From paper slips via TUSTEP to TEI - creating a lexicographic information system from the WBÖ database

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Outline

I. Overview of history of project to the present
II. Discussion of data: conversion; complications; enhancements
III. Future WBÖ work: article writing; online content

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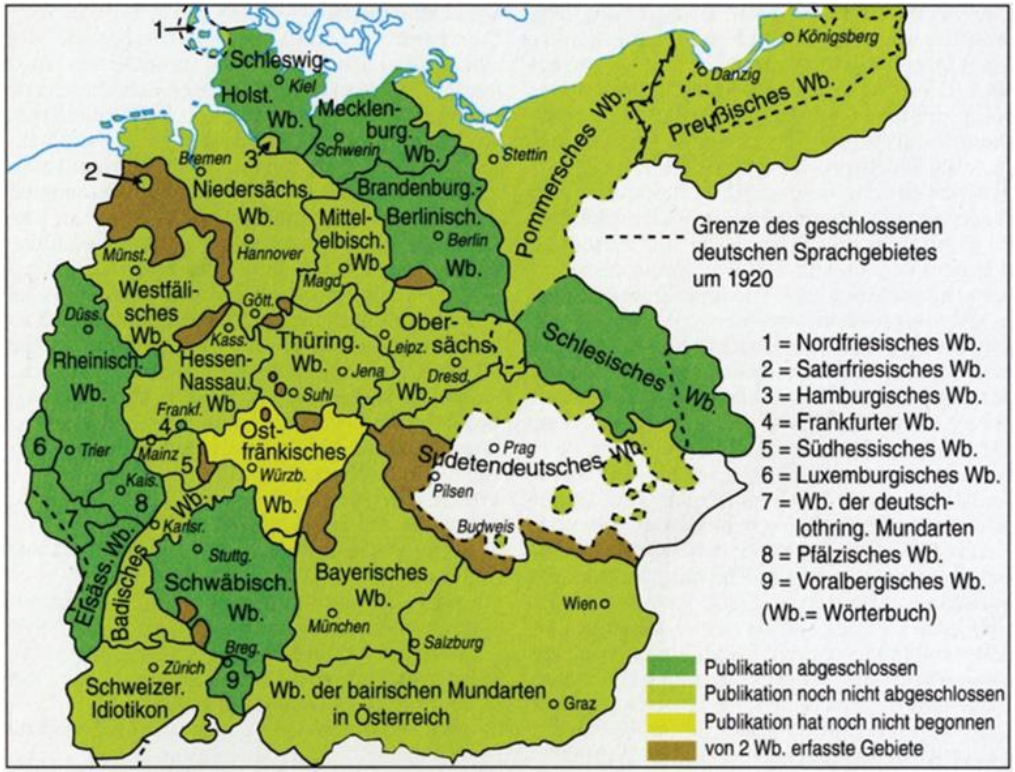
(I) Project Overview: Origins & Timeline

1911 Foundation of research committees in Vienna and Munich with the objective of creating dictionaries of Bavarian dialects
1913-1937 Questionnaire-based surveys, including 109 main questionnaires (1913-1933) and 9 supplementary questionnaires (1927-1937)
1927-1965 Direct data acquisition (so-called "Kundfahrten")

→ Paper slips were collected in the so-called "Hauptkatalog" (main catalogue), which contains approximately 3,6 mio paper slips

1963-2015 Publication of first five volumes of the "Wörterbuch der bairischen Mundarten in Österreich (WBÖ)", including the entries *A–Ezzes*
1993-2011 Creation of a digital version of the database by manually entering the original hand-written paper slip entries into TUSTEP
Since 2015 subsequent conversion into XML/TEI format
Since 2016 Relocation of WBÖ at the department "Variation and Change of German in Austria" at the ACDH

The WBÖ in the context of German-speaking dialect lexicography



König, Werner et al. ([18]2015): *dtv-Atlas deutsche Sprache. Mit 155 Abbildungen in Farbe*. München: Deutscher Taschenbuchverlag, p. 138.

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Overview of database contents

- Headwords
- Phonetic representation(s) of dialectal forms
- Grammatical info: pos, number, case, etc.
- Details of word formation
- Etymological information
- Translation (&/or) definition of meaning
- Location data for each record
- Questionnaires used in elicitation of most of dialectal data
- Bibliographic references
- ...

