teeth z, module m and/or the generator of the contour of model for FE method,
- discretizer of the generated model. It makes a model of finite elements according to prescribed lows, which – in addition to loadings obtained from the motion equation – serves as in input data in the program FEM.

- **Simulation Monte Carlo** Simulation is organized in the form of a subprogram which can be used at various levels of calculations and/ or for theory of the simulation Monte Carlo is shown in previous causes.

- **Loadings on gears - Generator of equations of motions** The gear is loaded mainly dynamically by a loading of variable amplitude as a time-dependent process and whose direction, size and point of application vary.

- We incorporated in our program STATFAG the possibility of generating the loading by means of a mathematics model of a random gearing. In addition, the loading due to residual stresses are taken into account in the program.

- FEM program.
- Fracture mechanical module.
- Optimization module.

The postprocessor serves for interpretation of results. They are presented in the form of tables and/or diagrams as follows:
- crack length - number of cycles/time,
- *da/dN* - D*K*,
- force – time,
- stress – time.

CONCLUSION

Information technology, through networking, knowledge-based systems, interactive multimedia, and other technologies, will play an increasingly important role in the way that education is taught and delivered to the student. Through these technologies, the student will be placed in an "active" role, as opposite to a "passive" environment of one-way lecturing. The teacher can then act as a facilitator instead of merely a one-way communicator. For this reason we presents in this paper the complex ES-STATEX for education, dimensioning, optimization and manufacture of gear and gear assemblies. Like the researchers in other countries we, too, tend to develop a user-friendly general system particularly for solving problems in schools and also in industry.

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Evaluation and Assessment of Informal Learning

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Abstract

A person acquires knowledge and skills both formally and informally, consciously and unconsciously. Non-formal and particularly informal learning i.e. unconscious process of education, its results, evaluation and assessment have not been the object of the research sufficiently. It is difficult to reflect documentary the competence got in the process of informal learning. In the context of life-long learning it is important that after graduation from the university graduates have conviction that education is a continuous process in all its forms. The following terms: indicators of education, evaluation and assessment, environment of education, parameters of subject and environment interaction describe the model.

FORMAL, NON-FORMAL AND INFORMAL EDUCATION CONCEPTIONS

Formal, non-formal and informal learning conceptions and corresponding terms have been created in a longer period of time of the 20th century and have been defined and described in encyclopedias of education as well as in various international documents during the last decades.

Terminology

In the Staff Work Paper by The Commission of the European Communities called A Memorandum on lifelong learning (2001) (further in the text *Memorandum*) in which kinds of learning in the context of life-long learning are described as basic categories of purposeful learning activity. **Formal learning** takes place in education and training institutions, leading to recognized diplomas and qualifications.

Non-formal learning takes place alongside the mainstream systems of education and training and does not typically lead to formalised certificates.

Informal learning is a natural accompaniment to everyday life. Unlike formal and non-formal learning, informal learning is not necessarily intentional learning, and so may well not be recognized even by individuals themselves as contributing to their knowledge and skills. Until now, formal learning has dominated policy thinking, shaping the ways in which education and training are provided and coloring people's understandings of what counts as learning. The continuum of lifelong learning brings non-formal and informal learning more fully into the picture.

We recognize in our research the terms *formal, non-formal and informal education* in many places because the term *learning* is narrower than education and we needed to use the broader concept.

Importance of Non-formal and Informal Education

Our experience and observations prove that informal learning is carried out intentionally and non-intentionally involving conscious and unconscious aspect. We got comparative data on the above mentioned kinds of learning in our researches of teachers learning. They state that in the process of acquiring the content of the subject what they teach dominate formal learning but acquiring teaching methodology - non-formal or informal learning. Concerning psychological and social psychological processes – informal learning.

Our researches in the 80-ies of the 20th century prove that informal and non-formal education is carried out also in a higher school alongside of formal education study programs. But students spend only 1/5 of their wakefulness in lecture-rooms in a year. The rest of the time is dedicated to independent work according to the programs of formal education and they learn formally, informally and non-formally. Evaluating the work of graduates we concluded that evaluation of study results do not correlate with the results at work, but out of study activities (dancing, choir singing, student self-government, etc.) correlate with the results at work. Both intentional and non-intentional learning could be in the out of study activities.

