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MEMO

Tallinn, room VI-113 in Open University  
Tallinn University of Technology

21<sup>st</sup> of April 2006

### 3<sup>rd</sup> MEETING OF THE LdV INNOMET II FOLLOW-UP PROJECT

Participants (in order of registration): Kadri Orula (TUT), Jüri Riives (EML), Torsten Kjellberg (KTH), Mattias Larsson (KTH), Ferenc Boór (BME), Māris Balodis (LMA), Jaanus Vahesalu (TCEB), Ingrid Hindrikson (TCEB), Kirke Maar (EML / Interact), Tauno Otto (TUT), Laidi Lembaru (TUT)

*Welcome and Opening by Estonian partners by Jüri Riives, EML*

*Presentation and confirmation of the agenda by Kadri Orula, TUT*

*Summary of Work Package 1 – The INNOMET taxonomy of competences and skills by Mattias Larsson (KTH), supported by Torsten Kjellberg (KTH)*

The idea of developing some kind of language for the description of skills and competences has been present all since the beginning of INNOMET I. By defining such a language it would be possible to compare, evaluate and develop (often certified) courses based on content, goals, and examinations making sure that educational portfolio really corresponds to the demands of the industry and certification authorities.

Feature/property	INNOMET I	INNOMET II
<b>The definition of a Skill</b>	Skills graded from 0-5, the possibility to define a skill by a simple text string.	The starting Skills graded 0 – 5 with a clear definition of each level.
<b>The definition of competence and knowledge</b>	INNOMET I does not differentiate between <i>skills</i> , <i>knowledge</i> , and <i>competence</i> .	INNOMET II extends the definition by stating that competence is the sum of knowledge and skills and by introducing the concept of competence modules. The definition of a competence module makes it possible to distinguish between <i>knowledge</i> , <i>skills</i> , and <i>competence</i> .
<b>Potential benefits for companies</b>	Works as a tool for competence inventory, based on company/branch	Works as a tool for competence inventory that does not require

	specific professions.	professions to be defined and maintained.
<b>Potential benefits for education suppliers</b>	Promotion of courses that are based on an up-to-date view of the companies needs.	Promotion of courses that are based on an up-to-date view of the companies needs. Supports the definition of educational objectives and assessment methods.
<b>Potential benefits for education coordinators</b>	Better market overview (customer demands). Support for course management.	Better market overview (customer demands). Support for modularised course management.

### **Competence = Knowledge + Skills**

**Competence:** possession of a satisfactory level of **relevant knowledge** and acquisition of a range of **relevant skills** that include interpersonal and technical components

**Knowledge:** Familiarity, awareness or **understanding gained through experience or study**

**Skill:** **Ability**, proficiency, facility or dexterity that is **acquired or developed through training or experience**

We have focused on taxonomies, as these are the foundation. To be able to develop an ontology you first need a taxonomy.

*How to use taxonomies?*

To formalize the terminology used for:

- Specifying levels of competence and skill
- Stating goals of courses and education programmes

*Is there any significant difference between specifying levels of competence and skill, and formulating goals of courses?*

We believe there is not – provided that the goals of courses are expressed as the knowledge and abilities a student should have after completing the course requirements.

Conclusions on taxonomies:

- All taxonomies are similar
- The typical verbs can not be unambiguously assigned to a specific level of competence
- Lower levels in taxonomies typically deal with knowledge – higher levels describe skills (upper levels include lower levels)
- No need to make a distinction between general and professional skills and competences – handled by the levels.

**Recommendation:** use the ideas and structure of Anderson`s revised taxonomy as base for describing competence templates and modules in the INNOMET system.

It is important to use right type of verbs in competence modules. Course description should be connected with the modules.

