

Intellectual Output 5

Developing assessment methods

Leading partner: Aalborg University

IO 5 – development of assessment methods was integrated during the whole period of the project, as one of the project goals was not only to develop and try the new curriculum for teaching road design with digital tools, but also to evaluate the effect of the new teaching form and curriculum.

To understand this IO, one should first read IO2 about the InRoad method, IO3 on the developed didactic measures and IO4 on the international learning environment as IO5 will describe how the new curriculum, teaching methods and international environment were assessed. The results of this IO will document the fulfillment of the project goals - the developed teaching method itself and teaching didactics as well as the environment chosen for the learning.

IO5 documents in what degree project has been successful at fulfilling the project goals. IO5 detects how project partners were successful with other IOs and in particular with IO2, IO3 and IO4.

Overview on the project goals (from the application) and a connection to other IOs:

1. Students improve their road design skills during workshops (IO2)
2. Students understand new digital tools (IO3)
3. Students learn theory behind the digital road design (IO2)
4. Students learn new ways of working: group work, cross-disciplinarity, global setting (IO3 and IO4)

The assessment process had focus on the several areas:

Have students, who participated at any of the 4 InRoad workshops, improved:

- their knowledge of road design theory
- their understanding of new digital tools
- their knowledge on theory behind the digital road design
- their skills on applying digital road design tools
- their competencies by learning new ways of working: problem-based learning.

Assessment methods:

The classic way to fulfill the assessment on the learning progress is to hold classic examinations. This method was rejected due to the necessity to keep the informal atmosphere of the workshop as well as shortage of time in order to develop the classical examinations. Project partners have developed our own assessment methods in the frame of IO 5 and conducted those assessment measures:

1. Survey for all participants of the InRoad workshops, answered individually and confidentially.
2. Focus group interviews during the InRoad workshops executed within the national groups.
3. Evaluations of every day in the project within the mixed national groups, which have been working on the same “project” during the workshop.
4. Interviews with teachers.
5. Interviews with the industry representatives.

1. Quantitative survey

During the whole project period project partners set up the online survey, which students had to fill in right after the workshops, so they have fresh memories and insights.

Survey's design is based on the *learning outcomes*, which the project partners found as the most important for the learning process of the students and, also, best corresponding to the goals of the project. Learning outcomes, which had to be measured by self-assessment, consisted of three main groups: related to knowledge, related to skills, and related to competencies.

Learning outcomes measured in the project:

KNOWLEDGE

The students understand the interdisciplinarity of road projects.

The students have knowledge about the concept of Integrated Concurrent Engineering.

The students understand the theoretical underpinnings behind the design tool (Novapoint).

The students understand output from the design tool as it relates to a road design project.

The students understand how design work in the office translates to practice in the field (i.e. machine control system).

SKILLS

The students can:

- Create basic models in Novapoint/Quadri.
- Apply theoretical and practical BIM knowledge to solve subject-related challenges and tasks (both individually and through collaboration).
- Master and demonstrate skills in Novapoint/BIM software relating to import and export of BIM information using standardized data formats/IFC between different software.
- Apply BIM theory in practical model- work in Novapoint.

COMPETENCIES

The students can:

- Work as part of a multi-national team.
- Collaborate with (and have respect for the roles of) other professionals in a design process.
- Find and utilize relevant regulations, handbooks, instructions, and documentation.
- Communicate through and interpret 2D/3D drawings/models.
- Work and communicate in English (common language) within a road design project/problem.
- Work within an ICE environment.

Self-assessment survey also includes the assessment of the methods and working environment during the workshops, as well as other parts of the workshop such as presentations by industry partners, where students were introduced to various applications of digital tools. The industry presentations are discussed in other IOs, so in this IO we will be focusing on self-assessment of learning objectives.

The survey set up is meant to be standard for each workshop, so that a comparative analysis can be made, pointing out the progress from workshop to workshop. Minor changes, though, occurred depending on the program changes in the different workshops. For example, InRoad workshop at Oulu University offered a day at the Oulu zone with an automated machine learning workshop, while other three workshops had a day with an ICE session.

In Total 70 students have answered the survey.

The survey's questionnaire is attached as an annex1.

Comparative analysis

The survey starts with the general evaluation of the knowledge behind the road design theory.

