

IPMA STANDARD ELEMENTS AND FEEDBACK IN PROJECT MANAGEMENT TEACHING

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Abstract

The paper proposes the concept of project management teaching including the International Project Management Association (IPMA) standard. The concept of teaching is theoretical and derives from the notion of competence, which the IPMA standard is based on. The paper presents a brief description of the IPMA standard and endeavours to define the notion of competence. The competence is worked with in respect to hierarchical recognition. The proposed teaching concept works with the concepts of information, knowledge and skills. The teaching proposal stems from the structure and contents of the IPMA standard elements. Furthermore, the paper elaborates the issue of embedding the elements of the IPMA standard competences into training courses. In the article, the eye of the IPMA competences is further enhanced with possible training courses and specialist areas in which the standard elements can thematically be included. The paper states that the competence elements and training courses cross one another and overlap in a manifold way. The authors also propose a way which could verify into what extent the students have actually acquired taught IPMA competence elements. The paper contains the proposal of feedback quantification for the IPMA standard and project management teaching. The results of the paper can be used as a starting premise for future research. Both the verification proposal and the embedding of the elements into teaching are derived from on-going academic experience of the authors of the article.

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Introduction

In project management practice we can find a number of failures from the point of view of extending the project financial budget, extending the deadline or not meeting goals and objectives of the project. To meet the deadline, budget and project objectives, responsible and competent workers are necessary. False steps or wrong assessment leading to losses are the results of insufficient or missing competence. Söderlund, Vaagaasar and Andersen (2008) write about the need of sufficient competence, competence defined and with determined content, which will during project planning or its realisation be "at the right time at the right place". In their articles the authors focused on the question whether companies are able to define and develop their competences while managing their projects. Bedrnová (2000) writes about competence as a dynamic relationship between man and his or her work. In her article she deals with interconnection between work competence and qualification. Teaching in specialist courses as well as at basic education level should lead to creating and acquiring competences. The need for creating and developing competences not only in educational institutions is supported by research results carried out by the American organisation "Partnership for 21st Century Skills". The organization associates employers and school workers, and its goal is enforcing changes in American education objectives. The research results (Michelman, 2007) revealed an insufficient reflexion of schools to global changes which are increasingly demanding development and greater emphasis on competences in many areas. The issue of competences and possible ways of their development is dealt with in more detail for example in Knecht et al (2010). Project management teaching has already been part of university education in the world for several decades. The project management is usually

lectured in the form of a one- or two-semester course as part of economic and managerial study fields and programmes. At some universities or colleges project management even exists as an independent Bachelor or Masters field of study. However, not always do such courses and fields of study embody at least one international standard of project management in their curricula. Therefore, it is rather unsuccessful to find a direct connection between selected standard and particular seminars whose teaching curricula would be defined by the standard content. The development of project management teaching is dealt with for example in Dixon (2011), whose article focuses on the possibilities of experimental project management teaching and compares the alternative approaches with traditional ones. Continuous improvements in training future specialists are and will always remain a current issue for discussion.

The aim of this paper is to create a concept for project management teaching with a direct implementation of the International Project Management Association standard, with the course structure referring to the content of individual elements of these standard competences. The paper also aims at proposing a way that would verify to what extent the students have actually adopted the taught elements of the IPMA competences, especially for training course purposes. The propositions drawn by the paper should outline the possibilities of future research in project management teaching.

Material and Methods

International IPMA standard

The international standard for project management, referred to in its abbreviated form as the IPMA, is issued and certified by the International Project Management Association (IPMA), based in the Netherlands. At present the IPMA has more than 45 branches at particular national levels responsible for manager certification in their own countries. In the Czech Republic the standard is represented by Project Management Association (Společnost pro projektové řízení, SPŘ, o. s.), residing in Brno. In 2008 the Czech branch issued the translation of the international competencies standard for project management "ICB – IPMA Competence Baseline" in version 3 from 2006 entitled "National competency standard for project management" (Pitaš et al, 2008). Both the original standard in English (Caupin et al, 2006) as well as the national standard in the Czech language is based on defining and analysing competencies necessary for project management. Following the first part dealing with general part of certification examination and certification system, the IPMA standard text is divided into three main competence areas. The IPMA standard distinguishes project management competencies as technical, behavioural and context competencies. There are 20 elements in technical area, 15 in behavioural area and 11 in contextual area. The competencies for particular competence areas are always described in a detailed and structured way.