**Competence template:**

- 6 levels of competence (lower ones are typically knowledge, higher ones are combined knowledge and skills)
- Typical competence demonstrated (key sentences to describe each level)

- Illustrative verbs (the list of verbs could be extended and adjusted to fit a certain field of interest)

**Competence module** is a filled in competence template!

*How are the competence modules used?*

- Course selection to achieve certain competence (student, public)
- Course development (teachers)
- Competence evaluation (HR personnel, managers, certification authorities, teachers)

Competence for employment and certification, competence needs and inventory

Using the competence module (*please see the presentation for additional information*): professions are connected with competences. New competences could be defined if necessary.

We believe that not only courses could be described in terms of constructively aligned objectives, activities and assessment methods. The same should apply to - the description of the ability to successfully take on a working task, or the description of how to specify and evaluate the competence required in a certain profession.

While defining teaching outcome – learning and teaching activities should be defined according to competence module.

Therefore, the principle of constructive alignment should be considered in specifying the competence modules, as they are described in report.

### **Summary:**

- Competence = Knowledge + Skill
- All taxonomies are similar
- Use Anderson`s revised taxonomy as foundation to the INNOMET system
- Constructive alignment should be considered in specifying the competence modules

### **Comments:**

Torsten Kjellberg: key sentences are very important (= what should you be able to do). If you match these things you may define the competence. It needs to be known what person should be able to do after finishing the course. Companies should have a clear idea about the knowledge and skills of their workers. Therefore demands of companies should be mapped.

Jüri Riives: it is a new ideology to put together demand from the industry and offers from educational institutions. INNOMET taxonomy is like a template for the future. **Competence modules in certain areas should be developed.**

We can use wiki site to create competence modules. Competence templates are available there.

Jüri Riives: that is a good opportunity to show how the system can practically work.

The aim of following activities is to show how the competence modules are connected with database and how these look like in INNOMET system.

For a certain profession there are shown what competences are needed (from the side of company) and what courses are offered (from the side of educational institution).

Activity	Responsible partner
1. Template with examples of CAD/ CAM on wiki site	KTH
2. Sample of BME will be sent to partners	BME
3. Partners make +1 sample	
- CNC Machine Tool Operator (example from the side of company and educational institution)	EML, KTH
- CAD/CAM (example from side of educational institution)	TUT

Wiki site: [http://wiki.iip.kth.se/index.php/INNOMET\\_II](http://wiki.iip.kth.se/index.php/INNOMET_II)

Work Package 2 by Jüri Riives (EML)

**About the INNOMET system:** first version will be ready in the beginning of May.

Group of tooling companies are mapped for the Work Package 2 activities (concentrated on CNC Machine Tool Operator). Workers for these profession are prepared both in vocational and higher educational institutions. We have a job description and professional standard for the profession. There are 2 possibilities for estimation: professional exams and evaluation of qualifications.

List of professions should be tightly connected with professional standards if possible. It varies country to country.

Job description of CNC Machine Tool Operator (*please see the presentation*) is not a standardized document, but many companies use this kind of structure. It contains following information:

- Title of job
- Structural unit
- Direct supervisor
- Reports to
- Subordinates
- General provisions
- Main objectives
- Required skills
- Rights
- Employment duties
- Liability
- Employee`s and employer`s signatures, names and dates

Professional standard helps to measure the skills through its different levels (e.g. levels I-III are worker levels and IV-V are engineering levels in Estonia). Professional standard shows what person must be able to carry out in a company on the basis of competence levels (= what kind of knowledge and skills are necessary for fulfilling the working activities).

Professional standard contains:

- Name of the profession

- Professional level
- Specialisation
- Title of the professional certificate
- Qualifications (=different competence levels)

Studying programmes must cover the needs for these competences. People from companies and educational institutions must make a team to have knowledge from both side in order to create studying programmes which must fulfil the requirements of professional standards.

Group of tooling companies have agreed with the framework with the standard. It is a first attempt, life will make corrections.

Professional standard is as a base for competence chart. There could be initial competence charts in database of INNOMET system. Companies may use these by changing or adding these.

