

# **The tool assessing the mental attitude, conducive to gaining an effective education and social empathy.**

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## **Abstract**

### **Aim**

The purpose was to elaborate a tool evaluating an attitude conducive to gaining effective education and to perform its preliminary evaluation.

### **Background**

We assume that it is possible to elaborate a tool that evaluate the mental attitude that fosters the acquisition of effective education and social empathy. Teaching staff should have available methods to check to what extent such attitude occurs in individuals or in a group of students.

### **Method**

Two repertory grids, formulated according to the personal construct theory were proposed. With the aid of these grids, we have collected data from several different groups of nursing students.

### **Results**

We found statistically significant differences in the proportions of responses between the youngest and the oldest nursing students.

### **Conclusion**

The proposed repertory grids can constitute the initial version of discussed tool. We believe that the obtained results can be used to outline a program to modify thinking strategies.

## **Introduction**

Many parents wonder what to do to make their children well educated and wise. Some people already in their youth are also wondering how to make the acquired knowledge useful enabling professional development and understanding of the world.

Institutions participating in the educational process also quite often try to estimate the quality of provided education [1-4]. Both in primary, middle and high schools, as well as in universities the tests of achieved learning outcomes and assessment of quality of implemented didactic activities – are carried out.

There are existing method which can be used to assess the performance of individual teachers, the effectiveness of teaching particular subjects, as well as the performance of university units or the entire university.

There are methods for evaluation of current results and actual ranking of particular universities. The best-known institution establishing such estimates is the "Academic Ranking of World Universities" [5]

All these efforts require, however, to specify what is the purpose of people, who take up the trouble of working on themselves and acquiring the desired education.



actions would be assessed by an independent, neutral observer analyzing your reactions. Only when the observer would not be able to make such an assessment, determine your behavior at your own discretion. Answer by placing an X.

## Attitudes

<i>No.</i>	<i>Question</i>	<i>yes</i>	<i>not so much</i>	<i>no</i>
1.	In general, when in class I listen carefully to lectures.	90	10	
2.	I am quite often inclined to participate in discussions.	30	70	
3.	I take care not lose orientation of what is happening in the world in politics, cultural events and technology.	60	20	20
4.	I am open to new ideas and concepts.	90	10	
5.	I sometimes present my own new ideas or observations.	70	30	
6.	I usually assess the reasonableness of the activities of politicians, publicists, journalists, officials, and teachers.	70	20	10
7.	I am not credulous or gullible, I can critically evaluate information.	90		10
8.	I have no objection to familiarizing myself with philosophical or psychological speculations.	70	20	10
9.	I think that reading novels is useful for education.	70	20	10
10.	I enjoy conversations, discussions, disputes.	80	20	

## Skills

<i>No.</i>	<i>Question</i>	<i>yes</i>	<i>not so much</i>	<i>no</i>
1.	I think I can distinguish facts from opinions.	90	10	
2.	I can distinguish the description of a natural phenomenon from scientific theory.	80	10	10
3.	I know how to validate particular theories.	80	20	
4.	I know how to find facts useful to verify opinions and theories.	90		10
5.	I can summarize, analyze and draw conclusions after reading a text.	90	10	
6.	I sometimes see contradictions in a statement.	90	10	
7.	I sometimes see that the argumentation is illogical.	80	20	
8.	I can formulate actions aimed at solving a problem.	90	10	
9.	I know English a bit and try to improve this skill.	80	20	
10.	I could write a story.	60	30	10

## Wisdom

<i>No.</i>	<i>Question</i>	<i>yes</i>	<i>not so much</i>	<i>no</i>
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1.	I know which features of my character are the strengths of my personality.	90		10
2.	I can be "here and now", and I can even practice a kind of meditation, which I do quite often.	80		20
3.	I think I'm resistant to adversities. I can deal with stress.	70	20	10
4.	I am able to determine what the most important views, beliefs and assumptions are that determine my actions.	80	20	
5.	I realize the meaning of my life, I take care to make myself more aware of it and better specify it.	80	20	
6.	I have my own opinion on the meaning and sense of human existence and the universe.	70	20	10
7.	I am communicative, I can make friendly relations with others and I care about having friends and acquaintances.	80	20	
8.	I can address people in a friendly manner and I take care that others feel good in my presence.	70	30	
9.	I can strengthen my wellbeing by perceiving extraordinary, amazing and transcendent experiences.	70	20	10
10.	I am happy.			

