



**THESES OF DOCTORAL DISSERTATION  
PhD**

**Baróti Enikő**

**EDUCATIONAL AND PEDAGOGICAL ASPECTS AND NEW  
METHODOLOGICAL OPTIONS IN WOOD INDUSTRIAL  
ENGINEERING TRAINING**

**Supervisor:  
Dr. Tolvaj László  
Professor**

**Sopron  
2010**

## **Table of content**

- 1. Motivation of choosing of theme and coming up of subject**
- 2. Aim of dissertation**
- 3. Characteristic of research**
- 4. Methods of research**
- 5. Theses of research and evaluation of these**
- 6. Results of dissertation and utilization of these**
- 7. Other research task**
- 8. Publications**

## **1. Motivation of choosing of theme and coming up of subject**

At the Faculty of Wood Sciences it has become normal and constant and recurring problem during the semesters that the students do not attend the lectures and they also not do their home assignments to a given point of time or they do it in low quality. To make matters worse the written tests results are so poor that many students fail at the exams or they are unprepared at the oral exams. Literature research shows that this problem is unsolved in the entire Hungarian higher education. The professors do not understand why the students do not attend at the lectures and cannot achieve the requirements.

During the previous years in the higher education a certain paradigm shift has started that tries to preserve those important values that made the Hungarian higher education acknowledged world-wide and integrate new kind of approaches and methods to make our education more student-centric

The processes are promising in the Hungarian higher education. There are grant opportunities that generate new developments (eg: TÁMOP 412 A, B, C). Elaborated training opportunities and the works of those well known Hungarian experts have come up for the professors to induce the approach change and processes of developments.

In the international education politics there is a wide-known concept the so called 'Delors concept', that says the education can become the antidote of the crisis of social relationships if we note the diversity of the individual and groups. It can be avoidable that education is exclusionary factor. All students cannot be forced into the same intellectual and cultural grinder without taking into account the personal capabilities. Theoretical knowledge cannot be given preference against the development of other human abilities.

The concept emphasises that "no more will education be determined because of its role on the economical development but more widely its impact

on the human development."

This dissertation is about the modernization of Wood Industrial Engineering training at the Faculty of Wood Sciences and the would be directions of development and it also carries out surveys among students and professors. From 2009 a new reform curriculum has been launched which has provided further opportunity to conduct newer scientific studies and the implementation of practical curriculum development. According to the Bologna Declaration this assisted in working out new modules—using the idea of vertical modularization—by which the recognised critical points can be solved in the training of Wood Industrial Engineering.

## **2. Aim of dissertation**

The dissertation examines the training of BsC Wood Industrial Engineering and its aim is the training. In my dissertation I aim to make the next programme:

- Introduce the higher educational circumstance of wood engineering training, delineate the processes of the past few years and the changes in the training structure, the curriculum and concept.
- Assess the situation and provide a realistic map about the quality and methodical aspects of education.
- Publish the results of mutual tutorial thinking during the survey and give generative suggestions to the problems of assessed status
- Present the partial ' solutions' and results of subject development.
- Present and suggest the introduction of new methodical elements.
- Suggest more achieved development trends in the training

### 3. Characteristic of research

From the coming up of the subject it is cleared up that I have made a discovery investigation at the Faculty of Wood Sciences. The research is empirical in nature which uses methods written in the next chapter. The different methods in my research are in favour of the justification of theses. The formulated theses in my work cannot be proved in a precise, objective predictable way that is usual in engineering studies as the theme of the dissertation is in the border of technical- pedagogical and psychological sciences. My work is considered to be as a basic research in a way that during the research more new questions rose while processing and answering a single question. So there is an opportunity for further scientific work being based on my present research.

