

The Semantics in Works.

Modelling the Author's Work and Its Making

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Abstract

How does the author form his or her work? Can we follow the work development based on the documents found in the author's legacy? Using the scientific legacy of Niklas Luhmann as an example this article presents a way of modelling the interrelations between the legacy material, proposing first steps on the way to an legacy ontology using FRBRoo and CIDOC-CRM.

Keywords

Scientific legacy description and indexing, Digital Archives, Ontologies, Knowledge Organisation, Digital Humanities

1. Introduction

The long-term project "Niklas Luhmann – Theorie als Passion. Wissenschaftliche Erschließung und Edition des Nachlasses", a collaboration between the Faculty of Sociology of the University of Bielefeld and the department for Digital Humanities of the University of Wuppertal, and funded by the North Rhine-Westphalian Academy of Sciences, Humanities and the Arts, deals with indexing, investigating, and providing access to the academic legacy of Niklas Luhmann (1927-1998), one of the best-known German sociologists of the 20th century and famous for his works in systems theory. The legacy is being archived at Bielefeld University, and comprises the notorious *Zettelkasten* (card index), his "Zweitgedächtnis"¹ with approximately 90.000 index cards, about 150 unpublished manuscripts as well as his personal library (ca 11.100 items) and academic correspondence. The project's goal is to provide access to these materials by means of a digital scholarly edition. A main part is the development of an accurate data model for the description of the legacy as a whole (and thereby giving access to Luhmann's work and knowledge system), showing its relations and context in a semantically accurate and machine-readable way. The poster will be divided in three parts: The first part illustrates the project's platform's functionalities dealing with the legacy and the specific phenomena the material contains. The second part describes the current data model based on TEI/XML[1], its advantages in dealing with these phenomena, and points where it fails to suffice. The third

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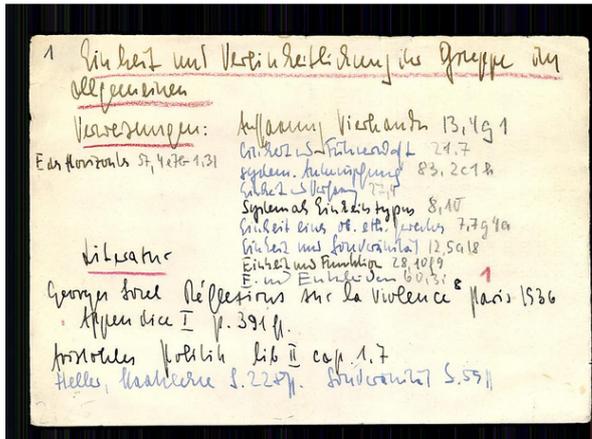


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CEUR Workshop Proceedings (CEUR-WS.org)

¹https://luhmann1.soz.uni-bielefeld.de/bestand/zettelkasten/zettel/ZK_2_NB_9-8-2_V

ZK I: Zettel 1 (1)



1 Einheit und Vereinheitlichung der Gruppe im Allgemeinen

Verweisungen: Auffassung Vierkandt 13,4g1
Einheit und Führerschaft 21,7
E. des Horizontes 57,4e7b1,31
system. Anknüpfung 83,2c1h
Einheit und Verfassung 27,4
System als Einheitstypus 8,10
Einheit eines ob. eth. Zweckes 7,7g4a
Einheit und Souveränität 12,5a18
Einheit und Funktion 28,10f9
E. und Entscheiden 60,3i 1

Literatur

Georges Sorel, Réflexions sur la violence⁸, Paris 1936, Appendice I, p. 391ff.
Aristoteles, Politik, lib II cap. 1,7
Heller, Staatslehre, S. 228ff.; Souveränität, S. 59ff.

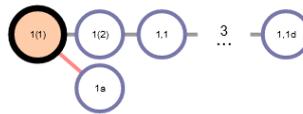


Figure 1: Index card and linking system (https://niklas-luhmann-archiv.de/bestand/zettelkasten/zettel/ZK_1_NB_1_1_V).

part tries to answer first problems by showing how an event-based model via FRBRoo[2] (and possibly a CIDOC-CRM extension [3]) can be used as a solution for gaps within the TEI-Model.

