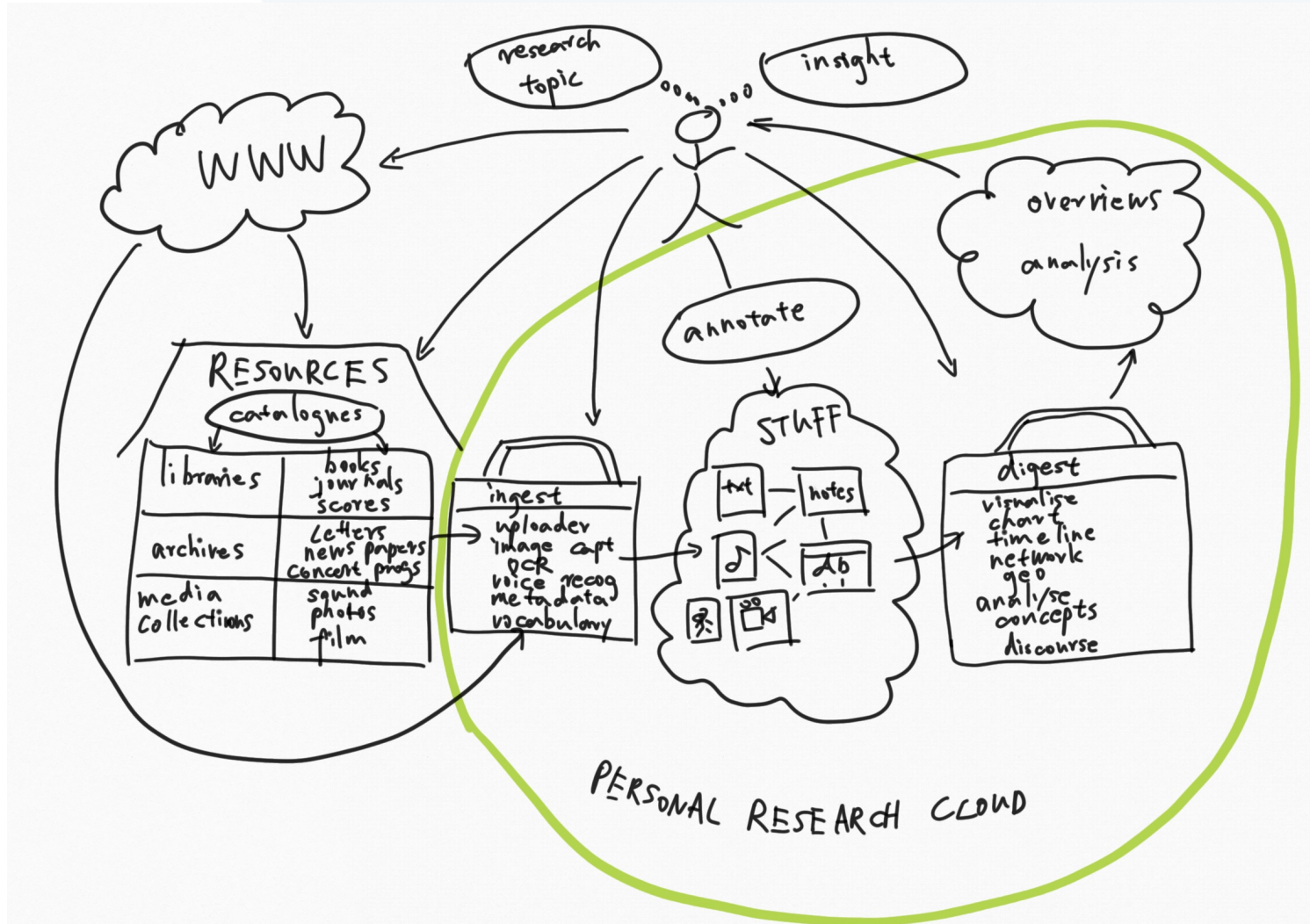


# Quotes for Personal Research Cloud

- I'm working at libraries where I can find all the pieces in the archives and then I am putting it, the records, in the database (6)
- some kind of suite of applications that were fully integrated... to capture images, but also be able to enter some quick metadata tags... that would allow robust notes (12)
- you can easily move things into the cloud and then keep working (12)
- it would be ideal that there is some software to visualize all the connections (6)