In total four workshops were executed in the project. Timeline of the executed workshops:

1. Workshop at Oulu University (31/10/2021-05/11/2021)
2. Workshop at Jönköping University (13/02/2022-18/02/2022)
3. Workshop at Aalborg University (23/10/2022-28/10/2022)
4. Workshop at NTNU (12/02/2023 – 17/02/2023)

Assessment of knowledge

After each workshop students were asked to estimate their knowledge on a scale from 1 to 5, where 1 equal strongly disagree and 5 equals strongly agree.

As table no.1 shows, there is not a big difference in how students assess their knowledge, but generally the assessment is quite high. Of course, knowledge depends also on the standard curriculum at their home universities and the 5 days workshops cannot fill all the theoretical gaps if there were some.

	Oulu	Jönköping	Aalborg	NTNU
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I understand the interdisciplinarity of road projects	4	3,93	4,18	4,18
I have an understanding of the concept and purpose of Integrated Concurrent Engineering	3,9	3,60	3,94	3,94
I understand and can explain the theory behind the design tool (Novapoint)	3,85	3,53	3,59	3,71
I understand the output from the design tool and its relation to a road design project	4,2	4,27	4,06	4,24

Table1 Self-assessment dynamics in knowledge progress after each of 4 workshops

Assessment of skills

After each workshop students were again asked to estimate their gained skills in the scale from 1 to 5, where 1 equals strongly disagree and 5 equals strongly agree.

Self-assessment of the gained skills varies a lot, and it is hard to determine if the workshops had positively contributed to progress of the gaining skills in road design with digital tools. It is worth mentioning that it was not the same students who participated in every workshop and that students come with their different academical backgrounds. There is no baseline where we could estimate the progress of the skills obtained.

Overall students estimate their skills high, though we cannot determine a clear pattern among the workshops.

	Oulu	Jönköping	Aalborg	NTNU
I can create basic models with Novapoint/Quadri	4,35	4,27	4,24	3,75
I can apply theoretical and practical BIM knowledge to solve real challenges and tasks	3,75	4,00	3,71	3,69
I can import and export BIM information using standardized data formats in Novapoint/BIM software	3,8	3,73	4,06	3,94
I can apply BIM theory in practical modelling work in Novapoint	4	3,73	3,59	3,88

Table2 Self-assessment dynamics in gained skills progress after each of 4 workshops

Assessment of competencies

After each workshop students were again asked to estimate their gained competencies in the scale from 1 to 5, where 1 equal strongly disagree and 5 equals strongly agree.

After a look at table no.3, we notice that students are very positive about their gained competencies. They are confident in working in a multinational team setting, can collaborate with other professionals on a project as well as can communicate and interpret 2D/3D models and use English as a common language for communication within the road design problem.

	Oulu	Jönköping	Aalborg	NTNU
I can work as part of a multi-national team	4,75	4,53	4,71	4,69
I can collaborate with the other professionals in a design process	4,65	4,07	4,65	4,56
I can find and utilize relevant regulations, handbooks, instructions and documentation	4,2	3,73	4,47	4,19
I can communicate through and interpret 2D/3D drawings/models	4,25	4,07	4,29	4,31
I can work and communicate in English within a road design project/problem	4,45	4,33	4,65	4,63
I can work within an ICE environment.		4,00	3,88	4,19
I can plan, execute, and evaluate a simple ICE session		3,80	3,71	4,06

Table3 Self-assessment dynamics in gained competencies progress after each of 4 workshops.

The evaluation of the ICE sessions is interesting as students do not learn this method at their universities. The knowledge and competencies related to the ICE method are only obtained at the InRoad workshops. The estimation of competencies related to being able to work and execute an ICE session is lower than estimation of other road design related competencies, but estimation increases from one workshop to another.

Evaluation of the InRoad method

In IO2 the InRoad method is described more in details, but shortly the method consisted of two parts that have been the same through all four workshops: advanced Novapoint classes and modelling time for international project groups. Other parts that have been changed or modified from workshop to workshop.

Novapoint Advanced classes

The idea behind the setup for Novapoint advanced classes are also to be found in IO2. In short, it was a one-hour intensive lecture, where the instructor in fast pace showed the instructions for the days modelling work.

Evaluation of Novapoint advanced classes was generally lower than other parts and/or students' satisfaction on the learning at the workshop.

It is worth mentioning that the level of knowledge and experience prior to the workshop with the digital road design tools is very different among the students from different universities. So, if one student estimated the pace of advanced lectures as too high, it could be just right for another.