2. The Niklas-Luhmann-Archive Digital Edition

The poster starts with an introduction into the project's scope and goals by presenting the online platform and the way in which it provides access to the legacy's materials within their context in an appropriate and useful way. It focuses on how the index card links have been digitally reproduced (figure 1) so as to show the edition's excellent ability to connect with Luhmann's working practice, suggesting how the card index's linking system and knowledge organisation work.²

3. The project's TEI-Model

This linking system is currently being modelled using TEI/XML (figure 2). Each index card is being transcribed using a TEI <div> element. Each card's data file comprises of a <back>

²A full description of the linking system can be found at https://luhmann1.soz.uni-bielefeld.de/bestand/zettelkasten/tutorial#p_3 "Punkt (3) Zettelnavigation".

```

<back>
  <div type="navigation">
    <p>
      <linkGrp type="numerical_navigation">
        <ptr type="vorwaerts-im-nummerierten-Gliederungsverlauf" target="#ZK_1_NB_2_V"/>
        <ptr type="rueckwaerts-im-nummerierten-Gliederungsverlauf" target="#"/>
      </linkGrp>
      <linkGrp type="logical_navigation">
        <ptr type="vorwaerts-in-diesem-Strang" target="#ZK_1_NB_1_2_V"/>
        <ptr type="vorwaerts-in-eingeschobenem-Strang" target="#"/>
        <ptr type="vorwaerts-in-ergaenzendem-Strang" target="#ZK_1_NB_1a_V"/>
        <ptr type="vorwaerts-in-parallelem-Strang" target="#"/>
        <ptr type="rueckwaerts-in-diesem-Strang" target="#"/>
        <ptr type="Anfang-des-Strangs" target="#ZK_1_NB_1_1_V"/>
      </linkGrp>
    </p>
  </div>
</back>

```

Figure 2: TEI/XML of a card's <back>-section (ID ZK_1_NB_1_1_V), modelling the relations to neighbouring cards. The complete TEI/XML file can be found at https://v0.api.niklas-luhmann-archiv.de/ZK/zettel/ZK_1_NB_1_1_V/xml.

section³, where a <ptr>⁴ for each link is being created, typed according to the kind of linking.⁵ The "parent" <linkGrp> element also uses a @type attribute to indicate the link group's nature. This linking information provides information when rendering the frontend. In using TEI/XML the project data is modelled in a standardised way generally accepted and used within the Digital Humanities community.⁶ But beyond that it has no deeper meaning that could be interpreted by non-human (or even non-German speaking) users. Hence there is an urgent need to look for other ways of modelling to ensure the project data's long-term sustainability.

4. FRBRoo/CIDOC-CRM approach

The project decided to base its model for bibliographic items loosely on FRBRer [4]. These items exist only "virtually" as bibliographical references on index cards and manu-/typescript but have proven to be very useful in terms of studying Luhmann's "workflow". Luhmann often cited the same literature, making these bibliographic items function as "hubs" that collect references to all items (cards, typescripts, physical books from his personal library) that cite this specific literature. The FRBRer oriented model suggested to also use it for modelling the typescript and publication development (the "Genese"). However, progress in the analysis and understanding of the work development shows that this approach may not suffice. Figure 3 gives an idea of the current state of the "Werk-Modell"⁷ on a theoretical level.

Whereas the typescripts individually fit into FRBRoo's WEMI model (as manifestations)⁸, the typed TEI/XML <ptr> elements used for describing the versions' development (figure

³<https://tei-c.org/release/doc/tei-p5-doc/en/html/ref-back.html>

⁴<https://tei-c.org/release/doc/tei-p5-doc/en/html/ref-ptr.html>

⁵Cf. 3.3 Ordnungsprinzip <https://niklas-luhmann-archiv.de/nachlass/zettelkasten>.

⁶A complete documentation of the currently used TEI/XML model can be found at <https://niklas-luhmann-archiv.de/projekt/dokumentation> (in German).

