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EXPRESSION OF TALENT IN THE TECHNICAL DOMAIN

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Abstract
The technological evolution requires a permanent change from the innovative perspective. Innovation is the result of the creativity of the endowed and extremely hard working persons. There are the inventor engineers who have actually turned their potential into technical talent. Despite of their special role in the economic and technological progress, the study of the technical talent - as a special form of giftedness - is just at its beginnings. Any supporting program for the gifted and talented people can start only if the issues related to conceptualization and identification were clarified. This paper proposes, after a review of the theoretical roots of the concepts of giftedness and talent, to provide a definition of the technical talent, accompanied by an empirical study designed to explore the vision of the academics and students in what concerns the psycho-behavioral profile of the students with technical talent. The research techniques that have been used for the empirical study are adapted from the social representations field and lead to the identification of the psycho-behavioral prototypes of the technical talent. The results have demonstrated a quite similar profile to the one created by a team of American researchers, Renzulli and Siegle, in 2005. Thus, among our identified factors that describe the technical talent, we can summarize: expertise in using technology, interest and initiative in the use of technology and creative integration of technology.

Keywords: technical talent, giftedness, defining, psycho-behavioral profile

Perspectives surrounding the concept of giftedness

In order to investigate the perception of the giftedness among the initiated in science education, Sternberg has studied the phenomenon from this perspective too, summarizing the colloquial meaning of the concept in *the*

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pentagonal implicit theory, thus identifying five criteria to be met by someone, in order to be considered as a gifted person: The Excellence Criterion - states that "the individual is superior in some dimension or set of dimensions relative to peers", The Rarity Criterion - states that "an individual must possess a high level of an attribute that is rare relative to peers", The Productivity Criterion - states that "the dimensions along which individual is evaluated as superior must lead to or potentially lead to productivity", The Demonstrability Criterion - states that "the superiority of the individual or the dimension which determine giftedness must be demonstrable through one or more tests that are valid assessment", The Value Criterion - states that "the person must show superior performance in a dimension that is valued for that person by his or her society" (Sternberg, 1993, pp. 186-187).

The scientific meaning is not far from the colloquial one. But the concept in its scientific perspective is more nuanced, enlarged and narrowed in connection with every new step of its evolution. It is transformed and reformed in order to be correlated to its primary purpose, which is to serve, together with its educational psychological and social optimum services, the immediate beneficiaries - the superior gifted people - and the subsequent beneficiaries – the teachers and the managers of schools, companies, etc., the society as a whole. Because of its generosity, we agree the definition of giftedness given by David Yun Dai and widely accepted in research community - „gifted is demonstrated excellence by age - appropriate standards, through authentic, exceptional performance or potential for excellence, demonstrated through aptitude tests, interviews, and clinical observations of behavior and performance" (Dai, 2009, p. 41).

Evaluations of the theoretical models for explaining the endowment and the talent, in order to define the "technical talent"

The theoretical models are valid in their usefulness for the society and science (Davidson, 2009), and in this case their relevance is related to the study of the technical talent. We will summarize in the following contribution to the definition of technical talent in each of the models described.

According to Feldhusen's talents list one can consider the technical talent as currently involved in the academic and vocational fields. In this model, the concept of talent is simplistically addressed as a component of the superior

endowment. Even the author, by reviewing his theoretical option for the meaning of talent and superior endowment, will adopt for talent the meaning inspired by Gagne, which is positive transformation of the remarkable aptitudes' endowment through educational intervention. (Feldhusen, 2005).

According to Tanenbaum's view, the technical talent is part of the "quota talents" and will be found in the outstanding results of engineers. Tanenbaum puts the portrait of giftedness in the middle of a five-pointed star and claims that each of the five elements (high general intelligence, exceptional specific abilities, non-intellectual traits, environmental support, and chance) will be present in different proportions in different areas of talent. Which should be the perfect combination in order to portray the technical talent? It will remain as an open question for further investigations, especially since to these on may add the importance of social responsibility. Tanenbaum stresses that "it is essential for gifted people to learn that a great character should serve as a mediator of a great accomplishment, by contrary the brilliant minds may become the most destructive forces in the world" (Tanenbaum, 2000, p. 447).

In the Ranzulli model of giftedness the technical talent finds its place in the list of superior endowment's manifestation areas (Ranzulli, 2005). Moreover, because the model is intended to be quickly one to put in practice, the author generates also a tool to identify the potential talented persons and elaborates multiple profiles in this regard, including some relevant for the technical field. We will detail that in the subsequent pages. The model stops at the education of the children and youth. The talented students belonging to the youth cannot be identified anymore by using the identification model of Ranzulli, by appealing to psychological profiles. This may be possible just by considering their performance.