At the daily evaluations the students would often complain that the pace of the advanced classes was too fast, they would ask for recordings of the lecture and complain that the number of tasks to solve were too high.

Table no.4 shows that Novapoint advanced classes were a good preparation for the modelling time afterwards and that the class strengthened previous knowledge and skills in Novapoint.

Evaluation of Novapoint advanced sessions				
	Oulu	JU	Aalborg	NTNU
The Novapoint advanced sessions increased my knowledge and skills on design of crossroads	3,75	3,8	3,76	3,75
The Novapoint advanced sessions strengthened my previous Novapoint knowledge and skills from my home university	3,25	3,93	3,76	3,94
The Novapoint advanced sessions were useful for my future education	3,75	3,8	3,71	3,88
The Novapoint advanced sessions were useful for my future career	3,65	3,93	3,71	3,69
The Novapoint advanced sessions increased my knowledge and skills on design of terrain	3,15	4,13	3,41	3,69
The Novapoint advanced sessions were a good preparation for the modeling sessions	3	4,13	3,29	4
The Novapoint advanced sessions increased my knowledge and skills on design of drainage	3,15	3,33	3,00	3,5
The Novapoint advanced sessions were concrete and clear	3,1	4	2,94	3,63

Table no.4 Estimation of Novapoint advanced classes

Modelling sessions

The core of the InRoad method (look for more details at IO2 report) is the group working together with the problem using problem-based learning.

Every workshop had around 20 participants, evenly distributed among the 4 universities. They have been divided into mixed groups, where the mixing method was different each workshop. First, we tried to find a gender balance and mix participants according to their level of Novapoint knowledge.

Participants spent around 5-6 hours daily, modeling and solving the road design problem together in the group, adding more elements every day. On the final day groups had a nearly finished element of a road intersection with ramps and drainage.

Table no.5 shows us that modelling sessions in Jönköping were best evaluated. The availability of the facilities at the Jönköping university were unique, as Jönköping university, as the only among

the project partners, could provide a dedicated computer classroom for the students, so a lot of technical problems were solved very quickly. While during the other workshops, internet connection, software problems were a continues challenge.

Generally, participants assessed the modelling sessions positively, as being useful for their future careers and education.

Evaluation of modelling sessions				
	Oulu	Jönköping	Aalborg	NTNU
I got some unique skills during those sessions	3,40	4,13	3,29	3,47
I got a chance to work on a realistic real-world problem	4,20	4,13	3,71	4,2
were useful for my future career	3,90	3,93	3,88	3,87
were useful for my future education	3,90	3,80	3,76	4,13
I got a chance to work independently	3,90	3,73	2,94	3,87
I got a chance to apply theoretical skills into the practical design	3,65	3,73	3,59	3,93

Table.5. Evaluation of modelling time

Modelling time was generally evaluated as the part in the workshop which contributed most to the student's professional learning and development (see table no.6).

How did the following workshop parts contribute to students' professional learning & development?	Aalborg	JU	NTNU
Modelling time	3,88	4,27	4,06
Novapoint advanced (lectures)	3,24	4,07	3,69
ICE session	2,65	3,2	3,06
CoClass	2,12	-	-
Savefuel			3,44

Table No.6 evaluation of main parts at the InRoad workshop

One of the main didactic methods of the InRoad workshop was work in the mixed national groups. The justification of this and a more detailed description of the method, can be found in IO no.3 – development of didactics.

In table no.7 we can observe that students evaluate group work as a method to fulfill modelling tasks positively. In the focus groups interviews and daily evaluations, students also mentioned that they learned a lot from each other's knowledge and skills and that the different skills of group members contributed a lot to the overall learning process. The positive evaluation of the group work increased from one workshop to another. Students are also satisfied with their own and their team members' contribution to the group work.

