Reframing Data Stewardship Education in Denmark
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As of yet, there is no formal university education in Denmark to train Data Stewards (DS), who are responsible for ensuring the quality and security of data. A national project was initiated to consider the prequalification of a DS education in Denmark.

### Methods

Our methodology included the following four steps of analysis:

1. **DS educations/certifications**: Investigate differences and commonalities between current DS educational programmes in Denmark and abroad.
2. **LinkedIn profiles**: Knowledge of how DS work and which skills are considered important for their profession.
3. **Job vacancies**: Learn more about frequently requested skills and functions of DS by employers.
4. **Stakeholder expectations**: Determine the expectations to future DS from various key stakeholders in society.

The methodological strategy included using: text mining, content analysis and topic modelling with the use of R to explore a corpus of job vacancies for DS from international job-seeking databases and LinkedIn profiles describing the roles and competencies of DS in Denmark, as well as interviews and systematic literature search.

### Conclusion

- Collaboration between academia and industry result in relevant educations that have a stronger recognition in stakeholder communities, including potential employers, thus improving the student's employability.
- Course design based on experiential learning creates motivation and presents the student with real-life requirements to data stewardship.
- DS work in a multitude of contexts, primarily functioning as a bridge between different stakeholders.
- Skills and competencies must not be limited to technical proficiency alone. Hard skills such as coding, software and system knowledge must be supported with Soft skills like the ability to communicate, teach, and assess the value of DS.
- Disciplinary knowledge, teamwork and project management are requirements for curricula.
- Certification should be renewed regularly and further education should be offered to ensure skill maintenance.

### The 4 roles of a Data Steward

**THE ADMINISTRATOR**
- Team player
- Can-do attitude
- Implement solutions and educating end-users about them
- Focus on execution in strategic development
- Structured and analytical mindset
- Passion for policy and IT security
- Establish good practices in compliance & data privacy
- Risk assessments
- Fast learner

**THE ANALYST**
- Programmer
- Statistical & data analyst
- Fast learner and innovative on building custom software and databases
- Ensure data quality
- Enthusiasm in cloud solutions
- Seek challenges, have positive attitude towards reporting

**THE DEVELOPER**
- Process optimization via good project management
- FAIR principles advisor
- Data planner
- Focus on collaboration and knowledge sharing to raise business intelligence
- Innovative
- Develop procedures & guidelines

**THE AGENT OF CHANGE**
- Client & customer oriented
- Mediate processes & operations
- Passionate to implement solutions via project & change management
- User empathy
- Focus on execution of policy and strategy awareness
- Agile mindset
- Enthusiastic

### The 3 models for Data Stewardship Education

**Students with BACHELOR degree**

- **Directed corporate employment**
  - One-year master programme
  - For students who fulfill requirements to basic programming skills, study skills, subject knowledge and academic language level.
  - Two-year master programme
  - For students who do not meet the requirements for programming and study skills, follow a pre-master’s year before the master’s and then continue with the one-year master.
  - Two-year candidates
  - Traditional university candidates combining theory, methods and internships: A dissertation in the area of DS is required.

**Students with a Ph.D. or equivalent**

- **Directed corporate or academic employment**
  - For PhDs from any field at university faculties or part of research teams in industry. Educational programmes are a collaborative endeavor between faculties, library or knowledge centers, Centers for Information Security, Data Steward Community, Research coordinators, Project PI’s, System Developers, Communication and Teaching teams, the Graduate School (for PhD training) & Human Research Ethics Committees.
  - Requirements: Short courses, workshops, mentorships, online modules, summer school programmes & MOOCs, that immerse the student in the DS Community.

**VET-students (Vocational Education & Training)**

- **Directed corporate or academic employment**
  - Flexible master programme
  - For students who have professional experience and wish to improve their DS skills but keep working full-time, or already have a master’s degree in any field.
  - The programme is a part-time vocational education with a prescribed period of study that the student individually plans, and a total of 60 ECTS-points.
  - The student combines elements from established programmes, thus it is a requirement that DS courses, such as the one year master and two year candidates, are available through the Open University.

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The poster and all results from the final report of the DM Forum sponsored project: National Coordination of Data Steward Education in Denmark, (Jan. 2020) is available at: [https://www.zenodo.org/communities/ds-edu-dk](https://www.zenodo.org/communities/ds-edu-dk)

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