⁷The model is not available yet on the project's webportal, a preliminary version and description have been published in P. Sahle, J. Schmidt: Der Text des Soziologen. Ist da ein Werk in diesem Nachlass? Präsentation zur GRK-Tagung 29.09.2021.

⁸Cf. Group 1 entities [4], p. 13.

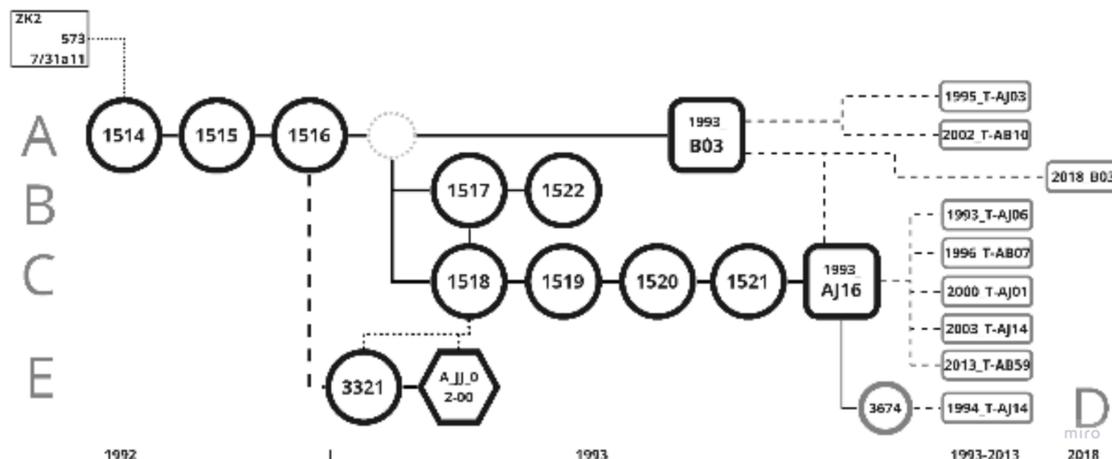


Figure 3: Present state of the “Werk-Modell” for work “WidF” (“WidF” refers to the constituted work based on Luhmann’s valedictory lecture in 1993 titled “Was ist der Fall?” und “Was steckt dahinter?” Die zwei Soziologien und die Gesellschaftstheorie.’ and the corresponding documents (ID nla_W_1145)).

```

<back>
  <div type="navigation">
    <p><linkGrp type="div_navigation" n="MS_1516_01_GESM_01_03_AS_1">
      <ptr type="entwickelt_sich_aus" target="#MS_1515_01_GESM_01_02_AS_1"/>
      <ptr type="entwickelt_sich_zu" target="#MS_3321_02_GESM_01_01_EF_1"/>
      <ptr type="entwickelt_sich_zu" target="#MS_1517_03_GESM_01_01_AS_1"/>
      <ptr type="entwickelt_sich_zu" target="#MS_1518_04_GESM_01_01_AS_1"/>
      <ptr type="publiziert_in" target="#Luhmann_1993_B03"/>
    </linkGrp><linkGrp type="ms_navigation">
      <ptr type="entwickelt_sich_zu" target="#MS_1518"/>
      <ptr type="entwickelt_sich_zu" target="#MS_1517"/>
      <ptr type="entwickelt_sich_zu" target="#MS_3321"/>
      <ptr type="publiziert_in" target="#Luhmann_1993_B03"/>
      <ptr type="entwickelt_sich_aus" target="#MS_1515"/>
    </linkGrp></p>
  </div>

```

Figure 4: TEI/XML of a typescript’s <back>-section (“1516” on the previous figure) with relations to neighbouring versions

4) cannot be mapped that easily. Attempts using *R2 is derivative of* for the specific relation “entwickelt_sich_aus” and “textfortsetzung_von” proved unsuccessful. As FRBRoo does not have any other property available, a look within CIDOC-CRM itself was necessary, starting with *P130 shows features of* (as superclass of *R2 is derivative of*). Figure 5 shows the proposed mapping between the project’s TEI/XML model and FRBRoo (version A of the “Werk-Modell” shown above) and CIDOC-CRM respectively.