### 4. Methods of research

Methods I used for research during the investigation:

#### Domestic and international literature

The domestic and international orientation in literature aimed at exploring the following practical and theoretical questions:

- Higher education as an environment– Hungarian and international outlook and future orientation and competence based education
- The position of wood and furniture industry and the effects on the wood industry engineer
- Characteristics of learning-teaching process
- New methodical and evaluation opportunities and non formal methods

### Questionnaire survey among the students at the Faculty

I did the empirical investigation at the first half of 2008 at The Faculty of Wood Sciences with BSc daytime and correspondence students. The survey was unrepresentative (63 students daytime, 17 students correspondence) it was only indicative but in this form unique at the faculty. The questionnaire focused on the following topics:

- Students' learning and career motivation
- Barriers to learning
- Quality of lecture,
- Teachers' features,
- Basic and professional standards,
- Students professional and personal development during the terms

The processing of data is with charts and tables after that conclusion is made.

### Training instructor's work: observational study

I have had a chance to study the students and instructors since 1990. I was able to carry out such special observations that an outsider researcher cannot do due to obvious interests

With the observations I intended to answer the following questions

#### Of students

- What student personality behaviour types – that can be differentiated by a professor – can a professor meet and what are the possible reasons, features and connections of these types that can help in teacher's understanding and designing the learning process
- What teacher's strategies can be applied for the students' motivation.

- What modes of organizing learning, work and evaluation forms and professors' behaviour are appropriate and can be developed for the students.

#### **Of professors**

- What difficulties have a professor at technical university education
- What basic competences are needed for a professor at technical university education
- How can the previously formed concept in higher education be refined, differentiated and integrated with new methods in the education
- What role does the professors' previous education in higher education on their methods, requirements and evaluation system.
- In what extent does the higher education prepare the professors to its own specialities

#### **Structured interview with the professors of UWH FWS**

The next important pillar of the empirical investigation—accordance with the principle of objectivity and authenticity that I get to know the professors' opinion during a structured interview. These information helped me to further course development and work out modules of curriculum. This investigation covered the 80 % of the professors at the faculty so it satisfies validity and all criterion of objectivity. The students could tell their opinion during a similar interview. The questions of structured professorial interview can be found at the 5th annex.

#### **Course development applying new methodical elements:**

##### **Introduction of Engineering Skill course at Wood Industrial Engineering in 2009 Bsc**

The course is to develop the students' shortages of facility, personality areas for which in technical education - like in wood industrial education—there was need which was not acceptable by now however it is indispensable in controlling the students own professional life and success.

The education based on training method, theme-centred interactive education, creative and motivated teaching and learning methods with many practical tasks that student do alone or in groups.

At the beginning and the end of the term they fill in a competency assessment worksheet and get and give feedback about their progress. The planned method of modules is the training-method. The training is a complex qualification procedure which is the most appropriate means to achieve the needed competence. It implements a so kind of application of traditional training methods which is capable of incorporate homogeneously the classical methodical elements and insert them with new elements into one, eg.: cooperative learning and project method .

##### **Introduction of Self-knowledge course in the Wood Industrial Engineering training**

The aim of the course is to affect the students' self image and creating their concrete goals and future image positively. And also establish a solid trust in their abilities, personalities. Develop their: awareness, self-transmission, self-reflection, communication, assertive behaviour, confronting ability, conflict management skills, problem –solving skills, collaboration skills, social sensitivity, empathy, spontaneity, creativity, acting ability, and self knowledge.

Thereby it lays the foundations of personal, professional self-confidence and performance.

## 5. Theses of research and evaluation of these

### Theses:

1. **In a given teaching-learning environment there are relationships between the students' attitudes and teachers' attitudes. Several aspects of the students' attitude are direct consequence of the teacher's attitude.**

The student questionnaires survey demonstrates that students aspire to have personal and good human relation with their professors. They require a so kind of professorial attitude that rather assists and supports than judges. The prerequisite of studying and active student behaviour is a good relationship between teacher and student and the teachers attitude and personality which calls for identification.. Students require professors to be role models with basic social and professional values and competences

Daytime and correspondence students mark as a learning motivation factor: the professor's attitude and behaviour" (7-8%) and the extra points, marks and appreciation" (11-8%) categories too. 20% of the interviewed students says that the professor's personality and behaviour can be hindrance.

From the processing of professors' interviews the theses statements are confirmed that professor's development has impact on students, starts from the professor's personal behaviour. According to professors they try to keep contact with their students in many ways and try to make lectures interesting with humour and practical tasks and personal examples. One of the positive

consequences of this is the student professional and personal developments which are: technical, academic preparedness, vocational skills, a way of thinking, problem solving and recognition skill, speaking, maturity, responsibility, autonomy, capacity.