There are slight differences in the evaluation of the cooperation in the group (see table. No.7). Evaluation of the cooperation in the groups is slightly lower in the workshop at the Jönköping university than in other universities. This can be due to the above mentioned fact that JU had a computer class, where each student were sitting behind the own screen and this physical arrangement was not encouraging good cooperation in the group, as in other universities students were able to sit in a small room, or at the same table and the cooperation was facilitated better, which can be seen at the answers to the survey (look table no.7)

Evaluation of the group work	Oulu	Jönköping	Aalborg	NTNU
Group work was a good method to fulfil the modelling task (compared to individual work)	3,75	4,40	3,88	4,27
I am satisfied with the contribution and efforts made by my team members	4,15	4,07	3,76	4,2
I am satisfied with my contribution and effort in the team	4	4,00	3,82	4,27
Cooperation in my group was good	4,4	3,87	4,06	4,2
I think that the creation of the groups went well	4,05	3,87	3,76	4,13
I had a clear understanding of my role in the group	3,9	3,80	3,65	4
Group was balanced and group members complimented each other	3,8	3,80	3,41	3,8

Table no.7 Evaluation of the group work

Preparation for the workshop

During the project time, project partners have agreed on common and individual preparation activities.

Students, willing to participate in the InRoad workshop had to fill in the application form, consisting of questions regarding their motivation to participate in the workshop, their self-assessed level of road design theory knowledge, their previous experience with Novapoint, problem based learning and English skills. Information from the applications was used to choose the right participants, and distribute the students into groups based on their knowledge and expectations.

The students' motivation to participate at the InRoad workshop was mainly to improve their Novapoint and other road design software skills, to meet other students interested in road design, to prepare better for the future careers in road design.

The students' knowledge of road design theory varied from basic to good knowledge. We can assume based on the university curriculums, that all students had similar theoretical backgrounds. This cannot be said about the student's previous experience with Novapoint. The answers varied from no experience to summer job using Novapoint. As described above the differences in previous experience in Novapoint was used to appoint the students to the mixed national groups. At the workshop in Aalborg it was made sure, that each group had a person with a lot of experience, and at the workshop in NTNU all group members had a similar level of experience. These changes were made in order to determine, which group composition encouraged learning best.

Not all students had the same level of experience with problem-based learning. At Aalborg University all student projects are done as PBL work in small groups, while the students work a lot more individually at Oulu University.

As mentioned above, project partners have arranged some common preparation activities and some individual. Oulu university arranged a basic Novapoint course for their students, as the Novapoint skills of Oulu University students were too low.

An online intro meeting was arranged for all participants with the goal to introduce the project, workshop agenda and the teachers and students. This meeting was not arranged for the first InRoad workshop at Oulu university. At the table no.8 we can observe that the level of being well informed about project goals has gone up with the introduction of the online meeting prior to workshops.

Preparation for the workshop	Oulu	Jönköping	Aalborg	NTNU
I was well informed about goals of the workshop	3,55	3,73	3,53	4,07
The online meeting before the workshop was useful in knowing what to expect for the workshop.	0	3,40	3,29	3,67
My communication skills (in English) were sufficient to understand and fulfil the tasks	4,5	4,53	4,47	4,4
My group work skills were sufficient to participate fully in the workshop	3,95	4,13	4,47	4,53
I had the Novapoint software skills necessary for the participation in the workshop	3,6	3,73	3,71	3,33

Table no.8 Self-assessment of the preconditions for the participation at InRoad workshops

From the students' answers to the survey, we can see in table no.8 that they had enough English communication skills, which were sufficient for understanding and fulfilling of the road design tasks. Students also assessed their prior experience with group work as being sufficient for full participation at the workshop (see table no.8). As mentioned before, students' skills in Novapoint and other digital tools for road design were very different. This fact can explain lower self-assessment of the Novapoint skills necessary for the participation in the workshop.

After the workshop – fulfillment of expectations

From the table no.9 we can see that fulfillment of personal goals is evaluated positively. Students felt that they were challenged at the workshops and the students have achieved their goals.

Less convincing, but still positive is the evaluation of the participation at the workshop and increased prospects for future employment or positive contribution to the studies. To measure the positive influence of the participation in the workshop, a long-term evaluation measurement would have to be arranged.

Students also positively evaluated their ability to develop a professional peer-network with the help of participation at the workshops. Only participants from the Aalborg workshop have evaluated this negatively.