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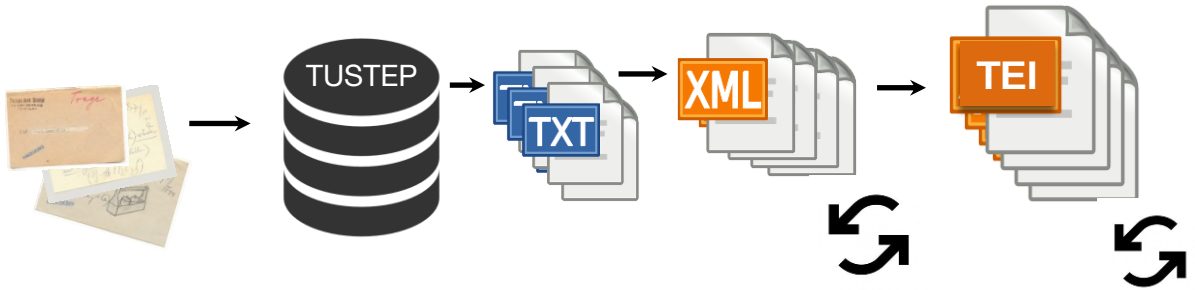
(II) Stages of Conversion



Transformation of structure from TUSTEP > XML > TEI

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(II) Details & Challenges of Conversion

- Heterogeneous Datasets:
  - no relevant data field was present or accurate in 100% of the entries
  - entry fields had a large degree of irregularity
  - 510 categories in original data! (269 incorrectly labelled!)
- Dialect transcriptions often unreadable to humans
- Invisible characters and characters invalid in Unicode crashed XSL scripts
- Deviations from guidelines in data entries:
  - in dialectal transcriptions
  - in field labeling/contents
- Multiple versions of source TUSTEP database

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(II) TUSTEP > TEI Content

TUSTEP

```
*A* HK 450, k4500502.pas^#95
*HL* k.af;éeln:6
*QU* Obertraun Hallstatt, Hango
*QDB* {5.3a04} söSkgt.:swTraunv.:OÖ *^@ Mtlg.HANGO·
(1927) *O* Hallst. OÖ [2o/2.]
===
*LT1* kafféeln *ANMB* ^#ée^# für: Akut über ^#ee^#
*BD/LT1* Kaffee trinken
**********
```

TEI

```
<entry xmlns="http://www.tei-c.org/ns/1.0"
                    xml:id="k450_qdb-d1e37367"
                    xml:lang="bar">
                    <form type="hauptlemma">
                       <orth type="orig">k.af;éeln</orth>
                       <orth type="normalized">kafféeln</orth>
                    </form>
                    <gramGrp>
                       <pos>Verb</pos>
                    </gramGrp>
                    <form type="lautung" n="1">
                       <pron notation="tustep">kaffe'eln</pron>
                    </form>
                    <sense corresp="this:LT1">
                       <def xml:lang="de">Kaffee trinken</def>
                    </sense>
                    <ref type="archiv">HK 450, k4500502.pas^#91</ref>
                    <ref type="quelle">Obertraun OÖ, Hango</ref>
                    <ref type="quelleBearbeitet">{5.3a06} söSkgt.:swTraunv.:OÖ</ref>
                    <usg type="geo">
                       <placeName type="orig">Obertraun OÖ</placeName>
                       <listPlace ref="sigle:5.3a06">[...]</listPlace>
                    </usg>
</entry>
```

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(II) TUSTEP, TEI and DBÖ Contents

- TUSTEP is a great word processing suite with macro capabilities and its own programming language and the data is encoded in it’s own way
- TEI is open source very well documented and the programs you need are all used for any generic XML therefore well known
- TEI vocabulary is able to accommodate all content and structures inherited from TUSTEP and improves structural efficiency and clarity
- TEI is used in the community, data more compatible with partner projects

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(II) Further Enhancements

- Re-export and convert TUSTEP Teuthonista encoding to actual Unicode characters (and IPA conversion in conjunction w/ Verba Alpina project)
- *Siglen* -> Add multiple <listPlace> structures for detailed geographic information -> can be used with geo information systems and displayed
- Normalization of Hauptlemma and store their decoded segmentation as XML
- Enhance and normalize also the sense content
- Scan the notecards and link these pictures to entries
- Continue to fix erroneous miscellaneous contents
- Add missing content

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Re-export & Teuthonista Conversion

Currently the majority of the transcriptions are stored in a code invented because TUSTEP system still could not represent enough characters. We will re-export the contents with the Teuthonista transcriptions converted to Unicode characters - (Derkits)

d-.es -is |A diN dA)u¡nm-.e%))glixkaid

↓

dēs īs ɐ diŋ dɐ ŭⁿmēgliχkaid

Kontext aus HK 157, d157^#142.1 Ding

i h;a¡n m.e¡c¡h >s;a¡n fodíNd

↓

i hąⁿ mėᶜʰ šąⁿ fodíŋd

Kontext aus HK 157, d157^#910.1 ferdingen

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Refinement Example - Decoding Sigles

- Sigles contain a hierarchical concept of regions in Austria and STir
- Can be expressed in TEI with a <listPlace> structure
- Could be referenced with <region ref=”sigle:3.1k”>
    - May not be searchable fast enough due to lookup

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Refinement Example - Decoding Sigles II

```
<listPlace ref="sigle:5.3a06">
                    <place type="Bundesland">
                    <placeName>OÖ</placeName>
                    <idno>5</idno>
                    <listPlace>
                    <place type="Großregion">
          <placeName>Traunv.</placeName>
          <idno>5.3</idno>
          <listPlace>
            <place type="Kleinregion">
              <placeName>söSkgt.</placeName>
              <idno>5.3a</idno>
              <listPlace>
                <place type="Gemeinde">
                  <placeName>Obertraun</placeName>
                  <idno/>
                    <listPlace>
                     <place type="Ort">
                        <placeName>Obertraun</placeName>
                        <idno>5.3a06</idno>
                     </place>
```