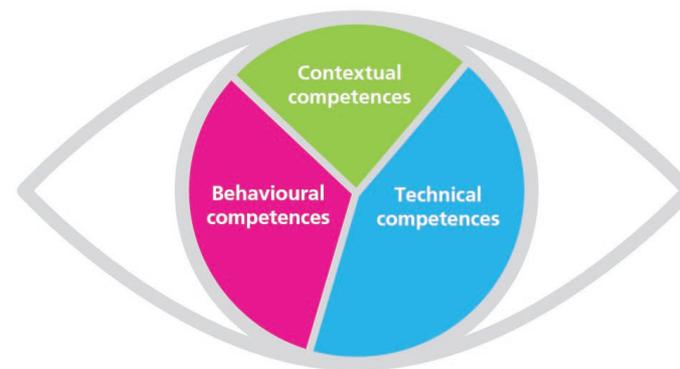


Fig. 1: The IPMA standard competence "eye" (Caupin et al, 2006).

The IPMA standard defines competence as follows: "The set of knowledge, personal approach, skills and related experience altogether needed in order to achieve success in a particular position." Further, the IPMA standard defines skills for project management as competences decomposable into separate elements and describable using particular points. In the IPMA standard, the element of each competence is created by text further divided into the following parts:

- **The description** of a particular area.
- **Possible procedural steps**, which may be recommended for processing.
- **Specialist or professional topics**, related to competence.
- **Key competence**, which the manager should know and master.
- **Relations to the surroundings in the area linked with competence.**

The area description is the introduction to the issues and related topics and parts. The procedural steps are presented as lists of tasks and activities, emphasising action with the use of imperative verb forms. The specialist and professional topics are submitted in a brief list of technical terms and entries referring to a professional, specialist or scientific discipline. The key competence can be regarded as the requirements and conditions necessary for meeting the IPMA standard certification grades. The relations to the surroundings and other standard elements, although mentioned in the list of references, can also be understood as a following description of adjacent areas. The overall structure of each IPMA standard element is presented in the form of instructions, entries and references. The full acquisition of project management competences, thanks to the IPMA standard elements, will always be conditioned by a continuous study of the topics as well as training and individual experience.

The meaning of competence

Competencies can be described as “the set of knowledge, skills, abilities, attitudes and values essential to one’s personal development and his or her application in society”. Today, and especially in the Czech Republic, there are understood two meanings of the competence. The first meaning expresses the competence as power or permission granted by the authority or belonging to the authority. The second concept of competence takes the form of abilities to carry out certain activities or be able to carry them out. According to Bedrnová (2000), it is possible to regard competence as optimal harmonization of one’s work competence for his or her tailor-executed profession and the particular work position.

The concept of competence can be classified into the hierarchy of knowledge and structuring the world as follows:

- **data,**
- **facts,**
- **information,**
- **knowledge,**
- **know-how,**
- **skills,**
- **competence.**

The competence does not stand the highest in the hierarchy because the meaning of competence consists of composing the previous concepts. The mentioned concepts can be found in many specialist disciplines and professional approaches, and in different contexts. For purposes of this article the mentioned concepts are mainly looked upon as system approach aspects. Therefore it is possible to simplify the list of concepts only to those which can be applied to class. The above-mentioned list of concepts can be condensed as follows:

- **information,**
- **knowledge,**
- **skills.**

Information, i.e. data and facts presented in context, are included in study texts and literature which can be mentioned during a lecture or recommended to students for their self-study. As knowledge we regard such information communicated to the students in a personal contact with the possibility of a dialogue, in the context of stories and examples. As skills we regard the knowledge which the student acquired on his or her own and which s/he practically verified and tested. Therefore, the skills creation will be determined by a practical specialisation of the

course. Combining the student's acquired knowledge and skills, the basis for the formation and development of the competence is prepared.

The second, in the Czech Republic widely used concept of competence which claims the ability to execute a certain activity or being able to execute it, is close to the original meaning of the English word competence. Another word close to the English word competence is competitiveness which is crucial for understanding the nature and role of competence in class and for the individual. The competence acquisition should lead to his or her competitiveness at work and in life. The competence acquisition at the level of primary school should prepare him or her for a successful personal and family life in a society. Therefore, the selection of competencies that are or are not essential or crucial is highly specific and based on the society in which s/he lives and receives education. The competence acquisition in the area of professional life should prepare him or her for solving professional and specialist tasks as well as for the competition in his or her job and career. That is why the competence can be explained as one's particular behaviour leading to expected and desired results. The students' acquisition of competition advantage will present the main criterion whether the information transfer, knowledge acquisition and skills verification has been successful. The testing of students' competitiveness can in no way be regarded as an easy task. It can be expected that the students' competitiveness is a class objective and not a verification object of class outputs.