2. **The teaching methodology and the one-sided application of work form are discriminatory against the students. The methodological diversity should be a basic criterion in the teaching-learning process.**

Investigating the use of new non-formal methods in education for the sake of Engineering Skills course I concluded that if more methods are used during a lecture the students' activity is higher and more students can be involved in the studying creating process. It is observable that what type work forms, methods suit to what type of students. I was looking for the answer to questions of what relationships are between the applied learning organization methods and student activity.

To verify this theory we need a kind of knowledge lead to the area of personality psychology. Relationship can be discovered among the type of personality, behaviour and the preferred learning method. It is seen that the students learning style, and behaviour strongly depend on this and consequence of this. This would contribute to the development of pedagogical strategy, methods and tools for selection and setting the direction of development, learning and flexible choice of valuation.

The professors must be aware of the frontal and non-frontal methods of teaching and by mixing them in order to maintain the students' interest and encourage them for group-work and personal achievement and also ensuring them equal opportunity and development. The methodical diversity of

Engineering Skills course provided a good basis development for students with a range of different interest, personality and preparation. This was shown in their achievement, behaviour and diversity and level of their work.

**3. The students' personality and skill development affect their long-term educational, personal and professional development., Following a curriculum reform at The Faculty of Wood Sciences the engineering skills and self-management subjects, launched in 2009, are suitable for students with a structured development of key competences, skills and additional items.**

The generally developed students' skills and competences by the Engineering Skills course are:

**Technical competences:** (creativity, autonomy, thinking modelling, creativity).

**Vocational skill competences:** (knowledge of educational and training opportunities, practical knowledge of wood industry and discipline orientation on motivation level and expansion of own professional interest).

**Learning methodical competences:** (make own individual learning style real, recognise the problems of learning and incorporate new learning strategies, learning ability, attention, memory concentration ability, the ability of the individual for lifelong learning, and career management, adaptability, flexibility).

**Interpersonal, intercultural and personal competences:** (skills in collaboration in various group activities, constructive communication and conflict management skills, empathy and replacement of others' trust, proficiency in expressing personal dissatisfaction of constructing way, striving to overcome prejudices and stereotypes, consensus skills, conscious application of assertive behaviour. **Entrepreneurship competence:** (accepting the changes, the individual's responsibility for actions, setting of goals and gaining

them, success orientation, planning, organizing, analysis communication, acting, reporting of results, evaluation, documentation, flexible collaborative teamwork, recognizing personal strengths and weaknesses, initiation skills).

**Cultural competence:** (relating own, individual and creative expressing aspects to others, openness to the diversity of cultural expression). **Native communication:** (ability to interpret thoughts feelings and facts good oral and written expression)

During the semester not the same skills developed for the students and not the same level. The chosen project work gave chance for differentiation

It was observed during the work with students how strong the relationship with the maturity of personality and performance and the personal development. The most students of groups were able to learn progress and achievement. Creating appropriate learning environment, professorial behaviour and methodical diversity, the enjoyment and acceptability, proper requirement and assessment system all encouraging the creative self-expression and learning factors.

**4. The judging, knowledge based teaching monitoring and evaluation forms with a strict set of requirements by the teacher hinder the development of student's internal personal motivation and the achievement of true self-steering learning process.**

The evaluation will accomplish its goal if it contributes to the development of student's self image, to start up the individual's self-awareness and self correcting mechanism.

The function of evaluation is to assist the pedagogical work and learning. So the task of evaluation on one hand is control, rating on the other hand self-correction and controlling of self-development. The evaluation helps to create conscious pedagogical activity in line with the goal (with the help of measuring up

the starting achievement), which is responsive to the students, and also to increase productivity through measuring the effectiveness of the educational work.

All the evaluating function, the diagnostic (appraising), the summative (qualifier) and the formative (developer) are very important in its place. They can only play their role if they are applied in time and it is especially important to retain the appropriate ratio between the application of certain valuation models.