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Refinement Example - Normalizing

- Word segments are encoded using []{}()-
- Encoding is bad for full text search
- Added a normalized form by removing them
- Check and correct the normalized form (e. g. F -> V)
- Use TEI vocabulary to express segment

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Refinement Example - Normalizing II

```
<form type="hauptlemma">
        <orth type="parsed">
            <seg>
            <seg>Amts</seg>
            <seg>pflicht</seg>
            </seg>
            <seg>for</seg>
            <seg>halt</seg>
        </orth>
        <orth type="orig">(Amts–pflicht)for–halt</orth>
        <orth type="normalized">Amtspflichtforhalt</orth>
</form>
```

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Challenges in Implementing Enhancements

Editing and making these enhancements to the DBÖ data is not a straightforward process when working with BaseX (and other XML) databases.

- 2.2 Mio <tei:entry> with various child nodes is challenging for XML database systems (BaseX, exist-db)
- Finding an entry in an XML database of above 3 GB size needs indexes
- Searching is quite fast in BaseX as there are various indexes to really speed up searches

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Challenges in Implementing Enhancements - Indexes

- It is easy to confuse BaseX 8.6 so it does not use the indexes
- Changing a single character will either delete all the indexes or
- The indexes need to be rebuild after the change and that takes **very** long
- While writing XML data is in progress the data is inaccessible

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Challenges in Implementing Enhancements - Data Splitting

- In BaseX the solution we pursued is splitting the data into 700 small databases
- For searching we hide this fragmentation behind an API that automatically queries each database and then presents the results

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Challenges in Implementing Enhancements - Parallel Work

- We can query several DBs in parallel to speed up the search
- While there is an update only one out of those 700 DBs is inaccessible
- Index generation is per database so it is fast
    - This is in part possible due to the fact that the source itself is split into 700 drawers

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(III) Next stages in WBÖ project

- Continue to make further enhancements to source (DBÖ) data
- Build lexicographic editor tool
- Begin writing articles for print and online versions
- Build online platform

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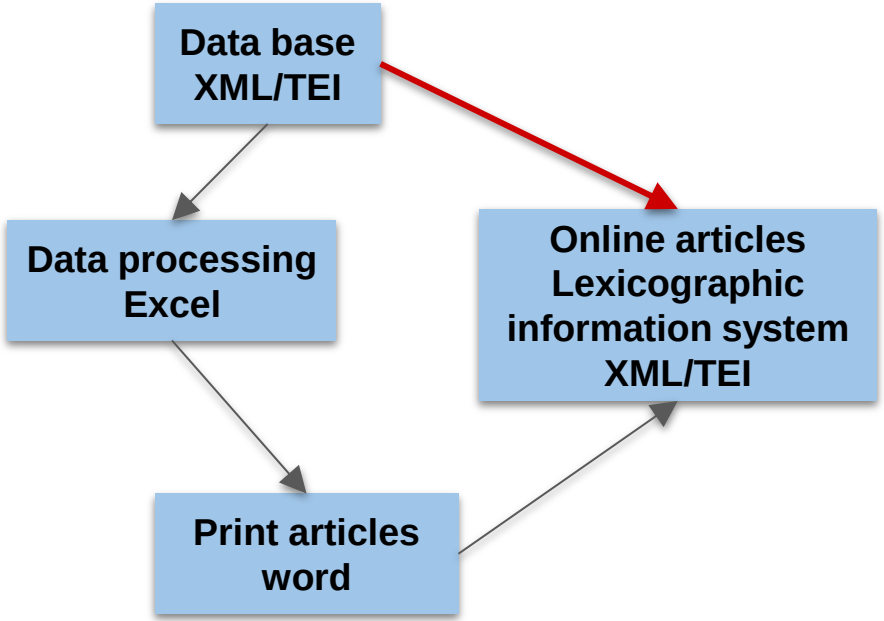
Article Writing

- Formulation of lexicographic guidelines for article writing
- Articles will be written directly in TEI as a dually born digital and print resource output
- A separate XML based system will be used - still evaluating solutions



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Online Lexicographic Information System

- Contains platform for visualizing articles as well as access to data base
- Geo information as maps <-> entries by selected region
- Source links into the lexicographic information system for reproducibility
- Link database entries with scans of paper slips
- Link database entries with other materials (such as scans of questionnaires)
- Link database entries and articles with other projects and dictionaries

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Conclusion

- Self invented data structures and field names are not sustainable → TEI provides a solid framework
- Data is best kept and edited in database solutions not in spreadsheets or text files
- … collecting, storing, digitizing, converting data within a time span of more than 100 years can create various sources of errors → require careful revisions