## Basic scripts

No.	Do you remember, are you aware of the significant impacts of your parents and other close relatives on your attitudes?	yes	no	I don't remember
1.	In your childhood did your parents with their eyes, voice, gestures and behavior create a friendly, warm and pleasant atmosphere?	90	10	
2.	Do you remember from early childhood verbal communications predicting what you would become or what would happen to you?	90		10
3.	Were these communications friendly and constructive?	70	10	20
4.	Were some statements a kind of life instructions or commands?	80	20	
5.	Were some statements bans?	90	10	
6.	Were some statements consents?	60	40	
7.	Did these communications also concern religion and philosophical views?	70	30	
8.	Were these communications also related to your gender identity, male or female role, marriage, partnership, sex?	30	70	
9.	Were these communications also about your future profession?	30	70	
10.	In childhood and adolescence, was there often talk about ancestors, racial, social, cultural and national history?	70	30	
11.	Had you already decided in childhood or early youth who would you be?	40	60	
12.	Have you revised your life goal defined earlier in childhood or adolescence?	60	40	

13.	Can you formulate in a few sentences the basic views and rules of action that you follow in life?	70	30	
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## Knowledge

**1 - I am sure that I know the correct answer.**

**2 - I am not sure if my answer would be correct.**

**3 - I have no idea what the correct answer is.**

**4- A different answer than 1,2 or 3. What answer? Please add at the end of the questionnaire.**

No.	Content of the question	1	2	3	4
1.	What is the name of the galaxy in which we find ourselves?	5	5		
2.	What is an archetype?	5	4	1	
3.	What is a hypothesis?	9	1		
4.	What is inductive reasoning about?	2	7	1	
5.	What is a chromosome?	8	1	1	
6.	What is a genome?	8	1	1	
7.	What is a protein?	9	1		
8.	What are a nucleotide, polynucleotides and DNA?	8	2		
9.	When is a person at risk of stroke?	9	1		
10.	Why did the First World War break out?	5	5		
11.	What is socialism?	7	3		
12.	List the four planets of our system located closest to the Sun.	5	5		
13.	What is the definition of Pi?	7	3		
14.	Identify the current number of people living on our planet.	4	5	1	
15.	List the names and surnames of two people considered creators of the basics of psychology.	5	5		
16.	List three people who throughout history have been recognized as important authorities in the field of philosophy.	4	3	3	
17.	Give two names of famous French impressionist painters.	1	5	4	
18.	Which two basic elementary particles are part of the atomic nucleus?	5	2	3	
19.	What is the positioning of websites based on?	2	4	4	
20.	How does GPS work and where can it not be used?	6	4		
21.	In which countries has there been a war during the last 10 years?	6	4		
22.	What was the difference between the psychological motives of macabre actions in Cambodia and Rwanda?		3	7	
23.	Have you seen in the sky the constellation of your zodiac sign?	2	3	5	
24.	Have you ever seen in the sky the cluster of stars called Pleiades?	1	3	5	
25.	When looking at the sky, why is it we are watching phenomena that took place a long time ago?	3	5	2	
26.	What is a symbol?	8	2		
27.	What does the word pupil mean?	9	1		
28.	Briefly describe blood circulation, starting from the right atrium of the heart.	9	1		
29.	During which days of the menstrual cycle does ovulation occur?	4	4	2	
30.	Can a person get a fever despite the fact no infection occurred?	9	1		
31.	What is Easter Island famous for?	3	3	4	