VALUATION AND RECOGNITION OF NON-FORMAL AND INFORMAL EDUCATION

There is used the term ''valuing learning'' in *Memorandum* but in many methodological sources are used the terms *evaluation* - ''means of measuring the effectiveness of a learning situation'' (Reece & Walker, 1977, p. 586) and *assessment*- ''measurement of how effectively the students have learned; usually measured against stated learning outcomes'' (Reece & Walker, 1977, p. 585).

Topicality of Valuing in Teachers Education in Latvia

The problem is urgent in Latvia and possibly in other Baltic States nowadays because of economic changes. The problem of proving and valuing results of informal and non-formal education is particularly topical in the field of teachers work. Because of decrease of many fields of industry in Latvia a lot of factories and agricultural enterprises collapsed and many specialists found work at schools. Till now a lot of them lack diplomas of formal pedagogical education. Many teachers of special subjects in vocational schools also lack diplomas of pedagogical education. They get the necessary competence mainly informally and non-formally. The questionnaires of 60 experts from the system of general and vocational education proved that 4/5 of them acknowledged that highly educated people can work as teachers without the diplomas of formal pedagogical education if they get the necessary competence informally and non-formally. The experts mentioned that relevant features of a good teacher are inborn abilities and quite rarely it is possible to become the teacher by means of formal education. The experts mentioned a range of restrictions, which prohibit working at school without the diplomas of formal pedagogical education. Observations prove that the teachers without formal pedagogical education compete successfully with that colleague who has it. Still putting an order the system of education in Latvia there are accepted the normative documents which prohibit the continuation to work as a teacher without an appropriate diploma. Therefore proving of competence got in the process of informal education is urgent. Valuation criteria and system is necessary for proving competence got informally and non-formally.

EVALUATION, ASSESSMENT AND RECOGNITION PROCESS

The results of valuation are usually necessary to describe the competence and recognize it legally. The recognition can be on the level of the place of work, nationally and internationally.

Valuation in the place of work is necessary to determine occupation and tasks for an employee. Legal recognition is not always necessary on that level.

Matching with formal education can happen in the case when a person has acquired non-formally a part (a module or modules) from formal education programs and assessors recognize that acquisition corresponds to the level of formal education. The other case is that the person has acquired all the program of formal education non-formally and the assessors recognize that acquisition corresponds to the level of formal education. Of course those two systems need to be discussed, developed, revised etc. and finally recognized.

What to evaluate. **The process of non-formal and informal education as well as its result can be evaluated and assessed. Therefore it is necessary to determine features (parameters) of the process and result.**

Methods of valuation should be chosen and adapted considering the chosen features or new methods of valuation should be worked out.

Who evaluates. Valuation can be done by a candidate and in that case self-evaluation skills are demonstrated. Several experts or groups of experts usually do valuation. There are special departments in the places of work (in large companies) as well as agencies and the centers of diploma recognition where valuation of non-formal and informal education could be carried out.

The first task is not so topical. The central place in the research is dedicated to the second and third task, which should be solved step by step making a system. For this purpose is necessary to create the model of the process and result as well as the model or models of valuation process. The models can be chosen and adapted from the existing ones or made new ones.

What and How to Valuate. Considering the ecological model of human development (Bronfenbrenner, 1979) we can state that acquiring of competence is in interaction of human and environment. Therefore we can conclude that it is necessary to valuate the features of human, environment and their interaction referring to the process of learning and its result.

Learning Motivation and Possibilities. Learning motivation and possibilities describe a personality from educational aspect. Person are motivated for learning in the case of ability to reflect on their own action and ascertain that there exists a relevant difference between competence the person has and needed competence to perform an appropriate work. The difference between competence and possibilities to improve it should be also stated, i.e. the person needs *knowledge about unknown.* Those two differences influence *the motivation of situative learning,* i.e. the motivation referring to a concrete field of the person's occupation and also the time of action. Besides motivation can be influenced by the *person's attributes*, which develop and function for a long time. Maslow's (1954, 1971) theory of hierarchical need system and need for self-actualisation is available to determine them.