The place of the technical talent proposed by Gagne to the author in the Differential Model is quite obvious. The educational interventions - regardless of their nature, formal or informal - applied to the innate skills and especially to the one specific for the technique could lead to performances that may demonstrate the presence of the technical talent (Gagne, 2004).

We consider the Munich Models of Giftedness (Heller & Perleth, 2005) as being very generous in that they can be consider as starting points in the study of the giftedness and talent, regardless of its manifestation's area and of the age of the persons included in the study. Extracting this from the dynamic model of ability-achievement, we can follow the evolution of the technical

talent from childhood to the youth age and even further up to its transformation into expertise, in adulthood.

According to the Global Model of Success (Creţu, 1997) high ability concentrates itself on a specific area of human activity along with the age. In this way we will find increasingly more people with technical talent in the quadrant C and increasingly less in the quadrants A or D. With optimal training at the beginning of the university education, due the time needed to adapt to the new environment, there may still be present numerous cases of under-achievement, so we may find in the quadrant B many people still having an unspecified technical talent in performances, these needing help and support rather in the emotional register.

Sternberg, as Renzulli and Tanenbaum, address the giftedness in terms of social contribution (Sternberg, 2000). The technical talent as expressing high endowment of the future engineers and inventors is probably one of the most useful for the progress of the humanity. If applied in the educational environment, Sternberg's theory could help in the professional fulfillment of many people possessing performance potential in the areas of this field.

The literature reviews of the psycho-pedagogy of excellence focused on understanding the phenomenon of giftedness and talent have allowed us to synthesize a working definition for the concept of "technical talent". We consider it to be the expression of the superior endowment in different areas of the technical field, the demonstrated excellence through outstanding performances in this area, or the potential for excellence, proved by the results in various forms of evaluation.

Vision of the academics and students concerning the profile of the student with technical talent

The literature describes the talented children and youth through psycho-behavioral profiles presented in different ways (Creţu, 1997; Jigău, 2004; Masari, 2006). Although some other forms of talent - such as mathematical, verbal, musical, and athletic - are described by this psycho-behavioral profile system, on may observe that technical talent is rarely approached. We have identified here just three cases in the literature that might approach the formula of a psycho-behavioral profile, two international - Gagne (1995), and Siegle (2004), and a local one - Belous (1995). Gagne, 1995, characterizes just a few

manifestation forms of the technical talent - the engineer, the programmer, and the skillful - highlighting their high skill in every discussed field. Del Siegle (2004), is more generous by finding a way to describe the technical talent in full, beyond an excessive customization as Gagne does. Thus shows a person with technical talent the expertise in using technology, interest and initiative in using of technology, assisting others in using technology, creative integration of technology. Belous has a rather philosophical approach than an operational one. According to his opinion the inventor, as the image of the maximum achievement of the talent in technical, is the one who "knows, directs and produces technique" (Belous, 1995, p. 32).

In an attempt to be closer to the image of the technical talented student we proceeded to investigate about the vision on this subject among the academics and students with higher academic performance which belong to the technical universities. Starting from the idea that giftedness and talent are social constructs (Tannenbaum, 2000; Sternberg, 2000; Borland, 2005) we used the research methods which are specific in the study of social representations. Aiming this we have started a study in two stages. The first one it meant the content category analysis for the terms related to the concept of "technical talent". The second one was the identification of psycho-behavioral prototype elements which are considered as prototypes for the technical talent. The research design was guided by the design of other studies identified in the literature, also in two stages: identification of associated terms with an investigated concept, and exploring their symbolic value (Kim, Shim, & Hull, 2009).

In March 2011 we have proceeded to the sending of a request to 75 e-mail addresses of the academics working at "Gh. Asachi" Technical University, containing a question which, by free association, asked for listing of minimum five characteristics of the student with technical talent "Please list at least five behavioral or attitudinal characteristics that would describe the student having technical talent". We have received 31 answers from the academics professors and thus we were able to collect 197 such related terms to the "characteristics of the student with technical talent".

The content analysis has revealed the following most frequently stated characteristics: Creativity - 15; Imagination - 12; Passion for the technical field - 12; Skills for teamwork - 10; Openness to technical innovation - 10; Practical skills / savvy - 9 ; Perseverance - 9; Capacity for analysis and synthesis - 8;

Curiosity - 8; Rich theoretical knowledge - 7; Intuition - 6; Patience - 5; Nonconformity - 5.

