

## DESIGNING AND TESTING AN FR-SOFT-SKILL MEASUREMENT SYSTEM TO BE USED IN HIGHER EDUCATION

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### **ABSTRACT**

*When graduates from the technical higher education apply for work they are assessed in multi level selection procedures. These assessments are aimed at the soft-skill competences. It is generally experienced that engineering students are less successful in those tests.*

*In 2013 a web based graphic quick test was developed by which the students can get an immediate feedback about their 40 competences and the relations of their positions. The test gives them a quazi real picture about which competences need to be developed or which ones are already developed.*

*The soft-skill measurement system is used at Széchenyi István University to assess graduate engineering students. Our future aim is to create engineering competence profiles and identify the entrepreneurs' need with this measurement system. The real differences between the needs of the entrepreneur sphere and the competences of the graduates can be shown as a result to reconsider the concept of engineering education and the development of education system. Finally, we hope that it can affect on the output requirements too.*

*We assume that this assessment can help the students consciously prepare not only for the specific vocational employment but their own personal development and they can acquire professional knowledge besides getting the applied knowledge.*

*Our other goal is to assess more university majors with my colleagues in large –scale study context and also to integrate the students personality development and soft-skill competence rising into the higher education especially the engineering education.*

**Keywords:** higher education, competence assessment

### **1. RESEARCH SUMMARY**

At Szechenyi Istvan University I aim at developing a Hard and Soft Skills measurement system that can be a long term support building their own professional research team consciously and professionally, moreover it can also help assessing other university students and determining development trends. The Széchenyi István University is the first Hungarian higher educational institution where modern organisational diagnostic tools were applied in 2010-2012.<sup>1</sup>

The term ‘Hard Skills’ is meant those vocational skills and abilities without which the vocational tasks cannot be carried out successfully or can be carried out less successfully.

The term ‘Soft Skills’ means those skills and abilities which are beyond the vocational Hard Skills. These substantial skills and abilities needed for someone to be able to unfold and develop personally in order to live a creative.

The development of human resource is inevitable if we are to introduce new methods in an institution.<sup>2</sup> The professors and researchers at the Research Centre of Vehicle Industry formulated such vocational qualities for their people which aims at shifting from the one focal point professional successes to an integrated performance and success the qualitative interplay of multiple focal points. The human factors cannot be excluded from this too. Besides the university professors' professional and educational skills, at the labor market inevitable key abilities are attached<sup>3</sup>. Top professional achievements cannot be realized without elaborate personal characteristics. Moreover they intend to take responsibility for students they teach and in addition to the students' professional training they would like to support their development of personal skills. They want to prepare them not only for a profession but also an entire life. That is why the new measurement system can be a new stand in which the students' status, hard and areas of improvement can be measured in advance. Moreover it can help at the very beginning to pinpoint the important directions for the further joint work and study.

## **2. HISTORY**

At the input side there have been data collecting for Hard Skills and thorough examination of 8 scopes of work. Constructor (engineering), Product design (engineering), Electronic developer (electrical), Programmer IT, Matlab programmer, Simulation environment developer (engineering/electrical), Electric drive system developer (electrical), Developer teamleader. Moreover there have been sythesization, weighting and text embedding of competences of a given scope of work.

The assessment of Soft Skills area has been in 5 groups:

1. Interpersonal skills (eg.: cooperation, finding the vocational role, initiation),
2. Skills in connection with work (eg.: creativity, innovation, planning, foresight),
3. Leading skills (eg.: creating commitment, leading colleagues, motivation improvement, performance measurement),
4. Individual features (eg.: reliability, authenticity, ethics and values, need for self-development),
5. Other skills in connection with work (eg.: Knowing a foreign language, Analytic-systematic thinking, system approach)

The hard and soft skills assessment of 8 scopes of work encompassing the areas of the Research Centre of Vehicle Industry has been done. This work included data collection of sheets, and the sythesization, weighting and text embedding of competences of a given scope of work too.

Moreover there have been expertising and further development of this given task to prepare it to computer processing. Finally, there have been the development of FR-Soft-Skills measurement system and the assessments of students and employees of the Research Centre of Vehicle Industry.

## **3. SHORT INTRODUCTION OF FR-SOFT SKILLS MEASUREMENT SYSTEM**

It is difficult to measure and concretize the so called Soft-Skills personal and beyond work range since it leads us from the 'hard' vocational knowledge specific rational requirement-system to a sort of irrational and subjective area. This area is a 'soft' range of the personality

in related to interpersonal features. Here the orientation is not linear and logical process of interdependence of cause- causality but sometimes unexpected „horse jumps“. Its disciplines span the areas of psychology, human resource development and pedagogy.