Mapping to FRBRoo and CRM seems feasible at this point. However, the progressing “Werk-Modell” development indicates the necessity of extensions specific to manuscript and work development and characteristics. The data model development is still in its initial phase and ongoing, the poster will present the updated status, as well as new findings and decisions.

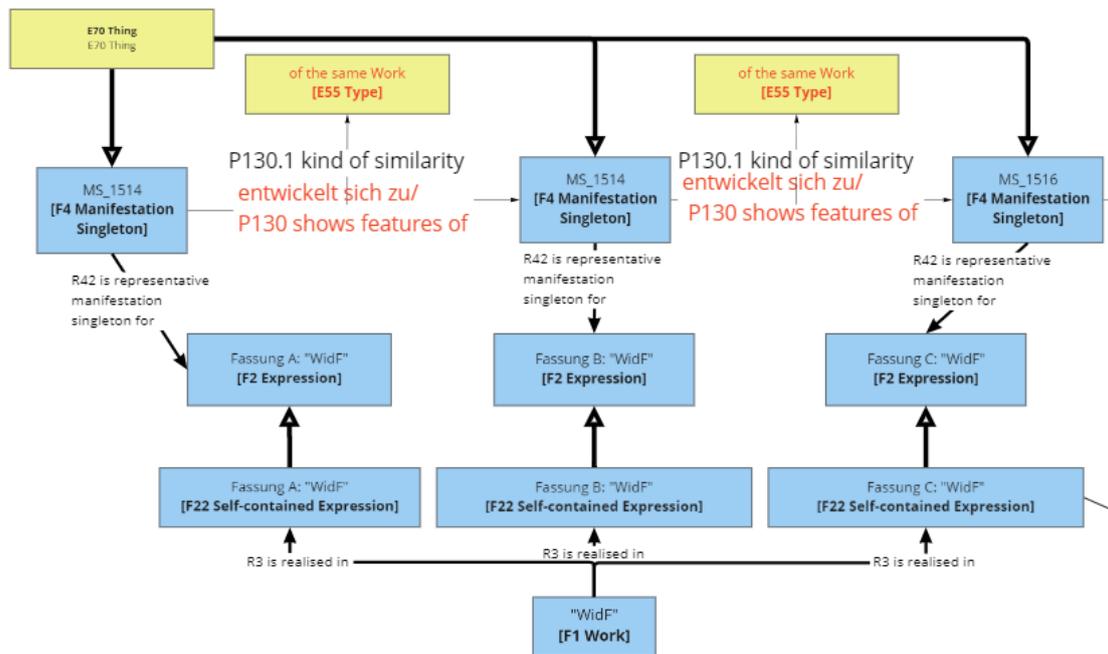


Figure 5: FRBRoo 3.0 / CIDOC-CRM V 7.2.1 approach of version A of work "WidF"

References

- [1] P5: Guidelines for electronic text encoding and interchange version 4.4.0. last updated on 19th april 2022, revision ff9cc28b0, 2022. URL: <https://tei-c.org/>, last accessed 26 June 2022.
- [2] C. Bekiari, M. Doerr, P. Le Bœuf, P. Riva, Frbr object-oriented definition and mapping from frbrer, frad and frsad, version 3.0 september 2017, 2017. URL: https://www.cidoc-crm.org/frbroo/sites/default/files/FRBRoo_V3.0.pdf, last accessed 26 June 2022.
- [3] C. Bekiari, G. Bruseker, E. Canning, M. Doerr, P. Michon, C.-E. Ore, S. Stead, A. Veli, Definition of the cidoc conceptual reference mode, version 7.2.1, june 2022, 2022. URL: https://cidoc-crm.org/sites/default/files/cidoc_crm_version_7.2.1.pdf, last accessed 26 June 2022.
- [4] Functional requirements for bibliographic records: Final report, february 2009, 2009. URL: <https://repository.ifla.org/handle/123456789/811>, last accessed 26 June 2022.

5. Online Resources

- Niklas Luhmann Archive Homepage,
- CIDOC-CRM Homepage,
- FRBRoo - Functional Requirements for Bibliographic Records Model.