During the higher education courses the basic requirement of summative evaluation on one hand is that the students' evaluation criteria must be clear and publicly available. It shall be specified that beside the content of the exam performance what the status determining factors are : for instance the student's work style, the chosen method for solving a task, achievement's consistency and complexity, etc.

The evaluation should serve the learning reform. It offers tools to direct the learning process towards to problem-solving thinking and the practical use of knowledge. Evaluation is always ahead of the objectives and implements the process. The three learning organizing focal points are (individual, cooperative, competitive) - in relation to the individual, group, and learning environment – and achieving their balance naturally creates evaluation system from the valuation. The evaluating dimension involves the student's self evaluation, team evaluation and teacher's evaluation.

**5. The prerequisite of the competency-based education is the tutors' personal and methodological training. The Wood Engineering Faculty has a vital interest in the consistent implementation.**

The professor should be able to raise interest and enthusiasm in him or herself and feel that education is an inner transformation. While his students are developing he is

subject to change and learns. The observation of this is the innermost peculiar form of modesty – feeling of self -transformation – this is what keeps the professor on, because from this feeling is born more than any other abstract premise.

In the United States of America the new standard list of teacher's competence by Interstate New Teachers Assessment and Support Consortium (INTASC) are:

- Subject Matter
- Human development and learning process
- Adaptation of education to the needs of the individual
- Use of diverse educational strategies
- Communication Planning
- Assessment
- Reflection and professional development
- Collaboration

New requirement should be formulated in the academic profile for the subject matter and pedagogical skills and excess of those – acquiring the use of new technology, openness, outer world and business life, commitment to accountability and quality improvement and training. Professors should know the learning skills and be able to cooperate with their colleagues and outsiders.

The feedbacks of the students and professors at the Faculty of Wood Sciences and from the literature the dissertation attempts to summarize those important professorial features and competences that are essential for every professor at higher education. Feedbacks at the teachers trainings in 2007, 2008 reflects that professors feel the need for self-training and pedagogical, methodical development and cooperation and special trainings.



## **6. Results of dissertation and utilization of these**

The dissertation examines concepts of its theme in domestic and international arena and lays down differences and similarities.

- Analyses the wood industry engineering training's processes of modernization in pedagogical and psychological aspects and on the basis of this it determines those most important features and affects on the whole training.
- Puts the results in a system with which the necessary student and professorial competences can be determined for the training of the wood industrial engineering.
- Presents the principles of student's skill development and specific opportunities at the faculty.
- Works out specific modules for the BSc Wood Industrial Engineering and Industrial Design Engineering, started in 2009, from the former results and use of vertical modularization. With the help of this the graduated students can easily and successfully find their place either at the university or labour market.

## **7. Other research task**

After the introduction of research results from the produced modules the graduated students- who enter the work force- it is necessary to have an honour examination which evaluates the modules done by the candidate and makes the necessary changes. Starting from these there is a need for a longitudinal examination process that must contain the configuration of a kind of information system that continuously analyses and the needs and skills of students and professors. By using this, the necessary educational methods can be actualised and more examination can be done on the conditions and realization of competence based training at the faculty.