32.	What is a dividend?		4	6	
33.	What is Atlantis?	6	4		
34.	What is the Gulf Stream?		6	4	
35.	What is the definition of the word Byzantium?	3	5	2	
36.	What is more or less the angle of inclination of the Earth's rotation axis to the ecliptic?		5	5	
37.	How much of the Earth's surface is covered by water?	3	7		
38.	How much oxygen is in the air?	8	2		
39.	What is a bathyscaphe?	1	4	5	
40.	To which country does Antarctica belong ?	5	5		
41.	Where is the Swiss Guard stationed?	4	2	4	
42.	What's the Apollo 13 mission famous for?	3	3	6	
43.	What is consciousness?	6	4		
44.	What is geostationary orbit characterized by?		3	7	
45.	Who is the messiah?	9	1		
46.	What is the ego and superego?	9	1		
47.	What is light emitted by a laser characterized by?	4	6		
48.	In which fields of achievements the Nobel prize is awarded?	7	3		
49.	List one or two of the most-valued literary prizes.	4	6		
50.	What does CERN deal with and in which country?		3	7	

**Table 1** Questionnaires of survey used in first stage of research. Tables specify not only content of questions but also resulting, rounded proportions of answers to particular questions.

Reviewing the content of questions included in this survey makes it possible to get acquainted with what mental features we considered to be important for an effective learning process. These important features have been grouped in four sections, namely: attitudes, skills, life wisdom, basic script.

Among the elements of the survey on attitudes discussed above, answers to questions no. 2,5,10 can be also estimated by the lecturer. The teacher conducting the classroom has the opportunity to objectively assess whether the students actually show the activities mentioned in these questions.

The items nr 2,5,10 are:

- 2 - I am inclined often to take the stand in the discussions
- 5 - Sometimes I present a new idea or observation
- 10 - I like conversations, discussions, disputes

It was obvious to us that the answers to the above questions, even in an anonymous survey, will not accurately reflect actual behavior. Therefore, in the initial part of the survey, we asked that answers to questions No. 2, 5, 10 should be rather formulated "according to the opinion of the respondent about how these actions would be assessed by an independent, neutral observer, for example a lecturer or a colleague".

We presented the questionnaire in several groups of nursing students. The survey was completed by 112 first-cycle students and 24 MA students.

We present in Table 1, apart from the content of the questions, also the proportions of answers "yes", "not very", "no" to the questions included in the above questionnaire. We determined these proportions in percentages. To be able to quickly acquire this data, we give rounded numbers.

The analysis of these data leads to the conclusion that the way of estimating the mental attitude of students, which would foster the acquisition of effective education, using the questionnaire presented in Table 1 is not effective. The obtained proportions of the answers speak for the fact that students usually assess their attitudes important for acquiring knowledge highly and positively. This also applies to questions nos. 2, 5 and 10 regarding behaviors that are checked by lecturers. We therefore concluded that students do not answer to these questions in an adequate and objective manner.

The content of the survey questions and the results obtained, presented in Table 1, are therefore only an approximate tool for assessing student attitudes. Survey questionnaire, especially its parts: "Attitudes", "Skills," "Wisdom" can be used as initial data related to student's abilities. The information obtained must, however, be verified by an individual conversation between the lecturer and the student.

### Methodology of the second stage of work

In the second stage of the our work, aimed at developing the tool discussed here, we assumed that perhaps we will obtain a more meaningful assessment if we formulate an anonymous questionnaire, aimed at more general terms of the mental attitude. We tried to formulate statements in our next, subsequent questionnaire in such a way, that the intention of including a given question was not obvious. The questions settled for this new questionnaire check some important determinants of the way of thinking and acting, but the content of the items does not reveal their purpose immediately, in an obvious way.

This time, we decided that the survey will have a repertory grid structure, according to the methodology of Personal Construct Theory [30]. We have developed two such repertory grids, including 10 elements. We present them in Table 2 and Table 3.