Competence chart presents existing and needed levels of a profession. On the basis of group of companies we can find a dispersion (diffusedness) between the companies.

Evaluation of tooling companies gave positive results especially because of similarity of these companies (similar technologies, processes, products etc.)

Some aspects which occurred:

- Companies require very high needed level in spite of their level and specialty.
- Quite dominating is requirement of upper level of knowledge and skills.

If we want some further results we have to make different estimations (= estimate different groups of companies). The parallel picture would be interesting. It means we need companies from other levels to compare.

### **Comments:**

Māris Balodis: were the meanings of each level (0-5) given to companies?

Jūri Riives: yes, the content of every level was given.

Ferenc Boór: Summary is completed after the companies have filled in questionnaires. There could be a problem – if we use summaries based on the questionnaires, we can not compare the differences. It is because some companies which understand levels can give answer from 0 to 5, but the others use just level 5.

### **Functionality of the INNOMET system**

Mattias Larsson: how the questionnaires are presented in the INNOMET system?

Jūri Riives: the questionnaires will be part of the system structure. The structure of INNOMET system is made – we need to translate it into English.

Also we need to think about of INNOMET system **graphical output (= user interface)!**

Mattias Larsson: SCENARIO of defining a course (= how it functions in a system?). We need:

- A text (a description) = **a function requirement for it!**
- Opportunity for SEARCH for competence modules to define a course

Partners could send some examples how to describe the professions because standards are different.

Next activities:

Activity	Remarks	Deadline	Responsible partner
1. Functionality list - list to the partners	<i>What kind of output we need from the system?</i>	02 May	EML, TUT
- feedback from partners	<i>Requirements to the system</i>	10 June	All partners
- summarizing in Verbania	<i>We can state updated requirements (INNOMET II may turn into "Future") and total updated requirements</i>	29-30 June (meeting in)	All partners
2. Structure of the INNOMET system - translating into English	<i>To be confirmed</i>		<i>EML</i>

Work Package 4 – INNOMET for engineering professions by Tauno Otto (TUT)

**Activities:**

- Development of the INNOMET system in the field of engineering professions (definition of skills, structure qualifications, training needs)
- Sample 2 re-training courses developed in the field of engineering based on industry needs for KTH and TUT

All other partners involved.

Re-training courses will be developed by using e-learning methodology. It is a good solution, because participants can choose a suitable time. KTH already has courses in English. One course (in Estonian) is already created in TUT.

**Main questions:** 1) how to plan a course and 2) how to use templates?

**Results and products:**

- Engineering levels developed in the INNOMET system
- Two re-training courses are developed for Engineering levels, using e-learning methodology and platforms

**Tasks:**

- T 4.1 Definition of skill lists for engineering fields
- T 4.2 Development of two re-training courses
- T 4.3 Development of engineering levels at INNOMET system

It will be focused on profession of CAD engineer / production engineering. There are 5 levels: levels I, II and III, level IV (accredited) and level V (EU engineer). By using templates modules can be combined.

**Expected outcomes:**

- D 4.1 skill lists in engineering fields (June)
- D 4.2 Sample re-training courses developed (July)
- D4.3 Engineering levels developed in the INNOMET system (August)

**Discussion:**

- IPS development

- Adding expert system, helping to advise evaluators

It is practically easy to develop (he or she can ask some questions and get answers from the system). There is a question: *could be the expert system added to a database?*

It should be possible to find a training course in the system

In case of using Google it will give as a searching result the homepage of the system, not the searched place from the system.

- Innomet II Concoortium Agreement
  - Every partner has right to develop and benefit from the system in own country (will be ready in May)
- Book of INNOMET
  - We have not decided yet what it will be (paper, e-book, video). We have to decide what would be the most useful alternative.

### Work Package 7 by Jaanus Vahesalu (TCEB)

Valorisation plans are missing (deadline was on the 14<sup>th</sup> of April!). Please send your plans, because it is much more difficult to do the summaries at the end of the project. Dissemination plans are also published on INNOMET website ([www.innomet.ee/innomet](http://www.innomet.ee/innomet)).