It is like the relation of the above and underwater part of a floating iceberg: the visible part represents the one- eighth which represents the hard skills while the underwater part, seven- eighth represents the soft skills that is always suspected as not visible. To be able to orientate here a subjective space distribution is needed. Similarly, as the great founders of profession eg.: Freud and Jung did. Both of them lives meant like light strikes into the darkness in this field. The Freud's distribution is even the basis in psychology today: (Ego-self, Superego, Id- instinc- self), Jung's personal dimensions are the basis of the most up-to-date measurement system: the MBTI. This is the deepest elaborate system which can be used to support student and professors' life skills in the university.

### **3.1. FR-Soft-Skills measurement system**

The theoretical basis of the development of Soft-Skills measurement system is Fritz Riemann's book: „The basic forms of fear“. There are 4 basic needs in human life and each need goes hand in hand with a fear. These personal traits are described from the healthy to constrict to disease. The present measurement system focuses on the healthy person. During our life we experience one of our need's transitional dominancy. This is inevitable in personal development. By avoiding this there can be the risk in critical situation that we are not able to emphasize and validate our interests. We know that the spiritual health is not a static notion but a state of mind which is about the harmony of the healthy adult personality. There are break points, wounds and many positive and negative experiences in every human life. More of which or lack of which can intensify one another fear mainly in critical situations and imbalance the personality. In long term it can shake our inner spiritual world.

The 4 basic needs forming opposing pairs can be represented as an axis placed at right angles to each other. On the 2 points of the horizontal axis one of the 2 opposite needs is a K-type the other one is the H-type, while the opposites on the vertical axis are S-type and D-type. The features of the types are detailed next.

Specific situation develops if during the personality development one or another need becomes dominant and it defies the personality. It deeply affects the stability of the personality. In this case the only balance for the person is what bears the dominance of one need. The dominant need affects the entire personality perhaps distorts and narrows it so only unstable balance can be formed in this way, causing unstable inner security. I hope the measurement system can filter these extreme personality traits and give an overall picture about the stability of the personality and the features to a given personality traits from which I made a list with altogether 40 competences, skills and abilities. Other complex competences are based on these basic skills such as conflict management, complex thinking, openness, learning ability, self knowledge and the need for self development, self efficiency etc.. These can be manifested in the well balanced interplay of the features of a given personality trait.

The FR-Soft-Skill survey in general name can be found in annex 1.

There are 10 attitude statements to each personality trait so altogether 40. The evaluation is on the scale from 0 to 4 with aggregated scoring.

### **3.2. Description of S-TYPE**

**The name of the personality trait:** Schizoid personality – Tendency for distance keeping

**Requirement:** Individuality, the need to become single unrepeatability

**Need:** autonomous personality, the need to become independent is dominant

**Fear of:** Devotion, dissolution from, losing from the self and dependency

**Short description:** The distance orientated people seem to be objective cool and distance keeper. They are capable of high degree of autonomy and taking responsibility. They prefer work alone. The cooperation is necessary so they strive to position this to let everyone have his or her own defined task to feel they after all work individually. Together with a partner or colleagues in their free time means disaster. The sunny side of their lives is that they can sharply observe and think objectively-critically. They are independent, with the ability of being separate and saying no. In conflict situation they know exactly what they want and they can express it clearly. It is not a problem for them if they should represent an unpopular position. For them at work life is about to focus on the subject, the task and to make the right decision. The schizoid personality keeps his or her autonomy; independence queasily but tends to make his or her relationships impersonal and eccentrically separate from others. The anxiety can be fossilized from the human proximity as it threatens with losing the self. Great distance need to be kept as the intimacy is frightening for them. Social interactions are tiring and it is needed to defend against bonding. They often behave rudely, cynically, sarcastically, aggressively in conflict situation and it easily makes them unpopular.

#### **S-TYPE personality traits in key words**

- need for independence
- performance orientation
- success orientation
- methodical, structural
- improved intellectual abilities
- high degree of rational thinking
- confrontation ability
- objectivity
- take responsibility
- task orientation, purposefulness
- steadiness
- self confidence

### **3.3. Description of D-TYPE**

**The name of the personality trait:** Depressoid personality tendency to proximity

**Requirement:** They need to be able to private opening to develop contact creating ability towards the world and people. They need to make exchange contact with the outer world too..