## 8. Publication of dissertation

1. Farkas Enikő: Numerical Simulation of Wood Drying Using Finite Element Method, Erdészeti és Faipari Egyetem, Sopron, 1995
2. Farkas Enikő: A nő küldetése, Semmelweis Egyetem Mentálhigiéné Intézet, Budapest, 2005
3. Farkas Enikő: Numerical Simulation of Wood Drying Using Finite Element Method, International Seminar, Department of Engineering Mechanics and Thermal Techniques, Agricultural University of Poznan, Poland, 1995
4. Dr. Szalai József, Dr. Kánnár Antal, Farkas Enikő: Beszámoló jelentés az ERFARET 2.1 alprogram keretében végzett akác faanyag technikai szilárdságainak meghatározása c. kutatásról, Sopron, 2007
5. Dr. Mészáros Attila – Baróti Enikő: Motivation der Teilnehmer und Lehrer in der Ausbildung außerhalb des Schulsystems in Ungarn, Magyar Tudomány Napja és a Kreativitás és Innováció Európai Év, Dunaújváros, 2009 nov. 9-13
6. Baróti Enikő: Nem-formális oktatás módszertana - a felsőoktatásban oktatók módszertani kézikönyve, (TÁMOP 4.1.2. C/ 2009 – 0010 projekt keretében készült), 2010. július, [www.moodle.sze.hu](http://www.moodle.sze.hu)
7. Farkas Enikő: Numerical Simulation of Wood Drying, Nemzetközi Tudományos Diákköri Konferencia, Zólyom, Szlovákia, 1995
8. Farkas Enikő: A faanyag száradásakor keletkező feszültségi és alakváltozási állapotmező vizsgálata végelem módszer segítségével, Marosvásárhely, Románia, 1996
9. Farkas Enikő: Nedvességvezetési tényező meghatározása magyar fafajra vonatkozóan/ Beszámoló előadás, Doktori Iskola, Sopron, 1998
10. Farkas Enikő: Researches in Drying of Wood at University of Sopron, Cost Action E15/ Advances in Drying of Wood, Lisszabon, Portugália, 2000

11. Baróti Enikő – Dr. Mészáros Attila: Nem-formális pedagógiai módszerek és kompetenciák megjelenése a felsőoktatásban és a pedagógusképzésben, VIII. Országos Neveléstudományos Konferencia, Budapest, 2008
12. Baróti Enikő- Dr. Mészáros Attila: Multidiszciplináris szemléletű pedagógiai módszerek alkalmazása a felsőoktatásban, IX Országos Neveléstudományi Konferencia, Veszprém, 2009
13. Dr. Mészáros Attila-Baróti Enikő: A brit NIACE képzési rendszer bemutatása humán erőforrás fejlesztés aspektusából, XIII. Apáczai-napok Konferencia, Győr, 2009
14. Baróti Enikő – Dr. Mészáros Attila: Hallgatói készségfejlesztés és tehetséggondozás a Nyugat-magyarországi Egyetemen, X. Országos Neveléstudományi Konferencia, Budapest, 2010 – megjelenés alatt
15. Dr. Mészáros Attila – Baróti Enikő: Új pedagógiai módszerek bevezetése a Széchenyi István Egyetemen, X. Országos Neveléstudományi Konferencia, Budapest, 2010 – megjelenés alatt

### **The Candidate's works related to topic:**

#### **Curriculum Development:**

16. Baróti Enikő: Együttműködés és konfliktuskezelés ifjúsági csoportokban, Foglalkoztatási és Szociális Hivatal, Mobilitás Országos Ifjúsági Szolgálat, Képzői Kör, Budapest, 2009

#### **Own trainings:**

17. Dr. Veress Mártonné – Baróti Enikő: Témacentrikus önismereti csoport nőknek, Sopron, 2005, 5 hónap, havonta egy alkalom, 4 óra
18. Dr. Veress Mártonné – Baróti Enikő: Témacentrikus önismereti csoport fiataloknak, Sopron, 2006, egy év, havonta egy nap – 10 óra
19. Dr. Mészáros Attila – Baróti Enikő: Fiatal oktatók és kutatók non formális pedagógiai képzése, Brennbergbánya, 2007. július 2-4, 3 nap

20. Baróti Enikő - Dr. Mészáros Attila: Gondolkodjunk együtt fiatal oktatók és kutatók tréningje, Brennbergbánya, 2008. július 2-4, 3 nap
21. Baróti Enikő – Dr. Mészáros Attila: Konfliktuskezelés (Soproni TISZK felsővezetőinek és pedagógusainak képzése), Sopron, 2009. 11., 1 nap
22. Baróti Enikő – Dr. Mészáros Attila: Nem formális oktatás módszertana (TÁMOP 4.1.2.C/ 2009-0010 uniós pályázat keretein belül) Széchenyi István Egyetem, Győr, 2010. 06. 11-12, 2 nap
23. Baróti Enikő – Dr. Mészáros Attila: Nem formális oktatás módszertana (TÁMOP 4.1.2.C/2009-0010 uniós pályázat keretein belül) Széchenyi István Egyetem, Győr, 2010. 06. 25-26, 2 nap

Sopron, 2010. September