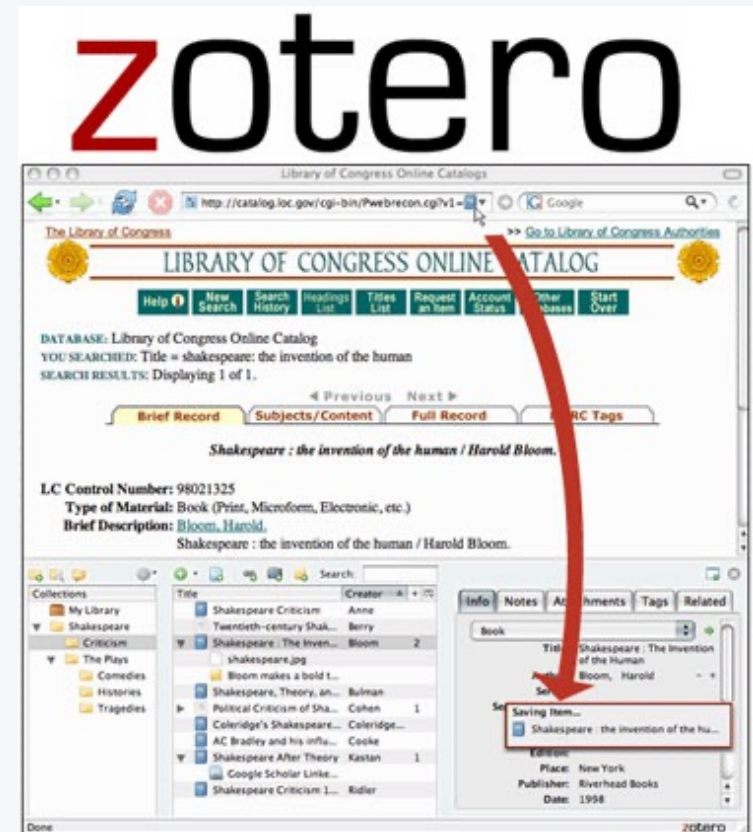


# Personal Research Cloud: visualisation



# Personal Research Cloud

- essence
  - capture research materials
  - annotate
  - basic analysis
- model: Zotero
- bottlenecks
  - data entry process
  - overview
- important properties
  - lightweight
  - interoperable components
- music-specific features rarely mentioned



# Quotes for Collaborative Source Study

- the ideal... tool where we could have the primary sources, where we could have our writing, where we could include sound and image, so that everything is really centralized. And which can travel with us and eventually parts of it be on line. And that is of course available for a team that doesn't necessarily work in the same space (7)
- it means you have for example the reproduction of the book, one person is comparing it with another book, the second person is interested in manuscript editions..., the third person knows something about the person and adds prosopographical content or something like that (3)
- a good platform for digital publishing, scholarly publishing music, and trying to find innovative ways... to update, or putting much more data to it, maybe even source material, to the article (13)

