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Note

Good practice: Innovation Labs

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Note to reader: honors keywords (see introductory article of this issue) *in italics* in the text

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1. Introduction

In the Rotterdam University of Applied Sciences (RUAS) in The Netherlands an honors minor has been developed in which honors students from different disciplinary study programs tackle, in *multidisciplinary* groups, an *authentic* and wicked problem from professional practice: the Innovation Labs (I-Labs). The organization of these I-labs, where teachers, coaches, and external expertise can be requested by the students, will be explained in this note.

The majority of the honors program takes place in semesters three to eight of a four-year bachelor program. The Innovation Labs take place in semester seven (minor period). For the honors student, participation in the Innovation Lab is a minor of 30 EC (20 week program, 5 days a week). This honors minor replaces the regular minor for honors students.

2. Why this good practice?

An Innovation Lab offers what we call a Powerful Learning Environment, where honors students and teachers from different backgrounds and disciplines work together to develop a practical solution for an actual and wicked problem. This problem comes from the regional professional environment of the university. A problem is wicked if it has been widely regarded as *authentic* and as a major *challenge* for some time and if there is no obvious solution to it.

Examples: with which measures or services can the hospital offer innovations that are important to their patients? Or: how can young mothers in the city (Rotterdam) with often stacked problems (health, education, economic, etc.) become better self-employed citizens?

The 'powerfulness' of these issues is that we do not cripple the problem to make it 'workable' for students; it should be left as a whole. They really need to work with the actual problem to get really involved and really engaged with it. And, of course, this is also a major challenge for their teachers! They must be able to admit they don't have a solution either or do not know enough of the issue to provide students with a solution. They do need to have a network of experts for the students to turn to, however.

3. Target group and target group size

The honors program at RUAS lasts three years, from the second to the fourth and final bachelor year. The first part is done in the second and third bachelor year and is mostly on top of the regular program. Internships can be replaced by honors-internships, as well as projects in cooperation with external partners. The minor part, the I-Lab, a course of 30 EC, which is taken in the first semester of the final bachelor year, can be taken instead of a regular minor.

4. Educational design (structure)

The starting point for the design of the Innovation Labs is that students contribute to the *multidisciplinary* assignment from their own discipline. In this *multidisciplinary* context, students must learn to introduce their own knowledge and discipline: what role does their knowledge play in this issue? This requires mutual coordination but also specific in-depth issues in their own discipline. It is therefore deepening and enriching their disciplinary knowledge and also often their skills within a broader context. Most of the time, students find out there is still a lot of knowledge in their discipline they don't know yet and find out some of it might be helpful in this specific situation and cooperation. Students say they develop themselves as a person and as a professional.

When organizing the Innovation Labs, the university assumes a number of social themes that are actually within the city, the university of applied sciences, and the university's knowledge centers. For a longer period (preferably three to four years), this university, in cooperation with external strategic partners, selects one or more issues that meet the above conditions. The external partner (or partners) acts as the client. The client is supposed to be part of the learning *community* as well. Under the supervision of a research group (and possibly with contributions from other knowledge centers), an Innovation Lab will be set up around this theme.

-Different models

Different models for the learning community of the I-labs are tested. For example, there are models that are organized around their own study program, in which topics are on the agenda that provide different perspectives from the disciplinary knowledge on the input in the various Innovation Labs. There are also models that are organized around the content theme and that are very externally focused on clients, experts, and the professional field. Research has to clarify the value of the different models.

-Learning community

During the participation in the honors program, the student is part of the learning *community*. The learning *community* is led by a lecturer or (head) teacher and includes the students, the teachers who supervise them, and the lecturer-researchers associated with the

research center. At the I-Lab, the client of the project is also regularly involved with the community. If useful and available, external parties are also part of this community.
The apprenticeship community is the home base for the student during the honors program. From the apprenticeship community(/ies), he/she participates in extra education in the form of workshops, symposiums, and training courses. Within the community, the student prepares for his graduation research.

5. Student assessment
There are many variants for the completion of the I-lab. The aim is to achieve a student-organized conclusion regarding the question: in what way do your products or findings best come into the limelight? In almost all cases, the client participates, including his / her organization.

The central question at completion of an honors project is always: what impact does your proposal, solution, or product have, and how does the client deal with it? What attunement has arisen between students, the problem, and the client, and how do you notice that the client values and carries the work and solutions of the students? In addition, teachers have an impression about the way in which students have behaved and developed professionally (and sometimes also give feedback on their *personal development*) based on the extent to which they have developed on the five competencies of the 'Learning to Innovate' profile' (Miltenburg & Weerheijm, 2018) (*assessment*).