**Need:** demand on proximity and close personal contact.

**Fear of:** being alone and unprotected, isolation, independence.

**Short description:** Those people who have high tendency for proximity are good at making contacts, well balanced, understandable, and acceptable. In their work the good atmosphere and harmonic relations are important. The sunny side of these people is that they are empathic with other people's situation and think more of the others than themselves. They are friendly, cordials, open hearted, and conciliators. They give and enjoy confidence and easily get close to others by knowing how to get on with others. They are able to sacrifice to feel belonged to somebody. Always being hugged and hugging is the paradise for them so they can do anything to achieve this and thrive of this opportunity. Emotionally they are extremely colourful, sensitive and attentive partners. However, when they are alone they become grey, colourless and vulnerable.

For the depressive personality man the proximity and the independence of another person can seem to be dangerous and can result the resurrection fear of loss.

Their dark side is that they avoid the tension and the confrontations. They are not willing to say no or they cannot do. They often overshadow their needs. It is difficult for them to distance themselves from others and express anger and aggressiveness.

**D-TYPE personality traits in key words**

- openness and trust in others
- high degree of adaptability
- high emotional intelligence (EQ)
- empathy
- operational skill
- relation oriented
- helpfulness
- creating harmonious atmosphere
- loyalty
- tolerance

**3.4. Description of K-Type**

**The name of the personality trait:** Compulsive personality– Tendency to permanence

**Requirement:** They pursuit of durability, settle in a world of changes

**Need:** thrive for security, the routine and the need for permanence dominates

**Fear of:** change, as transiency and uncertainty

**Short description:** the permanence–oriented people loves everything is organized, they are scrupulous and structured. They are perfect time managers; they bear the tasks, deadlines in mind and hand. They are good at organizing always punctual and reliable. The ‘permanent man can easily keep everything in order and expect it from others. Eventually, the order is half of success. They have a well-thought out record system. They appreciate lists, planning and most prefer record everything in black or white. On the other hand they are sceptical about every change, novelty and things that are not seen in advance. They tend to be conservative, dogmatic and stick to principles. Partly, they tend to dominate and control others. They seem to be meticulous and too fair to others. They look for permanence and disrelish every change. The permanence is after all. They surround themselves with rituals. They only buy durable items and cannot leave them. Throwing away a pair of leaky shoes reminds them of death and transience so they could end up storing huge amount of junk however; they are precise and love the order. Everything has its own place. If mess is perceived and if things are not at that place they elicit fear and anger.

**K-TYPE personality traits in key words**

- thrive for stability and alertness
- reliability
- precision, accuracy
- high monotony tolerance
- endurance, stamina
- compliance with dates
- order, structure formation
- tolerance of rules
- organised
- adherence to the known familiar things
- reliability

### 3.5. Description of H-TYPE

**The name of the personality trait:** Hysteriod personality Tendency to change **Requirement:** They need to be able to change, to give up the known, familiar, comfortable and traditional and to be able to move forward and progress.

**Need:** need for change, diverse colourful lifestyle, creativity and freedom.

**Fear of:** stability, necessities, definitive, losing the freedom

**Short description:** It is important for them that their activity should be creative, imaginative and flexible. Their workplace seems to be chaotic, their diary seems to be confusing but it does not matter for them as a genius can see through chaos. These ‘change men’ bring some colour to the grey working days with their spontaneity and vivid personality. They can be enthusiastic and love risk, novelty that differs from traditional. They live and let live. They are fun and charming. They come up with new solution to problems. On the other hand they avoid obligations, rules, regulations and laws. If it is about consequence they always find the loopholes. They are less reliable and easily neglect order and accuracy. They flirt with their bad habits. They are partly whimsical and easily become depressed but seek acknowledgment. They are enchanted by the new. Every novelty keeps them on move and makes them feel excited and energized. They search for the change and adventure. They adore fashion, if they can afford they change their wardrobe and also their friends and acquaintances annually. Their relationships are superficial, because they are afraid of bonds as it limits their freedom. They often move house, change workplace, they travel if they can afford if not they just loiter not to be bound to anyone and feel monotony. They are resourceful, inventive and colourful in happenings, but during the grey working days, they can be tense and unpredictable.

#### **H-TYPE personality traits in key words**

- creativity
- flexibility
- stress tolerance
- problem recognition
- new approach to a problem
- developing and innovative ability
- need for freedom
- change tolerance
- brevity and risk taking
- curiosity
- humour

## 4. TESTING THE FR-SOFT-SKILL MEASUREMENT SYSTEM

### 4.1. The results among colleagues of the Research Centre of Vehicle Industry

The survey was implemented with 17 people. The results are obtained either personal or as a group character by scaling the properties of the attitude statements formulated in a given competence. In a group survey the strengths and weaknesses, over-developed competences and the areas to develop are visibly separated.

