

**Eötvös Loránd University Faculty of Education and Psychology
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Research PhD Programme in Education

**Competence Orientated Elaboration of Task and Attribute Profile of
Teachers Taking Part in Adult Education**

The Main Arguments of the PhD Theses

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Introduction

I consider knowledge a major issue, and I consider form of knowledge even more important, that is the reason why I have found myself drifting into the system of education or andragogy, so called adult education. Having a degree in engineering I started my carrier as a layman in adult education.

Trespassing the barrier between economical studies and pedagogy/andragogy was in 1991 when I became founder member of the currently operating post-secondary school – Academy of Business Studies – which I directed for 10 years. As this post required pedagogical/andragogical and educational administrative qualifications I obtained a degree at BME Technical Pedagogy Faculty as a Certified Engineer Teacher and Public Education Manager. I intended to work at this institute but it was closed and the students were transferred to other institutes. I continued my studies at ELTE PPK Educational Studies Institute where I had the opportunity to meet such prominent experts as e.g. Bábosik István, Falus Iván, Németh András, whose works were compulsory literature at the BME university. (*Theory and practice of education, Didactics, and History of education*)

I had the opportunity to glimpse into adult education when in 1994 I was offered a job at one of the largest adult education institutes as the Educational Director.

On the field of practical adult education I experienced that adult educators are not trained but spontaneously selected. Elderly experts are prominent persons of this profession; they are made masters by long years' experience and empirical knowledge. They regard adult education as a beloved 'side activity' of professional work. Some of them having a huge amount of educational experience started to study andragogy but as it was limited to the narrow streak of practice and science they never developed into effective educator resources. They are prominent representatives of professional and personal attributes, however, professional and character development functions are hardly ever detected. These educators are convinced representatives of traditional teaching-reproductive strategies.

Besides arranging educational training I took part in numerous programme development projects. Participating in the Leonardo Educational Programme („ENTREPRENEURSHIP AND PROJECTS IN TECHNICIANS EDUCATION" [No N/97/1/33014/PI/I.1.1.b/FPC]) I had the opportunity to study the Scandinavian education system practices. Due to this experience I turned to the practice and theory of project method education, and managed to develop several secondary school pilot projects. Then I accepted the offer of BME Technical Pedagogy Faculty to teach Educational Theory Project.

My encounter with competence orientated approach – back in the second part of the 90s – lead me into two major fields. In the field of practice (mostly at multinational companies) competence orientated requirements were set in the human resource training as output requirements. Then in the Ministry of Labour and Employment I myself – as the Head of Adult Education Major Department for 2-3 years – applied competence concepts and approaches, which in the civil service sphere often met lack of comprehension and resistance.

Competence orientation in adult education became part of my way of thinking, it assured me that all the classical functions of human resource management (selection, appropriacy evaluation, result evaluation, carrier planning, and pre-redundancy evaluation etc) gained competence based interpretation. According to prominent Hungarian and international market leading companies knowledge is practical in the first case and theoretical knowledge is secondary.

This way I developed an adult educator, projectmethod approach and competence orientated 'way of thinking triangle' which mark the topics in my dissertation. I am searching motives to found adult education profession in this triangle, I am trying to argue for the necessity and usefulness of competence orientated training and analyse the importance of project approach in competence development.

I used works and publications of – among foreign resources – Arapovics Mária, Csoma Gyula, Feketéné Szakos Éva, Golnhofer Erzsébet, Halász Gábor, Kraiciné Szokoly Mária, M. Nádasi Mária, Maróti Andor, Nagy József, Nahalka István, Németh András, Pála Károly, Pethő László, Sáska Géza, Schaffhauser Franz, Sz. Tóth János, Szabóné Molnár Anna and Zrinszky László.

I would like to thank for the enormous support I received from my colleagues, my friends and my wife. I received valuable professional support from my supervisor, Balogh Andrásné.

I hope my work contributes to the growth of the prestige of adult education work, as well as to the clearer positioning of the situation of adult educators.

I. The development of competence approach

Philosophical roots of competence approach. Competence is a composition expressed in rational, pragmatic knowledge and activity. Competence helps us feel at home in the world. As Kant referred to it in his work (*Anthropological writings*) humans have to be competent, humans have to be at home in the world. According to Tamási Áron ‘*We are living in this world in order to be at home in it somewhere*’.

We can detect philosophical roots of activity based competence approach – characteristically American – pragma (in activities, deeds and useful things) that is pragmatics (in activity).

Character analysis. In my dissertation I use the character structure consisting of the unity of the three life dimensions (biological [lack] being, psyche, and social being). These dimensions realize in a unified mode of existence. I accept that human abstract (human myth) according to which human beings as free living beings may strive for self-realization and/or exceed themselves, reach socially valuable goals set by themselves or others, choose between options, create values, live a responsible life, have a responding attitude, that is an intelligent life controlling physical existence. Based on this ‘unified humans’ can represent four ways of life – reserved, reflecting, serving, and partner.

Different competence approaches. I divided the development of competence approaches – almost 100 years old – into 5 phases, which starts from the characteristic of the mechanical expert and finishes with the clever, motivated and competent character.