The I-Lab in the hospital often organizes the final presentation in the symposium hall of the hospital and the students present their products and findings to those present at the various departments, the innovation center of the hospital, and (often) also to the board. Critical questions are asked, and it is soon noticed whether or not the end products 'catch on' with the stakeholders.

6. Experiences
The Rotterdam University of Applied Sciences started the first run of 11 Innovation Labs in February 2010 with over a hundred students. They focused on Rotterdam issues by working together in a *multidisciplinary* way, innovating and sharing knowledge with students, teachers, and lecturers from different fields. In that initial setup, one day per week was available for the Innovation Lab. Meanwhile, the Innovation Lab has grown into a full-fledged university-wide accessible minor with 30 ECTS.

Within this approach, the following is the golden rule: the issue is leading for the organization of educational activities. Teacher and coach stimulate by asking specific (*coaching* based) questions but are not necessarily the content experts. The *multidisciplinary* collaborating students will have to develop into innovative experts in their field. The competences of the Learning to Innovate profile of the university 'steers' the educational activities and the assessment framework for the student's learning process.
The question to students: 'What did this honors education bring you?' they almost invariably answer as: 'Designing my learning process and learning from each other in multidisciplinary collaboration.'

In interviews, students say that they started the honors program having various motives: some needed more challenge, others had an inquisitive attitude, but there are also quite a few students who wanted to get more out of themselves or to distinguish themselves, like, for example, in their resume (CV), for more opportunities on the labor market. The challenge for them is not only in the theme but also in the I-Lab team, as a student said: 'The team of students that formed per I-Lab was very diverse in nature. It is also a challenge to let the whole team function as a *team* and to frame the theme in such a way that all students would benefit from it because of their study wishes' (Lappia, Weerheijm, Pilot & van Eijl, 2014).

Students experienced a great added value by working with other disciplines. Students indicate that *multidisciplinary* work has had special advantages for them, such as the experience of working together with the various disciplines: 'The different insights and expertise that come together are great'. And: 'There is enormous added value in working with other disciplines because you get to know those disciplines. This has two clear advantages: first, you learn to understand the other, making communication about topics on the interface of disciplines easier. Secondly, you learn how the other discipline works and adjust your own work so that it can be transferred with as few bumps as possible. Both aspects are indispensable in my field' (Lappia, Weerheijm, Pilot & van Eijl, 2014).
The honors program has made a remarkable contribution to the personal development for all students. Someone says that he has looked up the limits of his learning abilities and has developed further through the challenges and opportunities offered than all of his fellow students. Another says he has become more enterprising, and he became more aware that it is essential that, if you want to get something done, you should simply take steps to achieve that.

7. and 8. Time requirement for teachers and Tips for teachers
-First time: Under-structured and over-prepared
Innovation Labs are characterized by 'under-structured and over-prepared.' To make experimentation possible (as we have learned), the structure of the Innovation Lab must be open. Traditionally, it appears that, in descriptions of educational programs, the structuring has the focus, and the preparation is mainly involved in this structuring. Allowing an open structure often means that students can develop different speeds and can also take different routes to the approach of the problem. The group dynamics also require specific attention from the lecturer. How far we go into it illustrates the (somewhat, but not much exaggerated) approach of the I-Lab in the hospital. Teachers say: 'we have a workshop for day 1 and day 2, and on day 3, we ask: What are we going to do? Then, of course, students start panicking....'. In order to transform this panic to a meaningful learning environment, as a teacher you have to prepare a lot: what questions make them think about what to do? What prospects could students take up? Which experts are available? How do the individual students deal with this? How do I / do we ensure that they develop their competences? What do I have to 'prepare' and what to keep behind? Until when should I contain myself while students are struggling? How does their learning process develop?
It appears important to develop skills for both *coaching* the individual students and for *coaching* the group process. Keeping in mind the different steps in the well-known 'The Hero's Journey' (Campbell, 1949; van Eijl & Pilot, 2016) gives a pretty good idea of what might happen during the semester and maybe gives a certain grip of personal and group dynamics.

-Second time and further
Learn from the first time to do better next time, to become more experienced, to respond better to the differences between your students, etc. Teachers generally learn to 'sit on their hands' better and to intervene better at the right time.
Experiences with students are described in: 'Conversations with honors students: about personal and professional development' (Lappia, Weerheijm, Pilot & van Eijl, 2014; Blom, Bosch, Flipsen & Persaud, 2013).