Deadline for next dissemination plans is 1 week before the Verbania meeting, in other words on the **21<sup>st</sup> of June**.

#### *What could be a dissemination?*

E.g. Jüri Riives (EML) visit conferences, ministries etc. very often and speaks about INNOMET. It is a dissemination as well. There are many youth fairs in Estonia where we can introduce INNOMET and principles of the project through the image-making campaign of engineering professions.

Preparation work for developing a INNOMET system is also a dissemination. And DAAAM conference as well.

Riives: we can talk mainly about how important is human resource development, why it is important. We can explain that we are developing a tool that helps manage to solve the problem in this area. For example there was formed a new commission in Ministry of Economic Affairs and Communication and the main problems in HR area were put down. Many questions about INNOMET conception and system were asked, even separate meeting was wanted to organize. INNOMET is quite well known in Estonia already.

INNOMET brochure is ready: we will send larger amount of these to partners by post. Also the electronic version for translation will be ready soon.

In the frame of ESF INNOMET II project new logo of INNOMET was created. As all the participants of the meeting agreed, we can use it during our project as well. Logo will be sent to all partners.

Reminder: national seminars to introduce the project should be organized in the beginning of year 2007.

Also we have to discuss publishing of INNOMET book in Verbania.

### *INNOMET II finances by Laidi Lembaru (TUT)*

Questions and answers about quarterly reports. Examples of report for each partner.

- Next meeting will take place on the 29<sup>th</sup>-30<sup>th</sup> of June in Verbania, in Italy.

#### **Agreed activities and deadlines:**

##### **Work Package 1**

<b>Activity</b>	<b>Deadline</b>	<b>Responsible partner</b>
1. Template with examples of CAD/ CAM on wiki site	ASAP	KTH
2. Sample of BME will be sent to partners	ASAP	BME
3. Partners make +1 sample <ul style="list-style-type: none"><li>- CNC Machine Tool Operator (example from the side of company and educational institution)</li><li>- CAD/CAM (example from side of educational institution)</li></ul>	ASAP	EML, KTH  TUT

##### **Work Package 2**

<b>Activity</b>	<b>Remarks</b>	<b>Deadline</b>	<b>Responsible partner</b>
1. Functionality list <ul style="list-style-type: none"><li>- list to the partners</li><li>- feedback from partners</li><li>- summarizing in Verbania</li></ul>	<i>What kind of output we need from the system?</i>  <i>Requirements to the system We can state updated requirements (INNOMET II may turn into "Future") and total updated requirements</i>	02 May  10 June  29-30 June (meeting in	EML, TUT  All partners  All partners
2. Structure of the INNOMET system <ul style="list-style-type: none"><li>- translating into English</li></ul>	<i>To be confirmed</i>		<i>EML</i>

##### **Work Package 4**

<b>Activity</b>	<b>Deadline</b>	<b>Responsible partner</b>
Skill lists in engineering fields	In June	TUT
Sample re-training courses developed	In July	TUT, KTH
Engineering levels developed in the INNOMET system	In August	TUT

##### **Work Package 7**

<b>Activity</b>	<b>Remarks</b>	<b>Deadline</b>	<b>Responsible partner</b>
Belated dissemination plans	<a href="mailto:Jaanus.Vahesalu@tallinnlv.ee">Jaanus.Vahesalu@tallinnlv.ee</a>	<b>ASAP</b>	All partners
Next dissemination plans (April-June)	<a href="mailto:Jaanus.Vahesalu@tallinnlv.ee">Jaanus.Vahesalu@tallinnlv.ee</a>	21 June	All partners
INNOMET brochure: <ul style="list-style-type: none"><li>- to partners by post</li><li>- to partners by e-mail</li></ul>		Step by step ☺ ASAP	TCEB
Discussion about book of INNOMET		29-30 June in Verbania	All partners