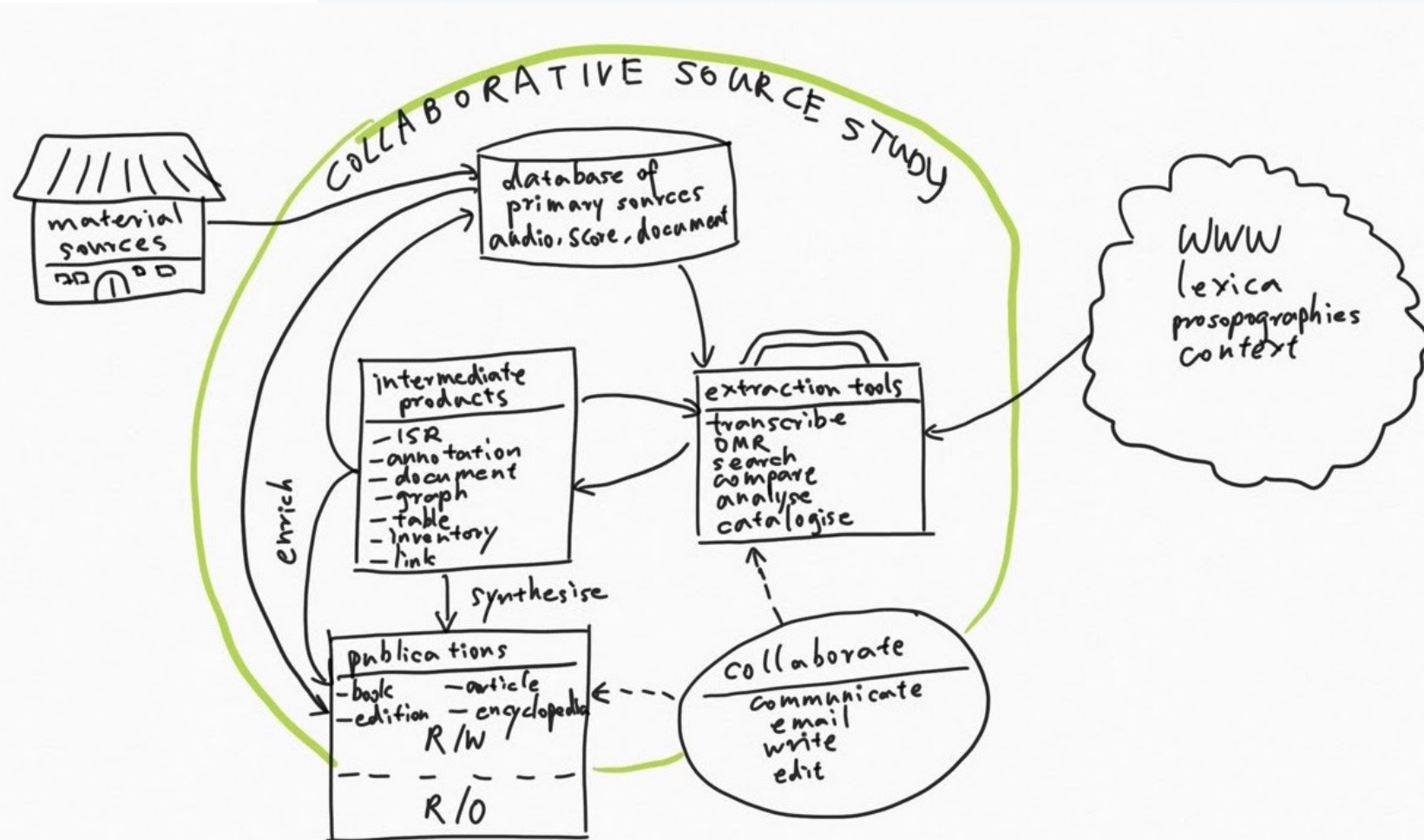


# More quotes for CSS

- I need different softwares which can be linked, which can interact (3)
- if you want to reuse it [a digital score] in another program or if you want to reuse it in a later version, it should be transferable (3)
- a good search function... if I have a certain number of treatises which contain one-page little pieces, to be able to search in which books for example the same fuga comes on or not. (3)



# Collaborative Source Study: visualisation



ISR = interoperable score representation





# Quotes for Empirical Music Research

- I want something almost like an app store with little app that perform my functionality and that I can chain together in a slightly more intuitive way than Max/MSP and Pd work (4)
- a kind of modular setup where you have different tools but then you want to be able to connect them very easily. So you would have something that would search for repeated patterns patterns in here and then you would also have a visualizer of some kind. (5)
- If it's going to be for use by musicians, you really don't want to show them a command line ever. (4)