Fulfillment of personal expectations and goals	Oulu	Jönköping	Aalborg	NTNU
I have been challenged in this workshop	3,95	4,40	4,24	4,33
My personal goals for participating in the workshop are fulfilled	3,15	3,93	3,53	4,07
Participation in this workshop has contributed to my studies	3,70	3,93	3,35	3,93
Participation in the workshop has increased my prospects for a good job	3,70	3,73	3,76	3,93
I developed a professional peer-network during this workshop	3,60	3,73	2,94	3,87

Table no.9 Fulfillment of personal expectations and goals

Students were asked to answer if they would recommend the participation at the InRoad workshop to their study fellows. They good choose answers ranging from *would not advise to participate* (1) and *would highly recommend* (5). The average of the answers can be seen in the table no.10

Would you recommend your fellow students to participate in this workshop in the future	Oulu (%)	Jönköping (%)	Aalborg (%)	NTNU
	4,35	4,53	4,06	4,67

Table no.10 Recommendation to fellow students to participate in InRoad workshop

From the average answers we can tell that the students were in general happy with their participation in the workshop and would recommend or highly recommend it to their fellow students.

The students were able to comment freely on the workshop at the end of the survey. From their comments we can conclude that the main challenges pointed out by the students were connected to

their rather basic level of digital road design tool skills, - shortage of technical support during the workshop or technical challenges related to the software during the workshop. Students otherwise expressed contentment about the setup of the workshop and ability to expand their professional network.

2. Focus group analysis

At the last two InRoad workshops at Aalborg University and NTNU, project partners decided to carry out focus group interviews in the national groups. The goal of the focus group interviews was to look at any differences related to the countries and to get more personal feedback on the workshop.

The focus group interviews were placed on the last day of the workshop, where four of the teachers from the partnership each interviewed participants from one country. The guiding questions of the focus group is attached in a separate document as annex2.

In total 8 focus group interviews were carried out, recorded, and transcribed.

Expectations

Groups mostly repeated the expectations they had mentioned and already described in the survey. Besides the most often expectation, which was to learn Novapoint as a digital tool for their future work, groups also mentioned expectations to learn to work in an international environment, to use professional English and to expand their professional network. Among expectations_s, which were not met, groups mentioned technical problems with the software, time limitation, wishing for more time for the learning and practicing the software, and more focus on problem solution.

The source of learning at the workshop

The groups were asked where their learning mostly came from at the workshop. Most answers showed group work and groupmates sharing their knowledge as the main source of learning. Learning by doing, as a “try and error” method was also mentioned.

InRoad in comparison with other learning experiences

Students expressed that learning by practice and the condensed video lectures were very good, not only following the step-by-step instructions. The regular way of learning - you listen to the teacher and follow the instructions “don’t get to think and discuss how to do something”.

Skills developed at the workshop

It was already mentioned above that students’ expectations were mostly to learn more skills to use digital road design tools. Besides those skills, students mentioned that they also learned problem solving, communication and ability to work in an international setting.

Lessons from the work in international groups

One of the core elements at the InRoad workshop was mixed national groups to create a more global learning environment as the future work environment is both more and more complex and global. During focus group interviews students were asked to evaluate their experiences from the work in the international groups. Students mentioned that different languages created some barriers for common work, for example different language at the software, different road standards. Students also mentioned that an upside of the different languages was that they were able to compare the different way countries organize and work with road design. This experience has drawn students' attention to the question of necessity of common standards and rules, at least in Scandinavian region.

Challenges at the workshop

The main challenges, which workshops participants mentioned in the focus groups were connected to the too low level of knowledge in digital road design tool, which made the video lectures hard to follow and understand. Among other challenges mentioned were English as a professional language and issues on the leadership in the group – who initiates and manages the process in the group.

Future usage of the gained knowledge and skills

The last question discussed in the focus groups was how the students could use the gained knowledge and skills. Almost everyone emphasized that skills gained at the workshop could be useful for their future careers. Experiences gained at the workshop could also be used for future international careers and studies.

“I wish it would have lasted longer, because I learned way more than I have learned at our university. Also doing the tasks in groups was fun and better, than doing things alone, because I felt like I learned more when doing things in groups.” [student]

3. Long-term evaluation (students)

During the evaluation process of the project, it was possible to make interviews with the students, who have previously participated in one of the earliest workshops of the project, so that they could give not only an intermediate, but also long-term feedback. 5 students have been interviewed.

Students emphasized the method itself, which was very useful, as the learning included a lot of problem-solving, which at the end gave *“better learning and a real understanding of how software*

works". One of the students was able to participate in two workshops and could tell after the first workshop how it was possible to learn a lot in a short time due to the problem-solving method.