At the end of the 19th and at the beginning of the 20th century (at the first phase of competence approach development) the world of labour required only a tiny piece of the human beings, which was brilliantly expressed by Henry Ford ‘Why do I get a whole worker when I only need two working hands?’

The development of the fifth phase competence philosophy was required by employers who rely on colourful mechanisms of different approaches nowadays too, although in different form or quantity in case of physical or intellectual type of work.

Interpretation of competence. During my research I regard competence as a structured and common system of personal resources that has been accumulated during the learning, experiencing and practising process of the individual, and which enables them to apply knowledge and characteristic components constructively and successfully in a concrete physical or intellectual field. (I would like to note here that Farkas András and Nagy Viktor „*Student Assessment of Desirable Technical Skills: A Correspondence Analysis Approach*” research was based on this approach or its published parts [Henczi Lajos – Zöllei Katalin: *Competence management*]).

I find it important that competence does not only mean the application of acquired knowledge, but also the characteristic features of the individual while acting.

We have to see that numerous experts look at the spread of competence approach suspiciously and regard it as the 'globalisation intrigue' of OECD–UNESCO–EU, which puts an end to the variety of education and culture and which would like to transform the employee into a gentle lamb of the world leading concerns. So I would like to emphasise that in the deep or fix layers of my competence approach there are moral and activity constructive stimulating education entities, and culture based morality Kant components too, according to which 'Enlightenment is the freedom of humans of its childhood caused by themselves'

Levels of competence components. I put competence components onto five levels. (1.-3.) I put the personal resources necessary for work such as knowledge (cognitive elements), skills and qualifications (know-how components) to the first three levels. (4.) I put the general quality of abilities/skills (intellectual, communicative, activity and social abilities) onto the fourth level, which are basic conditions for the development of components on the first three levels. (5.) Elements such as constructivity controlling components which critically influence the constructive and quality characteristic of work are to be found on the fifth level that is hardly detectable and developable.

Changing knowledge. There is a change going on in the world of labour, in the evaluation of knowledge. Economy finds activity based competences more important. There is (1.) knowledge and (2.) the two-pole, competence principle manifested system of knowledge application. Competence principles are gradually integrated into the target system of vocational training and adult education. This way output requirements of a training are defined in the form of competences. Competence approach transforms educator activity too.

Competence deficit and competence sufficient. This way competence is such a knowledge capital which is to be regarded as a dimension attached to the person. If we reflect the individual competency stock – vertically and horizontally divided – onto competence requirements determined by employers, the two heaps do not necessarily overlap. Depending on work situation there will always be deficits (lacks) and sufficits (extras). The phenomenon shows that knowledge based society intends to purchase job specific competent workforce, who is able to answer requirements and adapt as quickly as possible.

The development of competence models. The competence model is for corresponding the competency stock of the individual and the competence requirements defined by the company and which – more or less – contain individual or unique competences, cognitive competences, general or social competences, personal competences, furthermore functional competences necessary for outstanding achievements. (The most widespread models are outlined in the appendix of my dissertation.)

Competence model made of clusters (5K). On the basis of my research I can draw the conclusion that the model made of five clusters can reflect the most efficiently the necessary competences for different professions. Four out of the five clusters are according to the activity type: (1) work, (2) autonomic learning, (3) adjustment, (4) innovation. So called key competences will go to the fifth cluster that contain competences necessary for practising competences in the first four clusters. The unity of competences in the five clusters makes it possible to handle and to develop human and material resources, as well as the successful management of workforce and self developing activities.

Competence is the result of learning. Adults learn in different ways according to their age, social background, differences in their learning traditions and certain biographical issues. Because of this it is impossible to teach adults according to a standardized technology model and instead of ignoring differences educators should rely on the sensible combination of their experience and theory. The knowledge of the learning style of the students is an excellent andragogical support during the training, educators should do their job following professional method awareness, adjusting to the learning habits of the students, and forgetting routine or a certain standard.

Connection between learning and age. Opinions about the ability of learning of adults fall into 4 characteristic categories. (1.) William James American philosopher and psychologist stated in his work (*The Principles of Psychology*) at the end of the 19th century that the mental development of adults comes to a halt at the age of 25-30. (2.) Edward L. Thorndike completely disagrees with this statement (*Adult Learning*), and proved with experiments that there is life over the age of 25-30, also regarded this age as top learning period, and stated that learning activity finishes only over the age of 50. (3.) According to representatives of relative regression the ability of learning will fall back to young age when learners become saturated with positive learning experience. (4.) In my opinion – based on my experience – learning process can be maintained for a long time as it is not influenced by age, but it is determined by the stage of development of procedural captivities, way of life, culture, and also the effects of material and personal circumstances. Due to this, professional competence stock can be put on the individual n times.

Layers of knowledge. The knowledge based on competency (system of knowledge) has two layers. (1.) A constant layer is developed at young age which becomes stable by the adolescent ages and provides a relatively fix set of knowledge. (2.) Superficial knowledge layer developed at adult ages which contains special competences necessary for a certain activity and needs permanent developing from time to time is built upon that primarily fix layer.