The Description of the Environment. Parameters that describe social and informational sources created by humans who are the components of the environment should be searched for the description of the environment from the aspect of informal education. The researches prove, e.g., Zajonc, Marcus (1975) that the feature of the social environment in pedagogical aspect can be its intellectual climate that is measurable quantitatively by determination its index. The concept of intellectual climate and its index originated interpreting the results got from all the soldiers who served in the army of the Netherlands and were born from 1944 to 1947. Transforming the idea of the intellectual climate index to an analogue it is possible to use it for description of the environment where informal learning is being carried out. This index should be multidimensional. It can involve the parameters of the level of education, experience, communication, etc.

The environment of various informational sources and the possibilities of their usage are developing rapidly nowadays. The most important parameters are the usage possibilities and real usage of Internet, data basis, distance-education as well as a library.

Interaction of a Personality and Environment. From the aspect of interaction of a personality and environment an essential parameter is the length of interaction during informal education including also non-intentional learning. A summary length of work can be used as an indicator. The field of work, length of service, experience and occupation also should be described. It is highly important to describe from the length of service that a part of time used for informal education including creative activities was also necessary for complimenting knowledge and skills demanded in formal education programs.

We can say that at the same time the length of interaction is an incomplete feature of learning. Intensity of interaction is relevant but determining of its indicators is more problematic than determining of the length of interaction.

Objective determining of the features mentioned above is very problematic and even impossible in many cases. Therefore self-evaluation is of highly importance. The methodology of self-evaluation should be developed, e.g. evidence of reflection of ones' own learning and usage of knowledge and skills.

Valuation of informal learning can be carried out putting together self-evaluation and assessment (expert-evaluation, tests). The model of valuation can be the following: 1)determination of valuation indicators and development of methodology for self-evaluation and assessment; 2)self-evaluation according to indicators (portfolio, CV, etc.); 3)expertise of self-evaluation; 4)assessment (expert-evaluation, tests, exams and revision of its procedure considering the results of the expertise of self-evaluation; 5)integral evaluation of competence got in informal education; 6)decision on recognition and validity of competence: a)to perform concrete functions/ duties, b) to pretend to take a concrete post, c)for a part of formal education (a model or models); d)for a qualification which is got in the program of formal education. Formal and non-formal education programs should be taken into account in the process of decision taking.

CONCLUSIONS

The influence of informal and non-formal education on the development of the personality and competence is the same or even stronger than of formal education. Therefore valuation of this influence and evidence is of highly importance for many people in Latvia.

The development of methodology of formal, non-formal and informal education assessment and evaluation methodology is different. For valuation of formal education is developed methodology and criteria. They are widely used for valuation of study or teaching/learning process and its results. Both the amount (CP) and quality are evaluated. The parameters of the amount such as the length of study time with a determined number of CP are usually used in non-formal learning assessment and evaluation, and results are not always evaluated. The amount, quality and results of informal education are evaluated only in exceptional cases.

One of the versions of theoretical background for informal learning assessment and evaluation methodology development is the theory of the

ecology of human development established by Bronfenbrenner (1979). Considering it is necessary to evaluate the features of human, environment and their interaction referring to the process of informal learning and its result.

Qualified valuation of the results of informal education can be carried out by means of the model of valuation.

There should be worked out concrete indicators and tests or other methods for each profession and level of education to evaluate competence got in informal education.

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Content, criteria and checking of the portfolio for proving professional development

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Abstract

A portfolio is a documentary evidence of one's competence. Criteria of making the career portfolio have to comprise the following answers: what is a portfolio, for whom and for what is it, why is it worth for work, what to include, what are forms and appearance of the portfolio. It can contain the documents of knowledge, skills, reflection, achievement and attitude towards work and the main global processes. Artifacts can serve as an important part of the portfolio. Criteria for checking of the portfolio can be validity, authenticity, currency and sufficiency.