Another student, who is already employed emphasized that skills obtained at the workshop were useful for the career. Especially the use of professional English with international colleagues, usage of the professional vocabulary, working as a team and problem-solving were useful. Those are great contemporary engineering assets. It was also stressed that the workshop environment resembled a real situation, when there is not enough time, with shortages in budget and time. The workshop environment was different from the 'perfect' environment [in the class, safely following and repeating steps made by the teacher] during the standard learning at the universities and therefore more useful.

The third student describes communication skills, teamwork, distribution of tasks, working individually and in a team again as the main skills obtained at the workshop.

The fourth student again points to the InRoad method as "try and error" method, as the most effective method to learn how to use road design software and solve real problems, which is more effective than standard teaching, where one just looks at the teacher using Novapoint.

The fifth students, who is also already employed as a road design consultant described language barriers at the first InRoad workshop as the largest challenge, as there were different configurations of the software.

4. Evaluation from the teacher's perspective: Interview with the teacher

As a part of the general evaluation the teacher perspective was considered.

All universities and their students had generally similar preconditions before participation in the InRoad workshops (for more detail see IO1 report). It means that all universities teach a module on a road design course, which is structured in a similar way: theory presented first and then followed by Novapoint project assignment. The project assignment is usually based on a real-life road design project. An introduction is given how to the use of the software, followed by independent work by students.

There are also some differences among the universities on the teaching methods of the road design software. The duration of the introduction and further guidance on road design software may differ, as some universities devote longer time to learning the software. It may also differ if the introduction and further guidance on the software is done internally or externally (JU is the only partner in the project, that teaches the road design software by internal resources).

Having those differences and similarities in teaching road design software at the university-partners in mind, teachers participating in the project agreed, that participation in the workshop had a positive impact on the knowledge, skills and performance for students. During the standard exams at the universities-partners, students, who have participated in the project, have submitted projects and road designs, which were 30% better than of students who have not participated in the project or other years students. It can be drawn a general conclusion that students, who participated in the project were much more professional and skilled.

5. Evaluation from the industry perspective: interview with the industry representatives

It is clear, that students and teachers agree that participation in the project have had a positive impact on the students' learning of the road design software.

High education institutions would like to teach students skills that are on demand in the industry and labor market, therefore it was interesting for the project partners to find out what industry representatives think about the InRoad method and how they evaluate the impact of InRoad method on learning the road design software. Could obtained skills be an advantage for new employments? Is the InRoad method the answer to the contemporary demands in the road design industry?

We have interviewed 4 representatives from consulting companies from Denmark, Sweden, Finland and Norway.

Representatives from the consulting companies agreed that the InRoad approach is a good answer to the needs of the industry. In general, because there is an increasing shortage of road designers. The InRoad approach has intercultural- and problem-based aspects and what is more important the InRoad method has a holistic integrated approach on the road design.

The International approach is very relevant as companies no longer work within just one country. Projects are expanding beyond one country's borders and may require cooperation among several countries, as well as a big part of human resources are also coming from several countries.

Industry representatives agreed that it is a big help if former students – new recruits have some experience with road design software from their studies. It saves a lot of resources, as the students with some road design software experience usually are ready to accomplish basic road modelling elements within a week of their new employment, in contrast, to a half a year for new recruits with no former road design software experience.

Despite, the advantage of the software experience, industry partners emphasize in one voice that in order to be a proficient road designer, it is not enough to have only good digital road design skills, it is equally, if not more important to have good road design theory knowledge - to be able to integrate the holistic approach into the road model, to be able to integrate the road model into its surrounding environment, to be able to understand the environment around the road: water, geotechnics, how everything around affects the model. During ICE sessions students needed to discuss the possible place for a bus stop in their model, while taking a role of one of the possible stakeholders in the project: a cycle association, a bus company, the municipality, and a consultant company. According to the interviewed industry representatives, it is the right way of learning in several aspects: case and challenges are very realistic – resembling challenges in real projects; it includes a holistic point of view of the road model – including other stakeholders, analyzing demands for a bus stop; it encourages finding solutions.

The industry representatives agreed that road design models grow more and more complex, often expanding beyond individual municipality borders and covering counties or regions. Therefore, the understanding of the road design theory, understanding what is happening around the model and where to look for solutions, will be at the high demand in the future. Software is just a tool for a user. It is, of course, helpful to have enough skills to make a proper and good-looking drawing, but to be able to integrate the model into the whole environment is more important.