II. Task and attribute profile of the adult educator

Adult education. Adult educator roles have gone and have been going through important changes which can be explained by the quest of adult teaching, adult socialisation, or to sum up in one expression, adult education. I divided the history of adult education into 8 periods. (1.) religious education, (2.) experimental period of secular public education, (3.) enlightenment, (4.) the development of organized adult education in the spirit of 'home and development', (5.) school adult teaching and education [1945/1946-1990], (6.) adult education integrated into vocational (professional) training [1990 and 2000], (7.) gradually developing – mainly reflecting to needs in the economy – life long learning after 2001, and (8.) permanent learning style answering requirements of institutes, personality development and general knowledge.

Adult educator. The experienced situation reminds me of the principles of the middle ages and Protestantism: *'..... everybody who knows the material to be taught is suitable for teaching The most effective teacher training is teaching itself....'* (Pukánszky Béla: *Victory of enlightenment*). Spreaders of culture (former adult educators) felt education was their moral responsibility. There were numerous educators among artists, writers, scientists, priests, presbyters, and doctors. Public educators did the most for the education of the 'public'; they did away with lacks in child and teenage education despite the hard circumstances. The tendency is palpable: everybody did education beside another job. This duality is more or less the same nowadays. Adult educator profession is unclear both in its entity both legally even nowadays. Even the 'bible' of adult education 2001. CI. Law does not mention the adult educator.

Task profile of the adult educator. Task profile sets competence and activity requirements for the adult educator which consists of the list of those relevant tasks of work (task groups, activities and operations) which are to be done by the adult educator having the knowledge of the profession. (It defines what the concerned person in the – andragogy based – adult educator profession has to [or should] do.) The task profile consists of more parts – task groups, tasks, and operations. One profession usually consists of 6-12 task groups (tasks related to each other).

Attribute profile of the adult educator. Attribute profile (competency resource) is a system of expected attributes (acquired knowledge, skills and qualifications, personal, social and cognitive and special), which makes one to become able to practice the profession of an adult educator, to do this activity properly (to do task groups, activities/tasks and operations).

III. The importance of project method in the development of competence

The importance of project method. In my view project education based on teamwork which has some kind of activity of everyday life designed and carried out by the people concerned can provide significant support for the development of competence – especially social – as the processing of topics and the solution of tasks is based on the common interest and cooperation of participants and educators.

Task. The careful selection of tasks has a significant role which provides a wide, colourful and lifelike choice of creative activities for the participants.

Teamwork. I think the preferred means of project method for competence development is teamwork activity, which is also considered so by some scientific researches that regard teamwork a basic source of education. During common activities – similar to the world of labour – participants develop and practice a wide choice of social interactions and forms of behaviour, as teamwork creates real moral, life and social situations, problems and states that force participants to make decisions. This way, participants can acquire quality and valuable forms of reactions. (I have collected relevant components of behaviour and interaction within project work and examined what importance is attributed to these attributes by sample groups.)

Composition. According to my experience when creating sample groups – regarding the complexity of the project work, and help the appearance of multiple views – we have to strive to create heterogenic groups that are based on self organisation.

Educator. Those educators are capable in project education who do not regard ‘teaching and testing’ strategy the only and beneficial method, who are ‘curriculum capable’ that are able to take part in the development of the curriculum, who have the necessary experience, and motivated for acquiring new knowledge, who have problem solving capability, who do not reject making decisions and finding alternative solutions, who are empathic, and are able to realistically evaluate their own activities. Those who – because of the high number of interactive activities – are ready to be part of a reciprocal learning dialogue.

Topicality of project method. Public education, regular professional training and project education are on the same track. For several years the public education law has also mentioned project education. [45. § (1)].

The author was also taking part in the introduction of project method into the curriculum of regular professional training, and a book was also published on the topic. *‘The introduction of project method into professional training’* (SZTÁV Rt., Bp., 2006.). The essence of the method is that teams – participants/students – have to realize real projects taken from the real world, from the world of labour, especially from companies and enterprises.

IV. Empirical studies

LEARNING STYLES

1. thesis group

Let us look at the Kolb- and Fry-model (*Towards an Applied Theory of Experiential Learning*), in which four types of learning methods are illuminated. (1.) **CE**: Concrete Experiencing; (2.) **MO**: Meditative Observation; (3.) **AC**: Abstract Concept creating; (4.) **AE**: Active Experimenting.

The learning style of the adult derives from the combination of the four basic learning methods and according to this four learning styles can be constructed: Converging, Diverging, Assimilating, and Accommodating styles.

Methods and means of the research

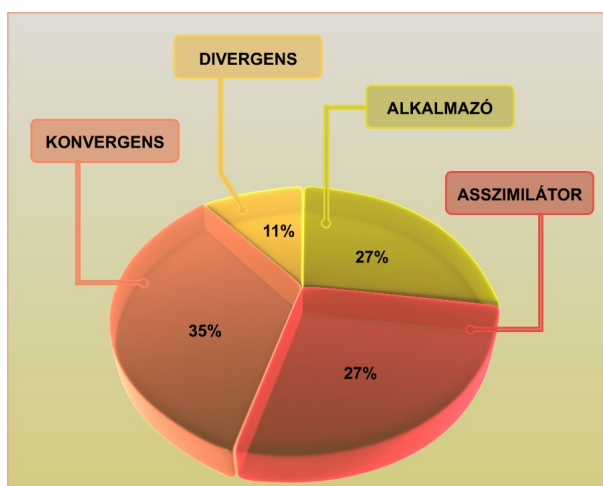
Survey. To collect the necessary primary information I used the Learning Style Survey (LSS) of The Cambridge Polytechnic University (which can be found in the appendix of my dissertation).

