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Impact Evaluation by Using Text Mining and Sentiment Analysis

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Overview

1. Relevance & Research question
2. Data & Methods
3. Results & Implications
4. Summary & Conclusion
5. Discussion

1. Relevance & Research question

Digitalization in higher education

rapid technological growth and related socio-cultural change

Assessing and promoting the effectiveness of digital education

1. Relevance & Research question

➔ Theoretical & empirical

- How effective is digital education? Which implications can be obtained from it? What can we do for (better) organizational, technological, and didactical implementation?

➔ Methodological

- How we can measure the effectiveness in (digital) learning worlds?
- What can digital methodologies (actually) do for that? Which instruments can be implemented?



(Digital) learning worlds as research space

2. Data & Methods



**How the (digital) learning space
looks like? Which data and
sources do we have?**

2. Data & Methods

➔ **(Traditional) Data analytics in evaluation**

- Data collection → Web surveys
- Quantitative analysis → Descriptive statistics
- Qualitative information from open-ended questions → Content analysis

➔ **Potentials for using text mining technologies**

- Efficiency
- Consistency
- Significance & Functionality



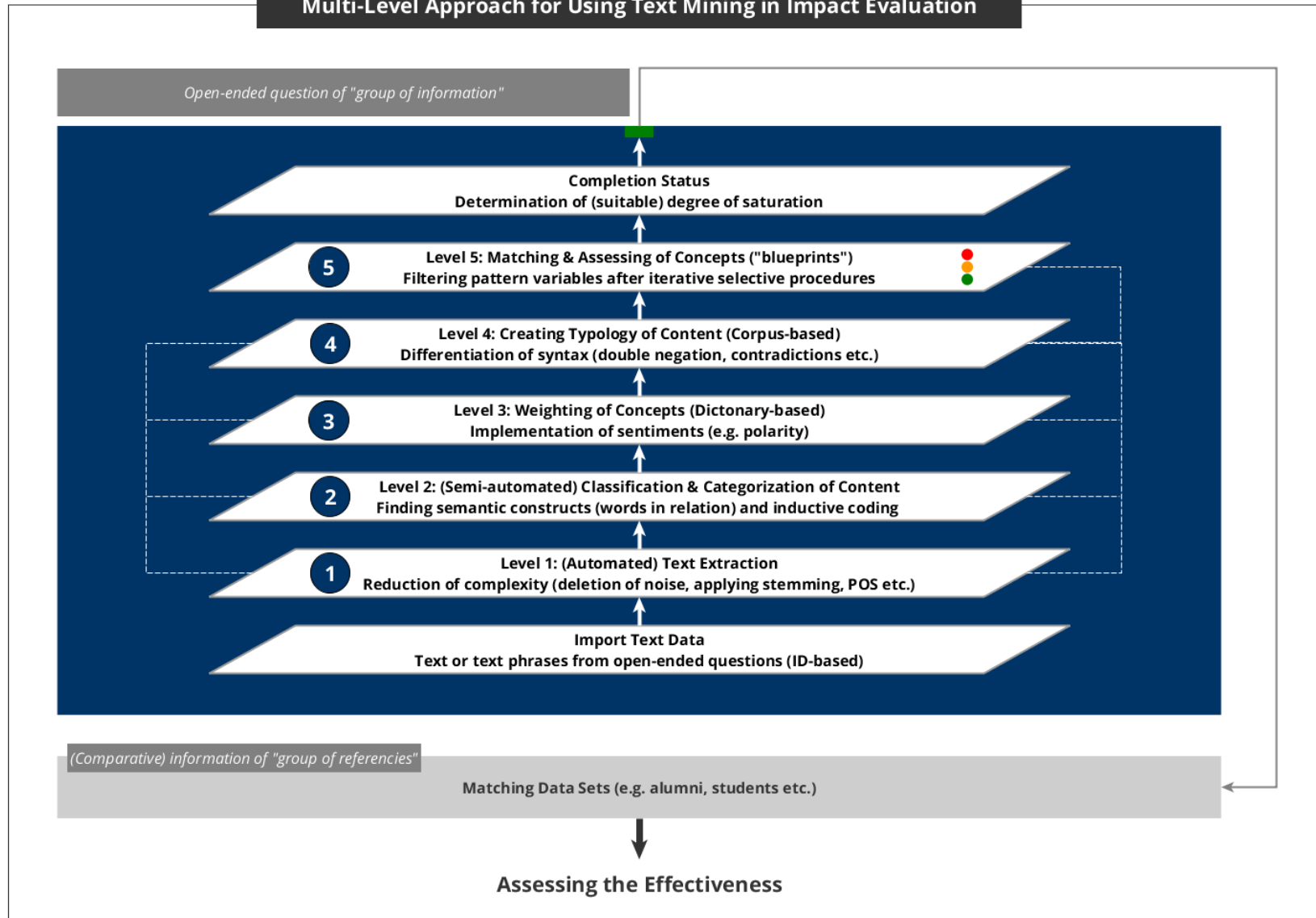
Analogies to market research

2. Data & Methods



Which (existing) tools and approaches are (partially) suitable?