Project management competence in present-day courses

Project management has been lectured and taught at the Faculty of Economics and Management (FEM), Czech University of Life Sciences Prague (CULS Prague) as a part of Bachelor and Master Courses and most study fields since the 1990's of the 20th century. It concerns especially the following courses: Project Management, Project Management Methods, Creating and Software Support of Projects and Software Applications of Operations Research Methods. The courses also involve critical path method, creation and work with directive and topical project plan and the analysis of project sources. These three latter topics may be included in the IPMA standard technical competence "1.11 Time and project phases" and "1.12 Resources". Although the mentioned topics follow certain IPMA standard elements when lectured in the courses at the university, they are neither taught in a wider context of the standard nor are they lectured in sequence with other standard competence elements.

At FEM CULS Prague, the IPMA standard is taught independently, without any links to the topics related to technical or other standard competence. The students adopt the knowledge from the project management field separately, irrespective of the standard principles and recommendations. The verification of the students' acquired knowledge is carried out through seminar works and tests. However, the verification is not linked to the IPMA standard at all. This leads to a situation when the students, who graduate from the university courses and acquire professional skills in the field of project management, do not have the opportunity of a full and thorough acquisition of the IPMA competence elements and the IPMA standard as such. However, in a current state of project management, only specialist knowledge or skill without any knowledge of project

management standards nowadays used world-wide, is rather insufficient.

Results

The IPMA standard competence element structure

The international IPMA standard, applied to project management, consists of 46 elements, each representing particular competence. By the element we understand a structured text which defines topics and knowledge areas for project management. The text of the element always begins with the area description which connects other areas of the element into a common framework. The element area description does not only introduce the issue but also connects and completes the following four parts. The remaining parts are nearly always presented as the list of activities, concepts or references. Each element part in the IPMA standard can be defined in terms of hierarchical learning as follows:

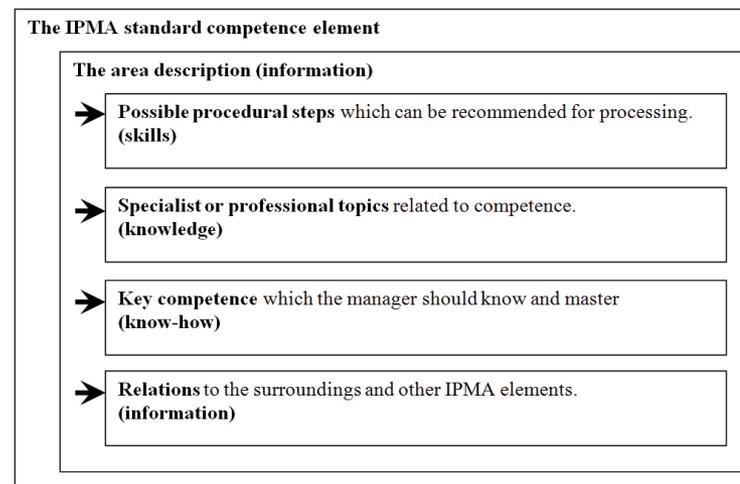


Fig. 2: Classification of the IPMA element description.

The structure of the IPMA standard element in school courses

For the purpose of students' education, the structure needs to be modified. Some parts of the element can be applied to class, some cannot. Those parts that are referred to as know-how cannot be conveyed to students in a direct way. The know-how in the element text can be expected to be conveyed to students implicitly, by means of other parts. The course content will consist of those element parts which are composed of information, knowledge or skills. However, even the skills cannot be transmitted to students directly. The student forms his or her own skill applying his or her knowledge to practice. Therefore, the skills are presented in class in the form of

practical exercises and students' individual work. The structure of teaching the IPMA elements can be described as follows:

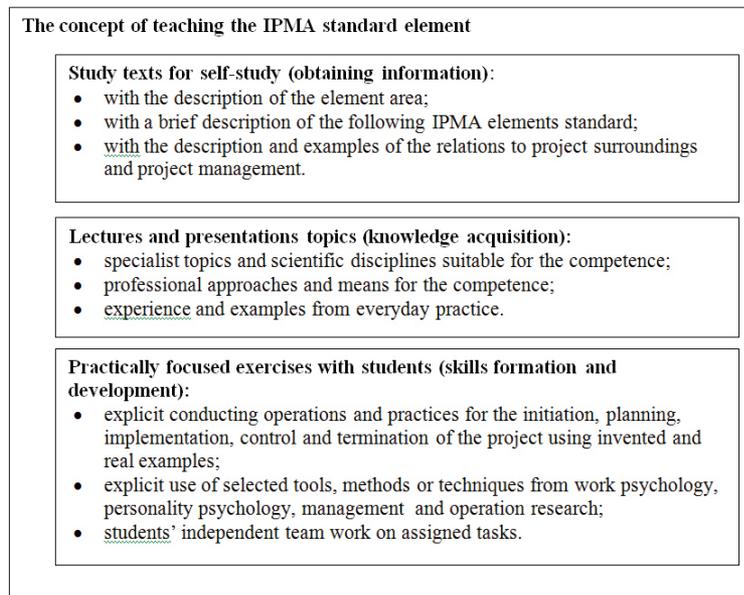


Fig. 3: The teaching concept of the IPMA standard elements.

The class structure which, beside study texts for self-study also presupposes lectures and seminars can be from the hierarchy of learning classified as follows:

- **study texts** for self-study will include **data, facts and information**;
- **lectures and a dialogue** with students will result in **knowledge** acquisition;
- practically focused exercises with the students' active

participation will lead to the formation of skills.

Here we deal with the system approach application while modifying the structured text for course needs. At this point the mentioned information, knowledge and skills can be regarded as partial aspects for the composition and formation of competencies.

Teaching the IPMA standard competence elements

Due to its vast range, it is impossible to teach the whole IPMA standard during one course. The IPMA standard comprises many specialist areas, such as: Operations Research, Finance, Personnel Management, Psychology, Ethics etc. For the training of the whole IPMA standard range it is also necessary to take into account training courses that would thematically follow and meet the standard competence elements. The IPMA standard elements are thematically well articulated and fall into several specialist areas at once. Only a small amount of the standard elements could be included in one training course without any further links in follow-up courses. Specialist areas and courses suitable for training and covering the complete IPMA standard can be related to the elements as follows:

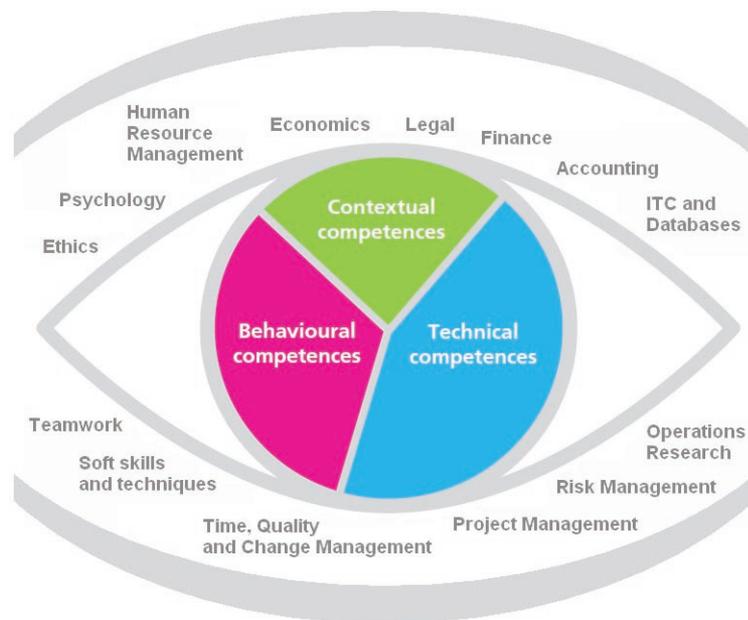


Fig. 4: The IPMA standard competence “eye” (Caupin et al, 2006) and related specialist areas and courses.

Figure 4 presents specialist areas surrounding the eye of competence that would absorb the scope of the IPMA standard competence elements and that could create further training courses. The specialist areas in Figure 4 are placed around the eye in correspondence to a particular competence scope. Behavioural competences may belong among specialist areas or courses like Psychology, Ethics, Teamwork, Soft skills and techniques, Time Management, Quality Management, and Change Management. Contextual competences will be most represented in courses or specialist disciplines such as Human

Resource Management, Economics, Legal, Finance, Accounting. Technical competences can be found especially in Operations Research, Risk Management, Project Management, ITC and Databases. Operations Research and Project Management exceed the IPMA standard in respect to their scope and therefore more courses need to be considered for them. Yet for the teaching of the IPMA standard only some topics from the field of Operations Research can be recommended, and these are mainly Game theory, Graph theory, Decision analysis, and Simulation. For the purposes of the IPMA standard it is necessary to teach Project Management in its complete range. Project Management will become a unifying and central topic of the course.