With the help of LSS I made a survey on a smaller sample (n=55), that are students of BME GTE certified engineer teacher students (ETS) (n₁=27) and BGF human resources manager students (HRM) (n₂=28).

Hypothesis.

- Proposition.** There are different learning styles detected **within the two different sample groups**, ETS and HRM.
- Proposition.** There are no significant differences regarding learning styles **between the two sample groups**, ETS and HRM, representing the two major fields of studies, technical and arts. Both groups were operating in the same circumstances, such as intensive learning circumstances (sample groups were made of both corresponding and regular students).

Definition of learning style. To show the major learning style we had to realize 'combination numbers' – with two simple subtractions (AC-CE, and AE-MO).



The analysis of data was with the help of SPSS 15.0 for Windows and Microsoft Excel 2002 programme. The learning style of the whole sample (55 persons) is represented on the chart, which shows – in accordance with the general situation – that adults prefer different learning styles. The majority prefer the convergent method made up from abstract concept creating (AC) and active experimenting (AE). Students representing the two different fields – technical and arts – had very similar concepts for learning that is they have very similar learning styles.

The system of higher education regardless of the field makes students acquire knowledge in a similar way, provides similar models, and requires similar attitude and solutions.

Results in the case of the two samples show intense coincidence. To study the connection between the two sample groups I used the Kruskal-Wallis co-efficient (H). Results show $H < H_{\text{chart}}$ ($0.835 < 7.815$, $f=3$ and $\alpha=0.05$) so the difference between the two samples on a 95% confidence rate is not significant. (divergence is accidental). There is no significant difference between the two sample groups in their learning styles.

COMPETENCE GROUPS FOR THE ADULT EDUCATOR COMPETENCE MODEL

2. thesis group

I assume that there are some special competences characterising the adult educator profession – deriving from personal, social and cognitive competences – that make adult educators able to apply knowledge, skills and personal determination successfully in practicing the profession. In accordance with it:

3. Proposition. To create the task profile for the adult educator

4. Proposition. To create the attribute competence profile (competence resources) for the adult educator.

The method and the means of the research

I divided the research into three phases.

I. phase. To contribute my own experiences – according to the logic of DACUM method – I have collected information from prominent adult educators, training managers, and experts about the activities carried out during the education process. As a result of this empirical study I created adult educator task profile.

II. phase. On the basis of these interviews I have made a survey form – regarding the attribute profile of the adult educator – and sent 20-25 copies back to the directors of the institutes and asked them to fill in the questionnaire with the colleagues working on that specific field. I have tested and made a confidence analysis on the completed forms (Cronbach alpha). I have used Kendall's W rank concordance coefficient to analyse opinion coincidence within one group. I have defined the major descriptive statistical characteristics in the view of the importance of each item. I have established the priority rankings on the basis of weighed arithmetic mean of the competences for each professional field and aggregated data heap. I have calculated the numerical values of the Pearson's product moment coefficient of correlation, which measures the linear relationships between importance value averages estimated by the experts of seven major professional fields.

III. phase. I have used the so called correspondence analysis which is a multi-variable statistical method to analyse in depth the relationship between the many variables. The description of this relatively new technique can be found in the works of Greenacre (*Theory and applications of Correspondence Analysis*) and Benzecri (*Correspondence Analysis Handbook*). The handling of category variables in the form of cross charts is the most frequently used simple form of applied researches. Correspondence analysis is a descriptive technique of factoring of category variables that represent them in a characteristics space, which demonstrates correlations plastically in two or more dimensions. Correspondence analysis works with chart data generally with two directional, cross classifications. It defines a distance rate between any two points, where the coordinates of the points are defined by the values of the discrete variables (categories).

The aim of such an analysis is that elements of a relative frequency chart represent the distance between any horizontal or vertical lines in low – usually in two – dimensional spaces. This can be achieved by the factorization of the basis structure of the distance matrix containing the proper elements of Chi-square statistics (singular value decomposition). This way we obtain horizontal line row vectors, vertical line column vectors, and singular values. (Greenacre: *Correspondence Analysis in the Social Sciences*).

Note that in the literature there is no complete agreement in the construction of graphic displays. Namely, there is dissension in the most proper selection of normalization method and the way of interpretation after visual display. (Gabriel: *Goodness of fit of biplots and correspondence analysis*; Greenacre: *Statistical Methods in Medical Research*; Nishisato: *Elements of Dual Scaling: An Introduction to Practical Data Analysis*).

The KA method has been applied effectively on multiple fields. In the Hungarian literature there have been only a few applications. Among these I consider relevant that with the KA method Farkas (*On the Competency Profiles of Graduates*) attempted to demonstrate the required competences of graduates by the labour market, the evaluation and analysis of their importance from the graduates's points of view.

Task profile of the adult educator

The experimental task profile of the adult educator is made of 9 task groups. Within each task group there are 5-17 task definitions.