Multi-Level Approach for Using Text Mining in Impact Evaluation



2. Data & Methods

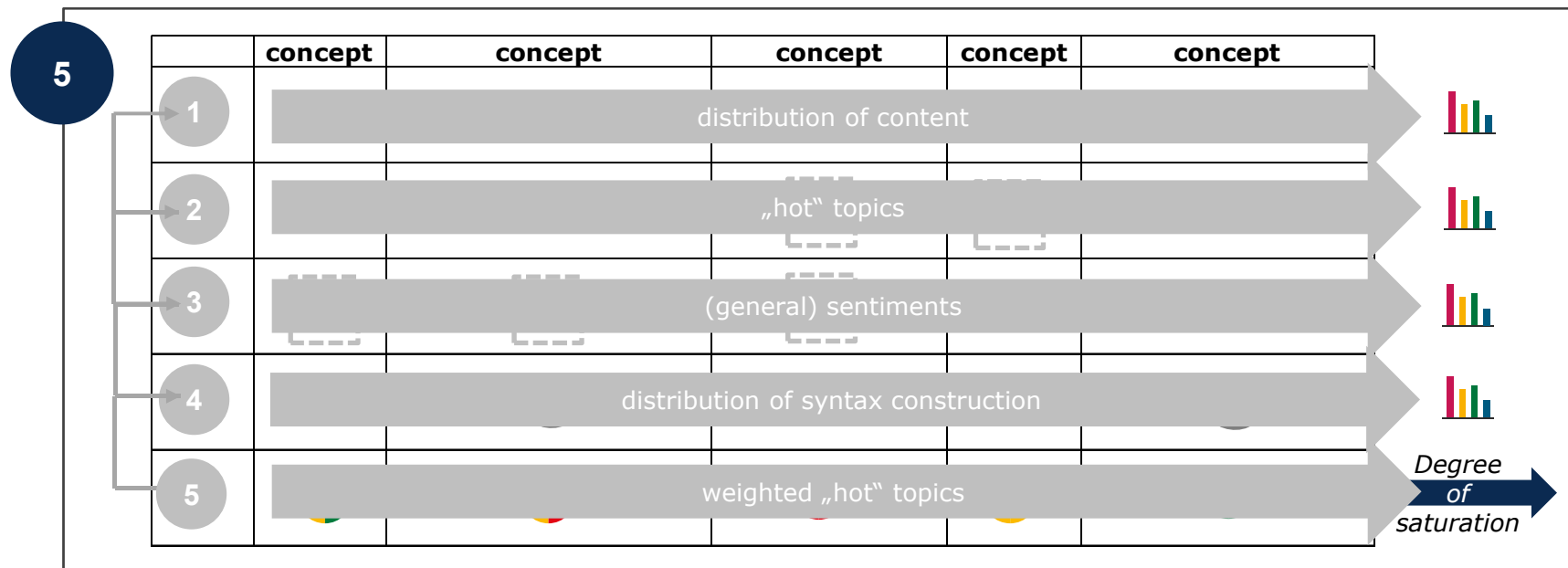
➔ **Teacher survey (2014–2017, n=338, NAWI)**

„What is particularly important to you in teaching?“



Multi-level approach (case study)

„Vermittlung der Methodik des Problemlösens im Ingenieurbereich auf der Basis soliden Grundlagenwissens.“



3. Results & Implications

- ➔ information about the **status of completion** → needed for the following matching procedure
- ➔ general insights in **language construction** in open-ended questions → e.g. for development of automated opinion mining procedures, Deep Learning, etc.
- ➔ extraction of **„hot“ topics** in open-ended questions e.g. importance of skills, expectations, and tasks
- ➔ insights in basic attitudes, tenors, values and norms, etc. → **reconstruction of (general) opinion** → **„sense“ of data**

4. Summary & Conclusion

➔ Multi-level approach for using text mining in impact evaluation

- 1 **Evaluation with a view from different perspectives**
 - “group(s) of information” in relation to “group of referencies”
- 2 **Content extraction via combination of different (semi-) automated text mining procedures**
 - e.g. semantic analytics, opinion mining (sentiments), and syntax analytics
- 3 **Assessing the effectiveness**
 - by different types of layering & matching procedures

4. Summary & Conclusion

- 1 **Field of research → Domain-specific** (resources, groups of interest, rules, expectations, language, etc.)
- 2 **High impact of survey instruments**
 - opinion mining in open-ended questions depends on suitable didactical concept → impact on reconstruction of opinion
- 3 **Function of evaluation (benchmarking, prognostics, etc.)**
 - aim controls the depth of procedures (e.g. length of algorithms, etc.)



Principles of “one size fits all” doesn’t work

5. Discussion

**Do you have questions, comments
and/or suggestions?**



Thanks for your attention!

Contact

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New publication: Stuetzer, C. M., Welker, M., & Egger M. (Eds.) (2018): Computational Social Science in the Age of Big Data. Neue Schriften zur Online-Forschung, (15) Köln: Herbert von Harlem