

Trainee mentoring

Addendum REPORT FOR THE CERTIFICATION COMMITTEE

PROFESSIONAL DOCTORATE IN ENGINEERING PROGRAM DATA SCIENCE

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In our PDEng DS we recognize the importance of mentoring trainees in all technical and non-technical aspects. In this addendum we present how we have implemented mentoring throughout the program:

- Coaching on personal development
- Coaching on team working
- Coaching on leadership
- Coaching on feedback
- Coaching on communication
- Coaching on coaching skills
- Report writing skills
- Ethics and law,
- Case studies
- Final project

Trainee mentoring is done by the program coach, the program director, the lecturers involved in our educational program, and the company representatives involved in the projects. There are few touch points between the trainees and their mentors:

- First year trainees
 - Every two to six weeks, a coaching session with the program coach
 - Every three months, an evaluation session with the program coach and the program director
 - Weekly coaching with the lecturer during a particular module
- Second year trainees
 - Biweekly meetings with the university supervisor(s)
 - Weekly or biweekly meetings with company supervisor
 - Every six weeks meeting with the steering committee (university and company representatives)
 - Every six weeks coaching session with the program coach
 - Few coaching sessions on ethical aspects with the university supervisor or the legal practitioner

1. Coaching on personal development

At the start of the PDEng DS program all trainees design their personal development roadmap. This development roadmap is documented in the Training and Supervision Plan (TSP). Each trainee is intensively mentored in their first month in the program on how to elaborate their personal development plan. The mentoring is done by the program director and the program coach over few sessions adding up to five hours per trainee on average, and covering both technical development and professional skills development. The TSP is highly personalized and is followed up as part of the evaluation sessions (every three months) and on basis of trainee's request.

2. Coaching on team working

Team working is an essential professional skill in the job market. PDEng DS recognizes this and, therefore, invests much effort in training the team working skill. We encourage trainees to mention team working in their Training and Supervision Plan and to describe the actions they plan to improve their team working skills.

All activities in the first year are team activities: the projects our trainees carry out, the assignments in lectures and workshops, the Data Challenge Weeks, and the personal development activities they undertake. Although the graduation project is an individual assignment, we encourage our trainees to team up with their new colleagues in the companies and organizations where they carry out their assignment. Moreover, each graduation project has a project team that consists of the trainee, the problem owner(s), and the university supervisor(s).

Our program coach plays an important role in coaching team working skills. The coach organizes twice a year a workshop on team working skills, typically before the Data Challenge Weeks or when a new cohort of trainees start our program.

Every case study starts with, what we call, the team canvas. The newly formed team takes two hours to align their learning goals at the start of the project. The team canvas sessions are observed by the coach and/or by the program director.

The program director closely observes the team dynamics during the case studies. Trainees are encouraged to share their concerns with respect to team working; the program director and/or the coach only step in when agreements cannot be reached by the team members.

Effective team working is especially important during Data Challenge Weeks, when roughly half of the participants never met before, and the challenges are tackled in an intensive manner.

3. Coaching on leadership skills

Each team that works on a case study or a challenge during the Data Challenge Week has a leader. The leader is appointed on basis of trainees' learning goals.

Before every Data Challenge Week the program coach organizes a workshop on leadership skills. The newly appointed leaders always brings forward their learning goal related to leadership skills during the team canvas, at the start of a case study.

Leadership skills are continuously discussed during the ongoing activities with the coach and the program director. At the end of each project or challenge, the team members, the coach and the program director give feedback on the leadership skills.

4. Coaching on feedback

We interpret regard feedback as a continuous improvement mechanism (or behavior). The program coach organizes twice a year a workshop on feedback. In a highly culturally diverse community, feedback sessions are essential.

Every case study and data challenge ends with a feedback session. The program coach moderates the feedback session; the program director often participates to observe the team dynamics. Our trainees are encouraged to give feedback also during the projects when the team members feel it necessary. Trainees are especially encouraged to ask for feedback after their project presentations.

5. Coaching on communication

We interpret communication broadly. Improvements on communication skills are always discussed as part of the Training and Supervision Plan. The trainee, with help from the program director and the coach, decomposes the communication skills into actionable aspects, such as communication within a team, communication with stakeholders, written and verbal communication, non-verbal communication, emotion control, and concise, coherent and correct communication. These communication aspects are regularly discussed by the trainee with the program coach and program director as part of the evaluations.

Communication skills are also discussed during trainee's final evaluation.

6. Coaching on coaching

We encourage our trainees to improve their coaching skills. The program coach organizes once a year a workshop on coaching skills. Trainees then exercise their coaching skills during coaching sessions for the Bachelor and Master students at TU/e, during data boot camps for the Professional Education programs at JADS, or for the Introduction to Data Science shared elective course we organize at Graduate School level for trainees from other PDEng programs.

7. Report writing skills

Our program recognizes that report writing skills are essential for further professionalization of our trainees.

PDEng Data Science trainees follow a year-long course on Technical Report Writing by a specialized professor. Besides the lectures and assignments, the trainee has four individual sessions during this module with the professor and the program director on writing skills. Mentoring on report writing skills continues during the graduation project.

8. Ethics and law

In our program trainees are always tackling real-life challenges using customer data. In every project we discuss the ethical aspects of the challenge and of the proposed solution, while being very conscientious about the legal aspects of working with customer data.

All trainees undertake the Ethics and Law module provided by a legal practitioner. During their graduation projects the trainees are encouraged to have few sessions to discuss the ethical aspects of their challenge and the solutions they develop. Ethics and law aspects are also discussed in trainee's final evaluation.

9. Case studies

During the case studies our trainees have the opportunity to integrate their technical learning goals and exercise their professional skills. The teacher of the module associated with the case study mentors the trainees on technical aspects of their work. All our modules have a lecturing component and a project supervision component. The mentoring is done mainly during the project discussions.

The program coach pays close attention to the development of trainee's professional skills during individual coaching sessions, the team canvas, and the feedback sessions.

The program director mentors the trainees during their case studies at holistic level, combining technical and professional skills. Discussions are often related to design thinking.

10. Graduation project

The project team during the final project consists of the trainee, the university supervisor(s) and the company supervisor(s) (problem owner).

The university supervisor guides the trainee in drafting the problem description, project management and time planning. The university supervisor guides the trainee for the entire duration of the final project. The university supervisor is the main mentor of the trainee during the final project. We also refer to this mentorship as process supervision.

The trainee is encouraged to seek technical expertise among the academic staff affiliated either to our program, to JADS, or to TU/e and TiU. We refer to this type of mentorship during the final project as expert supervision.

There is always at least one supervisor on the company side; it can be the problem owner, but not necessarily. The company supervisor supports the trainee in his/her new environment and facilitates access to resources (data, domain experts, administrative). The trainee and the company supervisor have weekly or biweekly routines to discuss the progress of the project. The company supervisor is part of the steering committee, which meets every six weeks with the trainee to give feedback on the progress. The company supervisor is asked to give a formal feedback on trainee's development during final project once every four months. The program coach discusses the feedback with the trainee in their regular coaching sessions.

The program coach continues the regular individual coaching session with the trainee during the final project. The program coach is also in the lead during the intermediate evaluations of the trainee.

The trainees in their final project are encouraged to join the peer coaching sessions. During these regular sessions trainees have the opportunity to share their project progress with their peers and ask for feedback from their peers.