Using Latent Semantic Analysis to Assess Social Competence

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Structure of the Talk

- (Social) Competence
- Other Approaches
- Research Design
- Results
- Discussion
(Social) Competence
Competence Definition

“A competence is defined as the ability to successfully meet complex demands in a particular context through the mobilization of psychosocial prerequisites (including both cognitive and noncognitive aspects)”

(Rychen & Salganik, 2003b, p. 43)
Competence Dimensions

- Competence is a human **potentiality for action**
- ... is **demand** oriented (= abilities required for e.g. task)
- ... refers to abilities that **can be learned**
- ... involves **cognitive** and **non-cognitive** elements:
  - factual knowledge
  - procedural skills
  - internalised orientations
  - values
  - attitudes
  - volitional aspects
  - ...
Competence Classes (I)

- Excerpted from empirical, political, and theoretical perspectives (cf. Stahl & Wild, 2006)

- **Professional Competence**
  - basic and specialized general knowledge, basic psychomotor and mechanical skills, and disciplinary and interdisciplinary knowledge (Jäger, 2001)

- **Methodological Competence**
  - ability to independently acquire, structure, critically evaluate, and exploit knowledge in a creative way (Kauffeld et al., 2003)
Competence Classes (II)

- **Personal Competence**
  - concerned with those attitudes and character attributes required to perceive and utilize one’s own competencies and to act in a reflective and self-reflective way (Erpenbeck, 2003)

- **Social Competence**
  - “facilitate communicative and cooperative action that aim at identifying, managing and mastering conflicts” (Erpenbeck, 2003)
Dimensions of Social Competence

COMMUNICATIVE ABILITIES
- phrasing skills
- expressiveness, multilinguality
- empathy
- negotiation skills
- willingness to change
- rhetorics, presentation skills

INTERPERSONAL SKILLS
- contact abilities
- trustworthyness
- openness
- acceptance, self-confidence
- positive image
- tolerance
- relationship management

SOCIAL COMPETENCE
- cooperation abilities
- negotiation competence
- collegiality
- identification with tasks
- willingness to integrate
- willingness to take responsibility
- leadership capabilities

CAPACITY FOR TEAMWORK

CAPABILITIES TO MANAGE CONFLICT
- partner-oriented interactions
- willingness to understand
- willingness to find consent
- self-control
- realistic evaluation of situations
- acceptance skills

(redrawn & translated from Jäger, 2001)
Other Approaches
Automated Assessment Approaches

- **Multiple-Choice Approaches**
- **Simulations**
  - Virtual labs, online experiments, games
  - From simple click-thru to sophisticated MM
  - Underlying model used to evaluate performance
- **Graph-Based Approaches**
  - Formalisms: concept maps, knowledge maps, mind maps, topic maps, ontologies, Petri nets, adjacency networks, and affiliation networks (plus many others)
  - Mining approaches (e.g. SNA on eMail interaction)
  - Construction approaches (fill-in-the-map vs. construct-a-map)
- **Natural Language Processing Approaches (NLP)**
  - Syntax-based: structural analysis (e.g. Page, 1966)
  - Semantics-based: analysis of the meaning

(Stahl & Wild, 2006)
Research Design
Our Approach

- Use forum messages
- that have been evaluated by humans
- on whether they contain certain dimensions of social competence
- to classify new forum messages
- by assigning dimensions whenever
- the weighted sum of the positive occurrences
- is higher than that of the absent best hits
Selection (!) of Dimensions of Social Competence

- Empathy, Politeness
- Phatic communication
- Ability to express own opinion
- Cooperation competence
- Team competence
- Ability to take initiative
- Ability to motivate
- Readiness to take on responsibility

(Stahl & Wild, 2006; Ben-Zie, 2004; Langmaack, 2004; Schröder, 1999; Jäger, 2001; Brommer, 1993;
Example: Ability to motivate

- Motivate yourself and others (!)
- Examples:
  - „grossartig, dass du es noch geschafft hast!“
    ~ great that you still made it!
  - „sonst freu mich eure posts zu lesen; ihr schafft es sicher!“
    ~ furthermore, I am happy to read your posts; you will make it for sure!
  - „ich glaube ich schaff das schon.“
    ~ I think i will manage to do it.
Research Design (1)

- 337 German contributions from students in one university seminar forum
- Split into 1,012 sentences = corpus
- Coded by human assessors along ten dimensions of social competence
  - (one dim dropped out with only 37 messages)
- Corpus was split into 490 training and 522 test texts
- Of the 522, 16 were omitted (no terms from the training space)
Occurrences (Human, All)

- Politeness 197
- Phatic communication 579
- Networking Competence 113
- Ability to express own opinion 156
- Cooperation competence 774
- Team competence 144
- Ability to take initiative 207
- Ability to motivate others 074
- Readiness to take on responsibility 215
- Feedback competence 362
Research Design (2)

- Space over 490 training docs calculated (dimcalc share 0.5, no stemming & no stopping, minDocFreq = 1, minWL = 0)
- Each of the 506 folded into the space
- Pearson’s $r$ to compare against all training documents
- For each doc, 10 highest correlating docs were selected
- Sum up correlations of ‘positive‘ and ‘negative‘ docs
- If cor sum of positives is higher, it will be assumed that the doc indicates this dimension
Singular Values of the Corpus

Dimcalc share 0.5 = 27

56
Example: Politeness of T011.txt

- polite = 1 for the documents
  - D015.txt (r = 0.7597227)
  - D133.txt (r = 0.7597227)
  - D230.txt (r = 0.7597227)
  - D063.txt (r = 0.5035313)
  = sum of r‘s = 2.7826994

- polite = 0 for the documents
  - D311.txt (r = 0.6581647)
  - D126.txt (r = 0.6147096)
  - D055.txt (r = 0.6057419)
  - D034.txt (r = 0.5638606)
  - D299.txt (r = 0.5589148)
  - D031.txt (r = 0.5246403)
  = sum of r‘s = 3.5260319

=> document T011.txt is inferred to be polite = 0
Results
Results (Percentage of Correct Classifications)

- express own opinion
- phatic communication
- feedback competence
- responsibility
- take initiative
- networking competence
- cooperation competence
- team competence
- politeness
Discussion
Discussion

- Results are promising
- Not ubiquitously applicable, some dimensions obviously do not have textually explicit cues
- We figure that Social Competence Indicators are transferable to other contexts and are stable (to be proven)
- For other more interaction centric dimension we intend to complement LSA with SNA
- Investigate Parameter settings so that it performs better in this case than pure vector space model
Outlook

- Validate with more corpora
- Validate externally (directly!) and holistically (all utterances of a person!)
- Is Percentage Method applicable?
- What with incompetence? What with triary indicators (there, not there, can‘t tell)?
- Other competence types: professional competence? methodological competence?
- What patterns can we find when this methodology is applicable and when not?
//eof.