Attribute competence profile of the adult educator

I have made the hypothetical structure of the attribute competence profile (competence resources) based on the task profile – with expert and mental technique support – that I have collected on a questionnaire and asked the sample group to fill in the form. I have turned to the directors of twelve institutes. I have received back 223 questioners from eleven of them. The participating adult educators were selected randomly by the institutes. I have asked the same number of questionnaires from each institutes, about 20-25.

The questionnaire contained closed-end questions with the help of which participants could remain anonymous and could evaluate the importance of competences on a 5 degree Likert-scale.

The confidence test of the questionnaires confirmed my expectations that the answers given to each item did not correlate with each other per pair. There is independence between the items in all the part- and whole database and that proves the correct interpretability of the scale.

I have made a 'side product' as a result of my studies, which is a competence collection (dictionary of competences), which can provide support for any experiments or studies and systematizing on the field of andragogy and human resources. (The complete competence collection is a part of the appendix of my dissertation.)

Hypothesis.**4. Proposition.**

4. 1. In accordance with the conclusions from the interviews the components of the complex competence profile distribute into two subsets:
 - a.) 'Education close' competence subset that can be associated with teaching-reproductive representing strategies;
 - b.) 'Education distant' competence subset that can be associated with education organizational procedures;
4. 2. As a result of the dominating educational strategies adult educators put the indirect practising educational way, the project work only to the third place – unfortunately, and against the author's viewpoint.
4. 3. On the basis of the priority numbers of competences there will be certain competences that will drop out of the complex competence profile (the arithmetic mean of the importance of some competences does not reach 3rd degree on the Likert scale, which is considered a relatively important level).

Evaluation

Reliability analysis. The value of the Cronbach alpha for the whole sample: $\alpha = 0.780$, for the sub samples: 0.797, 0.882, 0.701, 0.774, 0.718, 0.576 and 0.838. The consistency of the questionnaire can be very positively evaluated as the value of α for the correlated variables are close to 1 (100% reliability). In case of adult educators of the agricultural field, results can only be accepted with certain reservations ($\alpha = 0.576$) as this low value of confidence suggests some kind of misunderstanding.

Agreement analysis. I defined Kendall's W rank concordance coefficient for the whole and for sub-samples. For the whole data set: $W = 0.126$, for the subsets: 0.161, 0.338, 0.176, 0.143, 0.132, 0.140, and 0.177, which show significant disagreement rates (except in case of the foreign language field [FL], where $W = 0.338$). We can accept results with keeping this fact in mind).

Importance. According to the arithmetic mean of importance of competences educators find *Cooperation, Flexibility, Previous Knowledge, and Reflectation* the major attribute profile competences for an adult educator. Members of different sample groups agree about the priority of some adult educator competences, although sometimes there is some extreme deviation among the values. This statement can be supported by the values of the Spearman's RHO rank correlation, which is also suitable for comparing rank values of sample averages. For the last five ranks they put: *Innovation; Projectwork; Equal opportunities; Efficiency scaling and Management.*

The analysis of the structure clearly shows that all the educators put teaching-reproductive 'education close' activities – the competences in connection with their main activity – to the first third of the importance scale and they put the complementary/secondary organizational activity components to the third third.

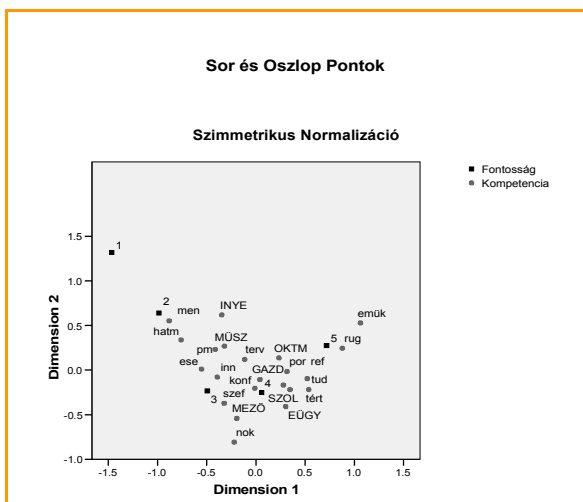
I regard *Character development* competence to be the boundary between the two domains. I regard it natural that adult educators preferring the transfer of professional knowledge did not attach importance to this competence and put it to the 10th rank on the scale.

Analysis of priority rankings. Agreement between the fields can be analysed with the help of the Spearman’s RHO rank coefficient of correlation. The smallest rate of agreement according to the rank coefficient of correlation is – $\rho=0.262$ – between the AGR and FL sample groups. The highest rate of agreement according to the rank coefficient of correlation is – $\rho=0.873$ – between the TECH and ECON sample groups. All coefficients are significant $\alpha=0.05$, only in case of pairing with the AGR sample group we hardly find significant rank correlation; moreover these values are very low.

Scaling the association between the ranks of importance of competences. With the help of Pearson’s product moment coefficients of correlation (r) we can state, that there is a strong positive linear correlation between the importance scale values estimated by the seven major fields, except for the AGR field and its pairs that was referred to earlier. The lowest correlation coefficient is: $r=0.329$ (between EDU and AGR sample groups). The strongest linear relationship is: $r=0.909$ (between FL and SERV sample groups). We should devote attention to the frequency and low value of non significant coefficients in the AGR column.

