



**Development report
Industrial Engineering and Management
University of Groningen**

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Introduction

On 4 and 5 October 2022, the programmes Industrial Engineering and Management at the University of Groningen were assessed by an independent peer review panel as part of the cluster assessment Industrial Engineering and Management. During the site visit, a development dialogue was carried out in the form of thematic sessions. This resulted in lively discussions amongst teachers, students, programme management and the panel about the narrative, inclusion and future steps of the IEM programmes. This development report was written based on these sessions.

Description of the developmental themes

Theme 1. Narrative

The Industrial and Engineering and Management programmes have a solid curriculum with a relatively high focus on engineering and the full design cycle. The panel studied the aims and profiles of the IEM programmes and concludes that the strengths of the programme could be transformed into a clear narrative, which offers an attractive proposition to external stakeholders and prospective students.

The most important element in creating this narrative should be to identify the position of graduates in society and the professional field. The programmes should integrate elements into the curriculum which are necessary to train students for this future career, thus creating the glue that binds the curriculum together. Subjects which could be included in this narrative are as follows:

➤ *Management skills*

Management skills are important for an IEM graduate, yet the programmes are not very explicit on how students attain these skills. Some of the content is optional as students can choose extra managerial courses in their minor. The programmes could strengthen opportunities for students to obtain management skills. The programmes could consider consulting stakeholders (industry and societal organizations) about relevant skills as a starting point. The programmes should also strive to keep their courses up to date in this regard. This requires teaching staff to be familiar with new practices in management. Furthermore, attention could be paid to what is expected of a project manager in different roles (budget responsible, reporting to a board) in order to prepare students for working in industry.

➤ *Stakeholder analysis*

An important skill which graduates probably need in their future career is the ability to work with multiple stakeholders with conflicting interests. The programmes could prepare students for this by integrating stakeholder analysis into the courses. For project managers and business developers, it is important to be familiar not only with technological feasibility but also with stakeholder management and coping with dynamics in and outside their company and industry. They work in a broader societal context, which decides the scope and success of technological transitions can become. Students need to be trained for this, for instance by letting them practice with mock presentations for CEOs to convince them of their ideas regarding innovation.

The teaching staff could take the lead in what students should learn and know about such soft skills. Although skills such as stakeholder analysis are now part of several courses, the programmes can

integrate these more fully and make them more visible, for instance by having students keep a portfolio of their skills development. In the master IEM, students could use their own internship project to practice dealing with different stakeholders. In providing students with the knowledge and skillset to accomplish this in the courses, the programmes could differentiate between the skills necessary for various technology readiness levels of the associated technologies.

➤ *Innovation thinking and sustainable development*

The programmes are experimenting with integrating innovation and sustainability further into the curriculum, for instance through a new bachelor core course covering sustainable redesign. The programmes could further develop this and make it a core part of the curriculum. Although the programmes are already working on this, it is not yet part of the narrative of the programme. This could be further developed in the courses and the programme as a whole. The panel recommends bringing the sustainability elements in multiple courses rather than a separate course on this topic. This requires critical reflection, open mind and action from the entire teaching staff.

➤ *Preparation for dealing with complex transitions in society*

Society is changing rapidly, requiring companies to constantly keep developing in an increasingly complex environment. To be able to accomplish this, society and industry will need people who have a clear understanding of how to manage these complex transitions and are able to deal with complexity and uncertainty. It is important to train IEM students for this role. A good starting point to develop the programmes in this direction would be project-based assignments, where students could learn how to formulate relevant questions and create a network of people to help them navigate complex issues. This could be further developed in the curriculum and the narrative of the programme.

➤ *Transdisciplinarity*

The IEM programmes could aim to go beyond multidisciplinary (working with insights from multiple disciplines) to transdisciplinarity (combining various disciplines to make something new that was not part of the original disciplines). To achieve this, the teaching staff could be complemented with staff members who are actively involved in combining multiple disciplines. In addition, co-teaching of courses by teachers with different disciplinary backgrounds could be interesting for this purpose. To complement this, the programmes could investigate how to assess transdisciplinary skills.