Acquiring and testing the IPMA standard competence in teaching

Any purposeful human activity should have its feedback. Without the feedback it is impossible to assess the contribution and effect from the carried-out activity. In education process, the feedback between a student and pedagogue is vital. Project management training can lead the students to the acquiring a number of habits, for instance: structuring a problem in time and space, systematic approach to problem solving, critical thinking during conflict solving and so on. The majority of principles and approaches in project management are generally valid and widely applicable.

The IPMA standard training, in the framework of project management training, should contain feedback in the manner of a test which would reveal whether the student has acquired the IPMA standard competence elements fully or only partially. The manner of the test can be proposed as the check of semester works according to derived control points. The control points

should be derived from possible and recommended process steps (see Figure 2) of regarded elements. The semester works can be assigned to the students at the beginning of the semester and carried-out throughout the semester. The assessment - whether or not the work has met the IPMA standard - should be done after its submission at the end of the semester. The students can work on the content of their work gradually as individual topics from the field of a particular course are being introduced and discussed. Whether the students work on their works alone or in small teams is up to the teachers to decide. It is advisable that the assignments of individual semester works vary and differ from one another. The students should be left with certain freedom as to which method or approach they use. The principal parameter of the assignment should be that the students strictly follow the IPMA standard and they apply particular course approaches according to their own consideration. By assigning the students this type of work, the pedagogue creates a teaching simulation game. During this simulation game it is suitable for the pedagogue to enter into partial results of the students any time during the semester and propose unexpected changes and conflicts according to the nature of the original assignment. Thus it is possible to achieve higher extent of interactivity in a teaching process and proximate the training to real project management experience.

The nature of semester work assignments and the selection of tested competence elements will vary for different courses. In their works, the students should make a certain number of recommended process steps according to the standard in order to meet formal as well as material side of the observed competence elements. Each IPMA standard element has a certain number of recommended and possible process steps (Caupin et al, 2006), which can be studied by students and yet in

their semester works remain incorrectly identified. The correct identification must be made by a pedagogue who thus derives necessary control points, so far unfamiliar to the students (see example in Figure 5). The occurrence and range of each control point in a submitted semester work can determine the level of the acquisition of a particular competence element by the student. Therefore it can be assumed that a complete number of control points in a semester work may express a total level of the acquisition of tested competence elements. For each control point a specific level of importance or a specific number of points can be considered. Or, it is possible to assume a value scale for each control point as follows:

- 0 points (no control point is present in a semester work),
- 1 point (a control point is only partially present in a semester work),
- 2 points (a control point is fully present in a semester work).

The sum of values for every control point from submitted works can be further used for a total assessment of the students in the semester because the number of researched competence elements will be firmly stated in each training course. For the training course feedback purposes it is also possible to consider a percentage expression of control point occurrence in semester works. A total control point occurrence in a semester work would express a 100% acquisition of competence elements. Conversely, this total extent would be reduced by each missing control point occurrence in a semester work either evenly (i.e. about $100/N$, where N stands for a number of control points), or according to its significance which will be determined by the pedagogue him/herself.

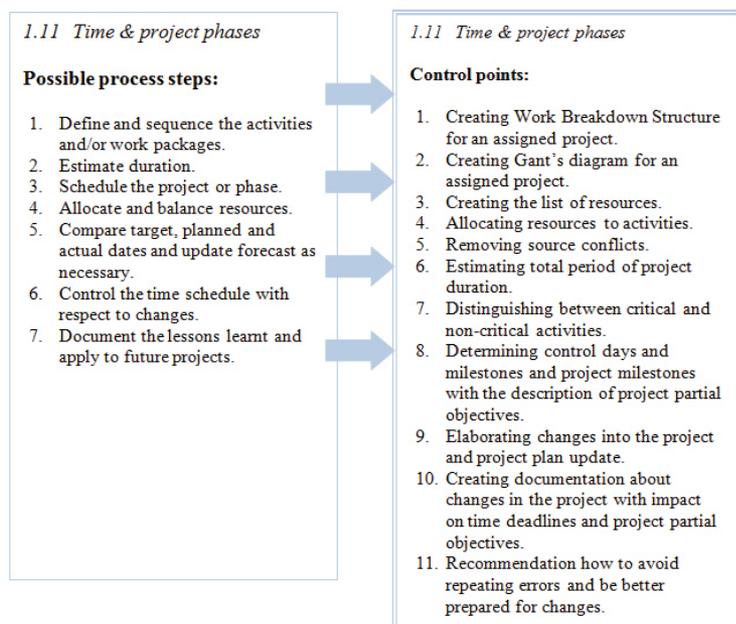


Fig. 5: Derivation and particularisation of process steps for a selected IPMA standard competence element.