Correspondence Analysis (CA)

I present the formal description of the mathematical background of CA in my dissertation. The main result of the multi variable statistical analysis is shown on the so called *biplot* perceptive map which displays the 93% of the original information content of the problem in a two-dimension-plane.



(Any studies I had known before did not show such good results, as they were able to display only 70-80% of the real content). In this same chart in the form of some extra points I demonstrated the averages of the different fields to make the study, the analysis and evaluation of the results possible. According to the map the main adult education competences can be defined – both referring to each and every

sample group – what importance is associated to them, and what associations exist among these competences.

Weighed Arithmetic Mean			
FIELD			
EDU	ECON	SERV	HEAL
3.95	3.85	3.99	4.01

Studying the map we can state that generally adult educators of Educational and Artistic Training (EDU), of Economics (ECO) and of Service Training (SER) found competences important. This result is in accordance with data of the table that contains the most important

local mid values of the questionnaires of the seven major professional fields.

We can find similar parallels if we compare symmetric biplot values of competences with the priority ranking of competences. From the table we can also see that members of the sample groups – out of the 15 competences – found *Cooperation* (Coop), *Flexibility* (Flex), *Previous Knowledge* (Pk), *Reflecting* (Ref) the most important (the closest to the number 5 rank on the Likert-Scale). The representation of the biplot values (in regard of the four competences) is the same as the result of the aggregate priority ranking. On the basis of the arithmetic mean, the variability measures and the biplot representation it can be stated that every member of the sample groups accept components of the attribute profile competence. On the basis of the facts no element of the profile can be eliminated. Not even *Management*, although it had been ranked lowest, as its weighed arithmetic mean average is 3.32 (dispersion 1.08).

THE IMPORTANCE OF PROJECT METHOD AND THE VERIFICATION OF ITS COMPETENCE DEVELOPING ROLE

3. thesis group

I have studied the question in what rate, and to what extent the project method based on teamwork supports reaching the education and training targets of different educational institutes (in my dissertation I only show a small segment of this complex topic).

Research hypothesis

5. **Proposition.** I assume as my (basic) hypothesis that different training and educational institutes (vocational schools, colleges, and universities) have to reach their competence development targets with the application of different methods and forms of work within the frames of project work. So I search if there is any significant difference between the attitudes and correlations in project work as competence elements on the three levels.
6. **Proposition.** I assume that the importance of attitudes and correlations induced by project method – on different training levels – induces different priority (preference) ranks.
7. **Proposition.** Among characteristic features that are indirectly developed and shaped during project work, we will find at least one component (e.g. *Problem solving*, *Cooperation*, *Taking responsibility*) with the importance of which all the sample groups agree, and put them on the same rank on the first five interval places.
8. **Proposition.** Attitude forms and the importance of correlations in case of all the three levels of training in regard of project work exceed the level of practice (in majority there is competence deficit and not sufficit).

We will have the (basic) research hypothesis formally and regarding importance (I):

$H_1: \mu_1 \neq \mu_2 \neq \mu_3$, where μ_i , ($i=1, 2, 3$) is the average of the variable in the population of the i th group.

i -index: identifies the group, that is the type of school.

The H_1 hypothesis verbally means that we assume some kind of a relationship between the groups. Henceforth we apply this to importance, as this seems to be the best feature that can be compared the most on different training levels.

On the basis of the above the following statement is valid for the null hypothesis:

$$H_0: \mu_1 = \mu_2 = \mu_3$$

Research methods and tools

Method and scaling tools: Questionnaire method and the complex statistical evaluation of the responses.

The characteristics of the sample and the participants. Students at vocational schools (**K**=Bolyai SZKI high level professional training [HLPT] participating students), College students (**G**=BMF engineer teacher students), and post graduate university students (**P**=BME GTE Certified Engineer Teachers of the Technical Pedagogy Faculty) filled in the questionnaire.

The number of filled in questionnaires is in regard of **K**, **G** and **P**: $N_K=29$, $N_G=16$ and $N_P=48$.

Degrees of scaling: ordinal scale.

Type of scaling: 5-degree Likert scale.

Construct/main factors. We created a so called construction (*construct*), a main factor for the problem. In our case *construct* is the aggregated set of items in the **V.**, **30.** and the **27.** questions. (e.g.: The unity of professional and personality development competences that can be reached by the project method.)

The processing and evaluating of questionnaires

Numerical calculations were made by the the SPSS 15.0 software and are demonstrated on the example of KV., **G30.** and **P27.** part database.

The independence analysis of the items (base factors) of the main factor. I have made independence analysis of all the part-database (K_f , K_m , K_g , G_f , G_m , G_g , P_f , P_m , P_g), and I have summarized the results in the correlation matrix [Inter-item correlation matrix: $R_i(K_i)$]. Apart from a few data all data correlated with each other positively, which means that the understanding of each item on the questionnaire was clear. Correlation coefficients are very low, which fact verifies that there is independence between the items that is each item is equally and independently provides base for the main factor. This way each item can be regarded as resultant vector.

Normality analysis of items (base factors) of the main factor. Analysis was applied to each part-database and it can be stated that the majority of variables (points) can be regarded as approximately normally distributed.

Accomplishment and analysis of reliability and validity of the questionnaires.