Theme 2. Inclusion

Both disciplinary and cultural diversity are important aspects of the programmes. The programmes have seen an increase in international students in the past years. This has resulted in more attention being paid to openness and equal opportunities.

To promote diversity as a learning opportunity, the programmes use team-based learning, allowing students with various backgrounds to learn from each other. In certain courses, students interact with other programmes, such as Chemical Engineering. IEM is looking to expand this, but it is difficult because of rules and regulations within the university. The panel advises programme management to persevere in working with students to help them practice their skills in a multistakeholder environment.

Every year around 50 or 60 students are selected for teaching assistant (TA) programmes. All students beyond the first bachelor year are eligible to become TAs, who are paid and part of the teaching staff. The TA programme consists of training, workshops, information on how to teach in English, a workshop on conceptual thinking, etc. It is noted that students in a TA programme usually develop themselves to become very motivated and proactive. The IEM programmes are, however, struggling with the downside that students not in the TA programme can feel excluded. The panel recommends the IEM programmes to consider making developing general skills through extracurricular activities part of the programme, with the TA programme as one of the possibilities to achieve this. This might create other opportunities for students not in the TA programme to obtain similar experience.

Theme 3. Future steps

Bring the outside in

Companies and society have become increasingly intertwined in dealing with complex societal transitions. Students should learn to understand the societal context they will interact with during their careers. The IEM programmes are considering creating a pool of guest lecturers from outside academia who can contribute to courses and provide students with insights from the professional field (bring the outside in). According to the panel, this pool could form a *denktank* that provides input from industry and society. This could even be implemented on the short term. In addition, the panel suggest to regularly ask alumni to present their activities in industry and how these are linked to the IEM programme.

Unique selling points

According to the panel, the programme is currently not fully communicating the unique selling points of IEM to external stakeholders and prospective students. The panel observed that even in the documents, unique selling points are not readily apparent. The interviews and tour of facilities provided the panel a more explicit and vivid impression of unique selling points such as a strong engineering focus, impressive facilities, lively learning communities and passionate teaching staff. These and other unique selling points could be identified and elaborated. The next step for IEM is to align the programmes and courses with this message. Clear communication within and outside the programmes is important for strong positioning of the programmes. This can also enforce student engagement if it is made clear to students what they will become and continue to make that point during the programmes. The programmes could use outside information and insights from industrial and societal stakeholders, including its alumni, to work on this narrative. To further develop this narrative, it might also be beneficial to obtain advice from an external communication professional not associated with the programmes.

Branding

The panel notices a tendency in the programmes to underline its geographical position in order to explain why students might opt to follow a programme elsewhere. The University of Groningen often calls itself the 'University of the North'. According to the panel, this carries the risk of becoming a self-fulfilling prophecy as the supposed isolated position of the university is being stressed. Since the Netherlands is still a small country, the panel thinks that the programmes should focus more on branding and what they are good at, not the physical location of the university. The programmes should underline the strong selling points of the programme and let the rest speak for itself.

The master IEM has significantly lower student numbers than the bachelor IEM. Many students opt for a master's programme at another university after completing their bachelor at Groningen, and there is not sufficient inflow from other universities to balance this. According to the programmes, students often provide career perspectives in the Randstad region as a reason for leaving Groningen. The panel suggests

that IEM could make it more clear to students that, contrary to the popular perception, there are sufficient career perspectives in the north of the Netherlands. There are several companies in the region that are in need of employees, particularly related to sustainability-related topics. This might convince bachelor graduates to stay at Groningen for their masters or attract master students from other universities to Groningen.

Internationalization

The panel recommends that IEM investigate opportunities to go elsewhere within the programme. IEM can work on one-to-one relationships with other universities. Perhaps it can benefit from its international staff in making connections. Currently, this happens ad hoc. It can be done in a more structured manner, for example by each month going through a list of contacts and what programmes students can enter.