The S and K personality types dominate in the majority of the group among the colleagues of the Research Centre of Vehicle Industry. Until the D and H personality types are in minority. Their obvious strengths are intellectual abilities, objective thinking, planning, structuring, orderliness, care, pursuit of precision and responsibility.

Their outstanding features are endurance, stamina, and thrive for maximum success.

Areas to develop: empathy, social contact and emotional intelligence, confrontational and progress ability, flexibility, stress tolerance, communication skills, preparation for changes.

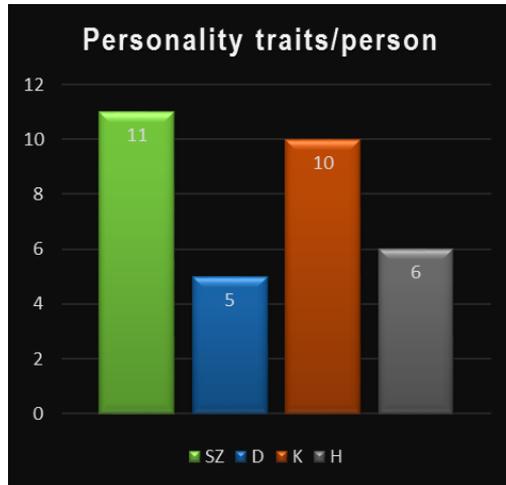


Figure 1. FR-Soft-Skills diagram summary of Research Centre of Vehicle Industry

#### 4.2. The Test and results of the FR-Soft Skills Measurement system among students

The survey was implemented with 36 people. In the student group survey the strengths and weaknesses, over-developed competences and the areas to develop are visibly separated. The dominance of S and K personality types are extreme and much more. Until the D and H personality types are in minority.

The areas to develop are the same as the minority areas in the Research Centre of Vehicle Industry.

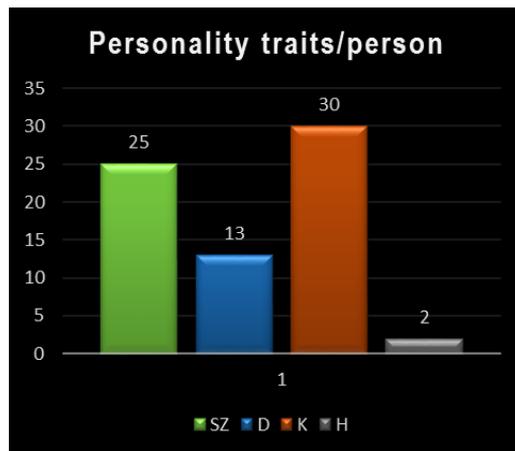


Figure 2. FR-Soft-Skill diagram summary of the students

The secure environment, predictability and the realistic requirements, planning and success are outstandingly important for us. They have high helpfulness and they rather avoid conflicts than undertake and solve them. They are afraid of unexpected situations, and their communicational and self-advocacy skills need to be developed. We must define that the areas to develop fundamentally do not belong to the engineering areas.

## 5. SUMMARY AND ORIENTATION FOR FUTURE

The long term result of the research is to coordinate the internal university need with the external entrepreneurship need. Moreover meet and establish the conscious future quality requirements of the development base of the human resource of the Research Centre of Vehicle Industry. The development has single value. It does not take into consideration the human factor, on which it is based on by aiming at achieving high quality professional goal. Other effect of this is the development of present educational system and strategy. The employees with extensive knowledge are preferably employed by big companies as these individuals can be quickly and easily prepared and retrained for the continuous needs of the economic world.<sup>4</sup> Another existing result of the research is to stimulate the mutual thinking of the professors to support and develop the students. The courses of the development can diverge and be multi-viewed by integrating the high quality professorial and students' individual initiatives with the structural ones. Such as: In 2010 a standardised integral culture assessment was carried out<sup>5</sup> or the Teacher Training Centre's long years' work to support methodological improvement in curriculum development and in professorial trainings. Moreover the professional knowledge and experience of the professors teaching at the Faculty of Economics and dealing with human resource management and development of student's skills, and those who assess and develop the students, using other measurement systems. The range of optional subjects that develop soft-skills competences can be broaden and recommended with individual professorial methods and developments in own subjects or offering other high quality opportunities available at the university.

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