For demonstration purposes we can consider control point identification (see Figure 5) according to the process steps of 1.11 IPMA standard elements. These control points can be used for example as feedback in project management training at the FEM CULS Prague, where the experience of semester works already has a long tradition but testing the IPMA standard competence elements in teaching is still lacking behind.

In order to verify the competence element of the 1.11 IPMA standard, 11 control points, analytically following recommended

process steps of an element, can be identified. Whether there exist 11 control points for one element is a matter of discussion and needs of a pedagogue, or it is determined by the nature of a course. The proposal presented in Figure 5 is an own proposal of the authors and it is determined by the character of the training courses at the FEM CULS Prague. If the students in their semester work do not meet the required 11 control points, i.e. the control points are not present in the submitted work, then the students have not acquired the 1.11 IPMA standard competence element to a full extent. Missing control points can lead the pedagogue to a weak point of the training course.

Discussion

The project management teaching cannot be performed without practical demonstration, example or a practical use of tools, approaches or methods. In teaching project management and its standards it is essential to put emphasis on students' active participation. The students' active participation, which can be initiated by assigning team or individual work deepens our knowledge and forms skills. We are not certain whether the knowledge and skills will subsequently deepen as far as the competence; however, it depends on each student's individual attitude.

The task of international standards in project management is irrefutable and still growing. Project management teaching should comprise at least one international standard. The range of the international standard training in project management is often very low. In university courses preference is rather given to basic surveys through which students are acquainted only with project management structure, approaches and project management standard principles, i.e. with basic information about a standard. A more profound and complex approach

to the standards in project management training collides especially with the problem of time dotation for the course. However, if project management and international standard training is approached through several follow-up courses of different expertness, it is possible to reach deeper knowledge of the students.

The proposal presented in Figure 5 may serve as a starting premise for future research in project management teaching at the FEM CULS Prague. The research could result in testing the above proposed student assessment, i.e. verifying the above proposed way of feedback quantification. The future research which would follow the results of this paper could further outline possible means of deriving control points from process steps of individual IPMA standard elements. For a quality derivation of control points from element process steps a notion of competence will become a central concept.

Conclusion

The topic of the article concerns project management teaching, taking into a significant account a current development and present international standards in the field. The innate contribution of the article is based on work with the concept of competence which presents a central concept and principal of the selected IPMA standard. The IPMA standard implementation into teaching where the teaching content is structured and formed by the IPMA standard content and structure corresponds with the latest trends and needs in future manager and project team member training. The project management teaching concept with the IPMA standard implementation can be regarded as fully applicable for the needs of teaching in Bachelor and Masters Courses. The teaching concept for an arbitrary IPMA standard element can be applied to the formation of course syllabi. The

content of each seminar or lecture can be based on the content of one or even two elements. For the number of 46 elements in the IPMA standard we can expect the establishment of a two-semester course with the same number of lectures as seminars. The lectures will result in students' knowledge acquisition. Nonetheless, the success of the IPMA standard element acquisition will depend on practical nature of the seminars.

The article is further concerned with the fact that, with regard to a number and range of specialist areas and disciplines, the IPMA standard teaching will be a complex structure of mutually related study courses with competence elements being taught in more than one course at a time. Individual IPMA standard competence elements can be lectured independently in a particular course with links to other preceding or following courses, thematically contributing to the element. Competence elements and courses cross one another and overlap in a manifold way. The teaching process, which would fully cover a specialist range of the IPMA standard, would be demanding in respect to specialist course syllabi as well as study material preparation.

What is more, the authors of the paper propose a way of feedback quantification in the IPMA standard teaching. They propose the derivation of control points for an individual competence element and their application in assessing student semester works. The control points should be derived from recommended and possible process steps, presented for each IPMA standard element. The derivation means particularisation and specification of a competence element in project management in respect to its load and process. Last but not least, the authors of the paper propose this latter contribution of the paper to be used as a starting premise for future research which would test and follow the results obtained in this article.

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