In the second stage of the study we wanted to identify the psycho-behavioral elements which are prototypes for the technical talent and we used the technique of calling the central nucleus into question. Moliner (1989) uses this technique in his article "Validation expérimentale de l'hypothèse du noyau central des représentations sociales", published in "*Psychological Bulletin*", *41*(387), pp. 759-762.

Thus, we have developed a questionnaire of 21 items starting from the result of the analysis presented above and from the example that the author of the technique (Moliner, 1989) investigates the social representation of the profession of nursing. The questionnaire was distributed by e-mail to 105 academics and students of "Gh. Asachi" Technical University. We have received 63 responses (37 academics and 26 students). Following we have calculated the percentage of the "rather not" responses for each item. The table below shows the results obtained. The bold figures represent the frequency of the "rather not" responses exceeding 75%. Only the items exceeding this threshold will be considered (discussed, of course, in affirmative way) as prototypical psycho-behavioral factors for the notion of "technical talent".

Table 1. Responses of the participants to the questionnaire for determining the psycho-behavioral prototypical elements for the notion of "technical talent"

No.	Items	% "rather not" responses
1	Doesn't find ingenious solutions to technical problems	89.2
2	Is unable to use the gained knowledge in applied situations	92.4
3	Has no passion for the technical problems	94.6
4	Has no advanced theoretical knowledge specific to the field of his specialization	64.5
5	Has not the ability to analyze a technical situation/problem	93.5
6	Can't summarize the theoretical and practical data in order to redesign a technical situation	83.8
7	Hasn't the ability to work in team, in order to complete a joint project	62.7
8	Doesn't show curiosity for technical issues	94.6
9	Doesn't predict the path to solving a technical problem	91.3
10	Doesn't show flexibility and openness for technical innovation	78.3
11	Has not patience in solving a difficult technical situation/problem	77.4

12	Doesn't approach a technical problem in a nonconformist way	73.1
13	Doesn't address to the academics interesting questions concerning different aspects of the technical	64.1
14	Can't handle easily the laboratory equipment	92.4
15	Doesn't help the less skilled colleagues in order to facilitate their understanding in functioning of a principle, a machine etc.	64.5
16	Doesn't create original objects (machines, software, facilities etc.)	76.3
17	Doesn't participate in specialized scientific manifestations, meetings	52.6
18	Doesn't have outstanding academic results	52.6
19	Is not interested in inventions and inventiveness (history, principles of operation etc.)	68.8
20	Doesn't create detailed models of some mechanisms, facilities etc.	64.6
21	Doesn't acquire theoretical or applied knowledge faster than most of their peers	69.8

The results show that, in the opinion of academics and students of a technical university, the list of the psycho-behavioral prototypical elements for the notion of "technical talent" in the technical includes:

- Passion for technical problems;
- Curiosity for continuous discovering and exploring in the technical;
- Creativity in finding creative solutions to technical problems;
- Intuition of the ways in solving technical problems;
- Ability to put the theoretical knowledge into practice;
- Analysis of multiple aspects involving a technical phenomenon, concept etc.;
- Skill in synthesizing the available data, and eventually in translating them into an original manner;
- Easily handling the laboratory equipment;
- Manifestation of an open and flexible attitude to technical innovation;
- Capacity of creating original objects;
- Faster purchasing of theoretical information;
- Interest shown for invention and inventiveness.

Conclusions

The list the features involving the student with technical talent which we have obtained indicate that the vision of the academics and the students from Iaşi, who are situated in the vicinity of the phenomenon of technical talent is quite close to the profile created by the U.S. researchers team Renzulli (2004)

- Siegle (2005). Among the factors proposed by the American authors (expertise in using technology, interest and initiative in the use of technology, mentoring in technologies, creative integration of technology) only the mentoring in technologies is considered insignificant by the participants in our study to describe technical talent.

Students with talent in technical domains are especially important resources not only for universities but also for the reason that they will become the engines of change and economic development of our society. In these conditions there is required that the talented students to be supported in order to become the so-called "knowledge workers". Any supporting program for the gifted and talented people can start only if the issues related to conceptualization and identification were clarified. Through this paper we wanted to point out the absence of a tool in the identification of the technical talent, especially manifested among the youth, and to contribute with a new instrument especially developed in this purpose. In this way, the results of this study were the starting point in developing the items for a tool to identify students with talent in the technical domains.

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