THE AIM, DEFINITION AND CRITERIA OF MAKING OF THE PORTFOLIO

People who develop their career successfully face new and new demands from the nowadays' society. In the documents of the Council of Europe, UNESCO and researches of various scientists (Commission of the European Communities, 1995; International Commission on Education, 1996; HUTMACHER, 1997) is stressed that people should be skilful according to the following characteristics: flexibility in facing uncertainty and complexity, to adapt to rapid changes e.g. take on responsibilities, persuade, solve conflicts in non-violent manner; ability to find information from different sources and use information; respect to people of other cultures and religions; readiness to life-long education; skillfulness in written and oral communication; ability to express active attitude towards processes in society and understand relations between past and present; co-operation skill including ability to work in a team and manage disagreements and conflicts; ability to listen and consider other views; understand and speak more than one language.

Those features should be reflected in one's portfolio together with specific competencies, e.g. European CV (EUROPASS, 2005) items allow to insert all that kind of information.

It is a typical demand of employers that they need an employee with high professional knowledge and skills and at the same time ability to be flexible, able to work in a team, to be responsible, creative, ready for learning, etc. Higher school graduates should be ready for meeting those demands of employers and therefore the higher schools have to guarantee a possibility to reach the appropriate level of competence. It means that the components of competence and their contents should be defined. As regards employers it is quite usual thing nowadays that they need employees who are versatile and able to act independently no only to follow simple rules. It is worth mentioning PURCELL'S (2001) acknowledgement that persons have to do concrete tasks in a given situation but they also should use knowledge and skills in new situations and contexts creatively.

COTTRELL (2001) mentions that since the beginning of the nineties, there has been a dramatic change in the approach to skills' development in higher education. She stresses that personal development planning including improvement of one's own learning, skills development, performance, presenting of evidence, rising of awareness of all students and reflection are important. The accent is on each person's responsibility therefore focusing on such aspects as planning, evaluation, learning etc. This is a humanistic model of learning in which student centered approach promotes independent individual work and reflective action. Taking it into account students should be trained in learning to learn to guide their study process successfully. It also concurs with the idea of adult and life-long education conception in the Memorandum of Life-long Learning.

In the result of consideration of the above mentioned acknowledgements it is possible to determine the aim and tasks of making a portfolio. So the *aim of making of the portfolio is to collect evidence for flexible adaptation to rapidly changing labour market demands and environment, and be aware of ones competence.*

The following *tasks* originate from the aim: to prove competence, to develop one's career and find work, to get a survey on a person's competence development in a concrete period of time therefore showing one's progress and dynamic, to help to keep adequate self assessment.

Competence often is defined as the ability to use knowledge and skills in action, which should be assessed through performance according to the appropriate criteria involving occupational requirements. The other definition of competence can be the following: competence is a totality of knowledge, skills and reflection abilities which is possible to prove documentary and in action in which a person agree to participate actively and with a sense of responsibility.

There is an opinion that competence usually consists of two large parts: professional and social. But in those both parts knowledge, skills and reflection are mutually connected. Will-power and responsible activity refer to the questions when, how, why, where to mobilize skills and experience for demonstration of one's competence.

Considering the above mentioned conclusions about competence we can define *a portfolio as a collection of competence evidence for flexible adaptation to rapidly changing labour market demands and environment.* City and Guilds in 1994 suggested (REECE & WALKER, 1997) that the portfolio is a folder which contains details of skills, knowledge, understanding, achievement which may arise from observation of employment tasks, products resulting from performance, documentary evidence of completed tasks, written accounts of activities.

CRITERIA OF MAKING A PORTFOLIO

White stresses the difference between work and career (WHITE J., 1997). Purposeful developing of the career is not the same as looking for various places of work. Clear understanding of career plans promotes making of the portfolio and it can serve as one of the criterion's as well. The portfolio describes our strong sides by presenting our skills and abilities and therefore self-assessment is a necessary step in the portfolio making process (UW Geography Dept Career Resources, 2005).

The criterion for making a portfolio can also be the Standard of Professions**,** i.e. the requirements determined for each profession (Latvian Higher Education Quality Evaluation Centre, 2001). The standards