The numerical value of almost all the reliability coefficient – M – is higher than 0.8 (moreover this value exceeds 0.9 in many cases). Thus, the internal consistency of the questionnaires is close to be excellent.

Questionnaires satisfy validity requirements, namely, they measure what we wanted to measure. (Maddox – Taddy: *A Comprehensive Reference for Assessments in Psychology, Education, and Business*)

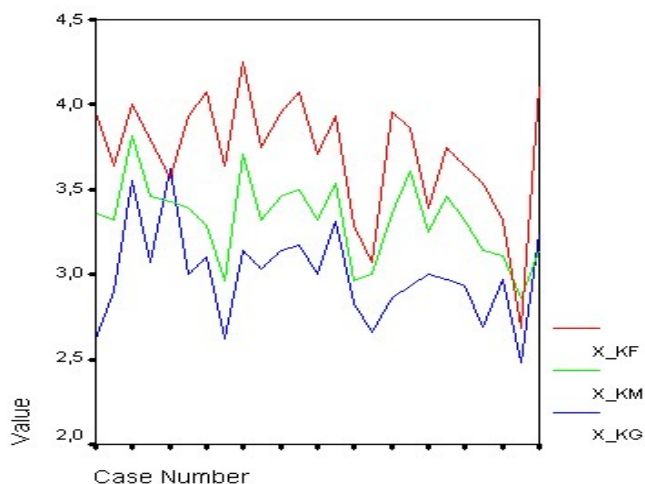
Group agreement analysis of participants. I have defined the values of Kendall's W rank concordance coefficients. According to Kindler – Papp: *The analysis of complex systems. Scaling methods*, if $W > 0.5$ the resultant group rank can be accepted as a so called *consensus* ranking. If $W \leq 0.5$, the group ranking can be accepted as a *compromise* one. In our case opinion agreement values in the groups are low, so we can accept the group ranks as *compromise* ranking.

Determining the values of association. I have examined the correlation between the importance-level of acquiring and importance-level of practical application of the single items (knowledge elements of project method and its necessary skills) within the same level of training.

The R_p correlation matrix – for all the part-database – contains rank correlation coefficients defined on the basis of weighed arithmetic means between the pairs of the rankings. As all the values are positive it can be stated that that participants of each questionnaire understood the questions in the same way. Very strong agreement can be detected only between secondary and postgraduate groups in the importance of items ($\rho=0.944$) and within the post graduate group in present and practical application ($\rho=0.811$).

Definition of Pearson's coefficient of correlation on an interval scale. I have computed the Pearson's correlation coefficients (r) on the basis of the scores resulted in the estimation processes. These values are given in the R matrix. These interval scale measures of association are a little bit higher than those of calculated on the basis of the ranks, which means that participants agree more – regarding the importance of each item and in the their use – than in the order of the importance.

Definition of competence deviation (deficits and sufficits). Based on the rank



points I have defined the values of competence deficits and sufficits. (Negative values represent deficits, positive values represent sufficits.) I have only defined differences between *importance* and other two categories (*presence and practice*) regarding all the three levels of education. Deviation is relatively small. It exceeds 1 point distance at some items. There are competence sufficits at the item: 24. Of the secondary education and at the item: 18. and 19. of post graduate training, and they are relatively low. Participants thought that compared to

their importance in 'Mutual judgement' 'Conflict resolution' and 'Regarding other people's interest' they have sufficits regarding 'Presence' and 'Practice'.

Importance ranks on different levels of education (K, G and P). I have made the ranking of the indirect development of character features in project work with the help

Components put on the first five ranks by the three sample level groups
Responsibility (K 03),
Time planning <i>Időtervezés</i> , timing of activities (K 07),
Cooperation <i>Kooperáció</i> (K 09),
Elaboration of own opinions (K 10),
Mutual information providing (K 11),
Problemsolving (K 12),
Documentation of the work done (K 25).

of SPSS in all the three sample levels on the basis of importance criterion. The table here demonstrates the major characteristic features on five ranks that can be developed in project work. On different education level we received different preference degrees. Even there are no components in the first five ranks that were evaluated equally by the three level samples. It can be stated on the basis of the ranking that pupils/students during indirect

teaching/learning processes attach importance to the following three interactions. Problem solving (K12) Cooperation (K09) and Time Planning (K07) were placed ahead in this ranking.

Definition of the Kruskal-Wallis coefficient (H). As in all the cases $H < H_{table}$ we can regard it true that all the three level sample groups put the characteristics on the first five places and this fact can not be regarded to be random. Participants decided that *Mutual demands* and *Mutual judgement* are the least important dependence-responsibility features. Participants in all the three level sample groups – regarding importance – put these to the last two ranks.

Testing of the (base) hypothesis of the research. To test the (base) hypothesis of my research I have used the ordinal scaled Kruskal-Wallis test (we can regard it equivalent with the method of analysis of variance {ANOVA} on an interval scale) and

	Rank numid	Asimptotic significance	Monte-Carlo significance
Kruskal-Wallis test	Kf 30. 70	0. 114	0. 111
	Gf 38. 72		99%-os konfidencia intervallum
	Pf 43. 31		0. 103–0. 119
Jonckheere-Terpstra test		0. 045	0. 046
			99%-os konfidencia intervallum
			0. 041–0. 051

a relatively new method the Jonckheere-Terpstra test. The variable used in the test is the average of the ranks. The result of the test is demonstrated in the table. Non-parametric statistical tests of the H_1 base- (null-) hypothesis of the research have showed quite unexpected, but very interesting results.