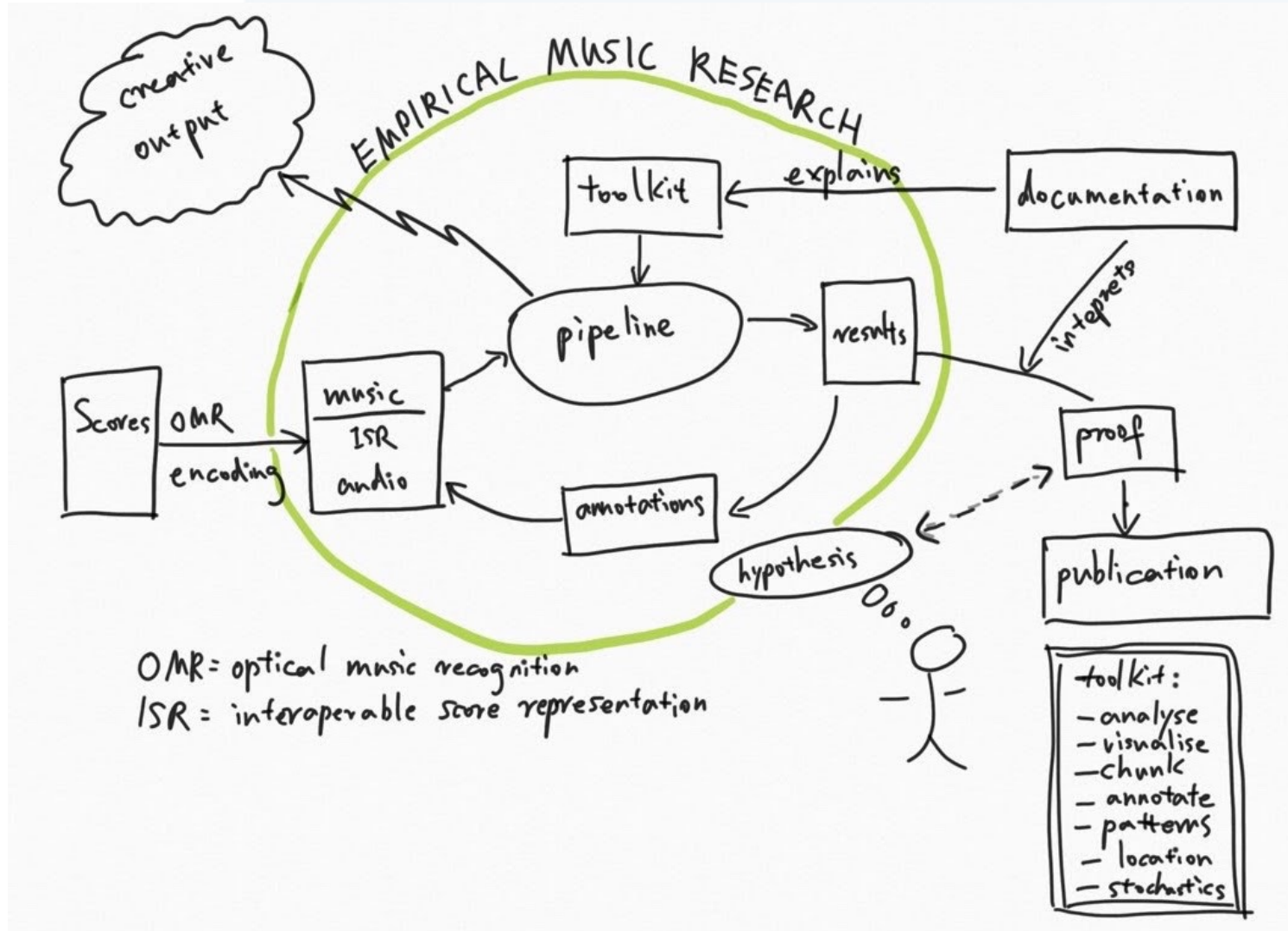


# More quotes for EMR

- But really you would want something to be flexible enough be able to adapt to different ideas... so that I could try them out before investing a really long time (1)
- it would be to assist researchers with statistical verifications of observations (1)
- I have to reassure myself that what the computer says about the piece, that I can verify that by looking at the piece... (5)
- I'm not a mathematician and I still need to understand what goes on in a way that doesn't require me to read the latest PhD theses in mathematics (4)

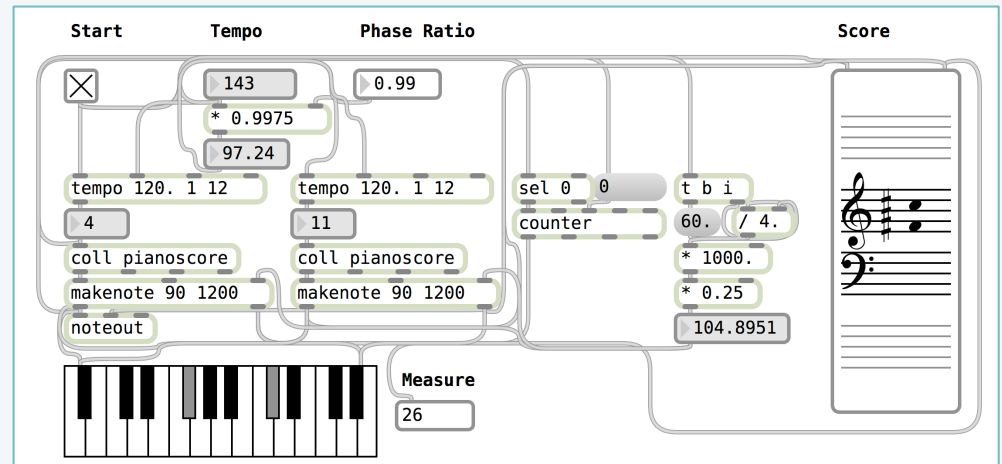


# Empirical Music Research: visualisation



# Empirical music research

- essence
  - toolkit for creating analytical pipelines
  - evidence and proof
- model: Max/MSP
- bottlenecks
  - lack of data
  - fit with domain knowledge
  - internal workings of tools
- important properties
  - intuitive
  - transparent
  - connects generic and specific
- closest to MIR research



<http://akihikomatomoto.com/download/pix/pianophase3.0.png>



# Common traits

- respondents envision research environments
  - support considerable part of work process
- app store model
  - interoperable tools
  - interoperable data
  - usability
  - transparency
- lack of (suitable) data nearly always mentioned as a problem
- collaboration is often appreciated but also problematic



# Conclusions

- dreams reflect daily realities
  - no grand plans for rebuilding musicology
  - reflect experience (and frustration) with existing software
  - bottlenecks and incremental improvements
- four types of dreams
  - there are interrelations
  - more interviews might suggest different typology
- dreams types are abstractions
  - implementing them as they are → fallacy of grand design
  - component level better suited



# Implications

- look beyond automatic processing of *musical data* only
  - immense role of contextualisation
  - interactive creation of insight
- tool creation should focus on component level
  - interactive processing, researcher is in control
  - many relevant initiatives already exist
  - adapt, reconsider assumptions?
- disentangle conundrum of interoperability (data, tools) and collaboration



# Thank you!

if you want to be interviewed  
about the software of your  
own dreams, contact me at

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