9. Tips for students
The main tip for students is: 'Get in with an open mindset and be ready to find out what your education is about.'

The approach to the problem is essential. That determines whether a project leads to something that has value. Sometimes, the problem on hand is investigated in a systematic way, as the following statement from a student points out: 'We first looked at what the problem is, where this problem came from and how big the problem was. Then we made a division with our fellow students, who focused on which sub problem. This way we could bring everything together and we had examined every detail. After we had finished our individual research, a start was made to share the findings of each other's research. On this basis a "solution" was developed, which in this case was a new product' (Lappia, Weerheijm, Pilot & van Eijl, 2016).

In the multidisciplinary teams of the I-labs, disciplines have to be bridged. 'By trusting everyone in the knowledge from their own field and to give everyone an equal input,' says a student. It is also important to get to know each other better in the team: 'In the I-Lab it really helped that we started to get to know each other first. To talk to each other, but above all to attend the presentations of professionals and then discuss this. In another team it was important to first discuss where the qualities and expertise of the various disciplines lie. In this way you can move questions quicker or just pull them towards you in order to keep the momentum in a project and to keep discussions understandable' (Lappia, Weerheijm, Pilot & van Eijl, 2016).

10. Transfer to other programs
The approach of the I-Lab has already been applied to other courses in the university when working with case studies. It also inspired the 'Try-labs' (Try-out-laboratories) in the first and second year at the Rotterdam University of Applied Sciences.

11. References, additional information and relation with Circle of Talent Development

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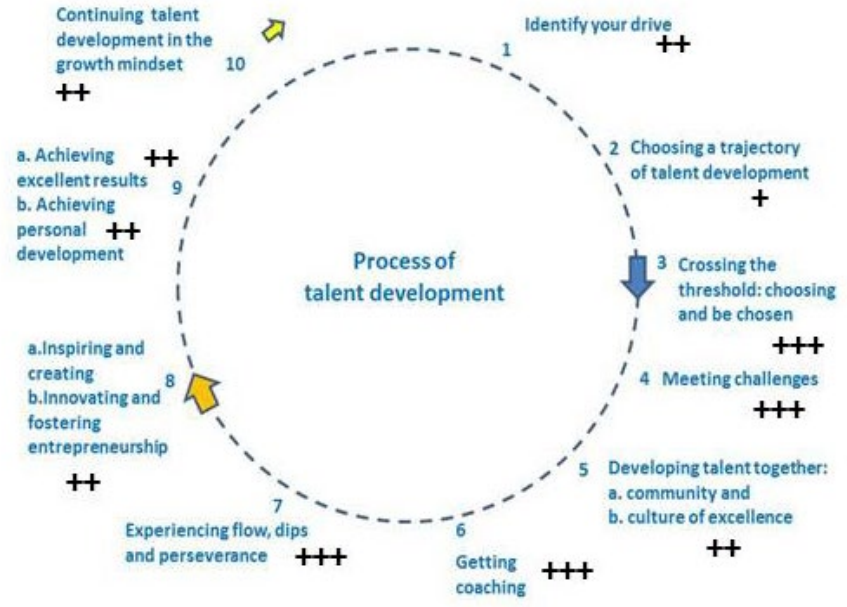
Relation with Circle of Talent Development

In the introductory article of this issue of *JEHC*, the 'Circle of Talent Development' has been described. Based on interviews with forty honors students and literature about honors programs, it reflects relevant activities of students regarding the development of their talents in an honors program. The author of this note has been asked to score the good practice in relation to the activities in the Circle of Talent Development. The meaning of the scores is: + = somewhat important; ++ = moderately important; +++ = very important; - = not applicable or irrelevant. The scores are intended to illustrate the strengths of a good practice for the reader.

Figure 1. Circle of Talent Development in relation with the good practice 'Innovation Labs' with the teacher's scores



Question to the teacher: What makes this good practice attractive for other teachers?
The teacher of this practice argues: 'What makes it attractive is that your role as teacher is completely different. The main role of a teacher in an innovation lab is *coaching*, but as in that *coaching* the *learning process* of the student. You need to be alert to signs you would normally find not important in regular class: what assumptions is the student working on, how did the student prepare him/herself, in what way can I (as teacher) encourage the student to ask questions to think further than the first thought? How can I facilitate this student to encourage and not interfere in the learning process he/she is in? An important issue is of course the design of the Innovation lab: what kind of possibilities are there in this 'issue,' which will enable the students to encounter all different kinds of experiences and knowledge to research?'