Namely – by setting an $\alpha=0.05$ level of significance – one can be stated

on the basis of both tests, that there is no evidence provided to reject the null hypothesis stated at the beginning of the research. (From a mathematical point of view the trial practically is inconclusive) This means that there is no clearly definable relationship between the groups. In my opinion this refers to the fact that using the project method (its curriculum, methodology, and priorities etc.) it is not dependent upon the level of education. It is fairly clear for me that by conducting further analyses even more sophisticated results might be gained.

V. Summary

The results of the empirical studies – in the order of the elaborated theses – can be summarized as follows.

1. Proposition. The results of the researches supports that there are different learning styles within the sample groups. The majority prefers convergent style, the application of standard solutions.

2. Proposition. Publications show that there are dominant deviations between sample groups belonging to the same field of education in regard of learning styles. During the research I presumed that in intensive learning circumstances special field differences will become indistinct and will not be significant differences between the learning styles of students of different fields – technical and arts. Output data proves that special field determination does not prevail within the frames of formal regular training; deviation between the individuals belonging to different special fields can not be detected. There is great extent of coincidence as far as results are concerned.

3. Proposition. With the use of DACUM-method we can create the adult educator task profile, which consists of 9 task groups. For the single task groups I defined 5-17 tasks. I have made a 'side product' as a result of my studies, which is a competence collection (dictionary of competences), which can provide support for any experiments or studies and systematizing on the field of andragogy and human resources.

4. Proposition. On the basis of the task profile I created a hypothetical structure of an attribute competence profile (competence resources) that consists of 15 components.

4. 1. Among the elements of the complex competence profile:

a.) Competences supporting direct and main activity of educators were put into the first two-third of the scale. Within this *Cooperation*, *Flexibility*, *Previous Knowledge* and *Reflecting* received highest ranks – in accordance with the representation of Biplot values – which is supported with the results of the aggregate priority rank.

b.) Elements of successful application of complementary/secondary organisational activities were put into the third third of the scale. Unfortunate, but not surprising, that adult educators who prefer transferring professional knowledge do not attach great importance to *Character Development Competence*, and they only put those on the 10th rank.

4. 2. My expectations that *Project Work* was only ranked into the third third, to the 12th rank, were supported by the results of the questionnaire, the reason of which I see in the fact that adult educators completely prefer a strategy of teaching that completely ignores the need of practice.

4. 3. My assumption that there will be some components that fall out of the complex competence profile (their weighed arithmetic mean does not reach the value of 3 on the Likert Scale.) on the basis of the competence priority ranks was not proved. Based on the data provided no elements of the competence profile should be taken out. Not even the *Management* component on the last rank as its weighed arithmetic mean is 3.

5. Proposition. On the basis of the Kruskal-Wallis {ANOVA} and the Jonckheere-Terpstra tests it can be stated that the zero hypothesis is not to be rejected, namely the teaching of project method (curriculum, methodology, priorities) is not dependent on the level of education. During the process of training – regardless of the level – project work is inherent, its own natural characteristics are valid, and not its teaching/learning process direct, educator and level dependant methods and the work forms. (An opinion that can be regarded as marking from a mathematic point of view can be created with a growth in the sample size or with the evaluation of analysis of further answers of participants)

6. Proposition. In regard of the importance of behaviour forms and interactions inducted by project method – on different training levels – there are different preference ranks. On the first five degrees there are no such items whose importance was ranked with the same rank number by the different sample groups. Participants attach special importance to three interactions – *Problem solving, Cooperation, and Time planning*. Participants – in case of all the sample groups – regarded *Mutual demand* and *Mutual Judgement* as the least important in regard of dependency-responsibility features.

On the basis of values of Kendall's multivariable rank concordance coefficient (W) ($W \leq 0.5$) group ranks can only be accepted as compromise rank.

7. Proposition. Among the 25 character features that can be indirectly developed during project work, there was none that was put on the same rank by all the three sample groups. *Coordination* was put on the 1st place by secondary education participants but on the 4th place by graduate high level training participants.

8. Proposition. Defined differences between importance and the other two categories refer to the fact that importance of behaviour forms and interactions during project work exceeds the level of practice, in majority of the cases there is competence deficit rather than competence sufficit. Deviation is rather low. Competence sufficit is scarce; it is only in case of some elements.

In my introduction I have already mentioned that my experiences predestine me to mark topics of my dissertation in the 'triangle' of the adult educator, project education and competence principle. I have searched the characteristic features – for main and secondary tasks – of the attribute competence profile of the adult educator in this triangle. I attempt to argue for those activity based learning styles that are able to combine theory and experience with the demonstration of the importance of behaviour forms and interactions, thanks to project approach education which attributes to the development of competence resources of adults with the aim that Man '*... the pragmatist as a free active being.....should be at home in the world....*' It is clear that the results of my experiences and researches do not provide full-scale answers in this triangle, that is why further examination and analysis are necessary to provide more sophisticated results.

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