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**Table 2** **Attitude A or B - Grid I**

**Please mark or complete the data in the initial part of the form and fill in the questionnaire according to the instructions.**

**Sex:** F M ; **Age** .....

**Type of study:** intramural cycle I – year I, II, III; extramural cycle I – years I, II, II; intramural cycle II – year I, II , extramural cycle II – year I, II

**Instructions how to fill the repertory grid.** If you agree with the statement on the left, put "+1" in column No. 3, if you agree with the statement on the right then put "-1" in column No. 5. If you do not have an opinion on the subject or if you think that the truth lies in the middle, put "0" it in column No. 4. In the last line put the sum of points.

1	2	3	4	5	6
1	I focus mainly on contacts with family, friends and messages received from Facebook. Ideological discussions,				In addition to meeting the requirements of everyday life, I make sure that I do not lose track of what is happening in the world in politics,

	politics do not interest me.				cultural events and technology.
2	I do not have a clear opinion about the characters and conduct of individual politicians or publicists.				I usually assess the attitude and sensibility of politicians and journalists. I am not gullible. I can see when someone is trying to twist things around.
3	It is not easy to decide which views are true. Most often it is impossible. I am not interested in such disputes.				I believe that it is worth investigating the truth. For each problem, an explanation can finally be formulated that comes quite close to the real state.
4	I believe that I have the right to say what I think without looking at meritorious people, authorities and experts. I myself know best what the truth is. I do not have to support myself with the opinion of others.				Thorough, accurate commenting on many problems requires knowledge and experience, which is gained over the years. That is why I take into account the opinion of people with high authority.
5	It is necessary to be bluntly honest to demand your own, even if it is selfish.				One should not allow oneself to be deceived, but one should take into account the needs of others and respect their dignity.
6	I do not like sophistry, I like simple, understandable explanations. I do not like philosophizing.				I have no objection to becoming acquainted with philosophical or psychological speculations.
7	My views are quite similar to those of my parents. Traditional values must be respected.				My views result from my whole upbringing and education. They do not always coincide with the views of people close to me.
8	Most people around me have similar views to mine. I like to spend time and talk with people who have similar views to mine.				I don't care if my views are similar to those of people around me. However, I am communicative, I can establish friendly relations with others and take care to have friends and acquaintances.
9	I do not feel that my rights and freedoms are threatened.				One should anticipate the consequences. I try to predict the events that will occur in the future.
10	I do not read novels.				I enjoy reading novels
Sum					

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**Table 3**

**Attitude A or B - Grid II**

**Please mark or complete the data in the initial part of the form and fill in the questionnaire according to the instructions.**

**Sex:** F M ; **Age** .....

**Type of study:** intramural cycle I – year I, II, III; extramural cycle I – years I, II, II;  
intramural cycle II – year I, II , extramural cycle II – year I, II

**Instructions how to fill the repertory grid.** If you agree with the statement on the left, put “+1” in column No. 3, if you agree with the statement on the right then put “-1” in column No. 5. If you do not have an opinion on the subject or if you think that the truth lies in the middle, put “0” it in column No. 4. In the last line put the sum of points.

1	2	3	4	5	6
1	I rarely go abroad. It is not important to me.				I like traveling to other countries. I try to spend holidays abroad, because it allows me to expand my knowledge about the world.
2	My knowledge of English is negligible. I do not think that English is necessary.				I try to improve my English language skills. I think it is worth learning foreign languages.



	I do not devote time and energy to learning foreign languages.			I think that apart from English, it is good to know one more foreign language
3	Around the world we can see a switch to national states and governance by a strong hand.			The source of these changes is known and understandable, but among Western countries there are still countries managed in a democratic way.
4	I am a patriot, I have a sense of belonging to our nation and I do not understand the arguments about feeling a European identity.			I feel I am not only a Pole, but also a European. In addition, there are certain matters that are important to every inhabitant of our planet.
5	Globalization causes many problems and even disasters. We should be self-sufficient.			Today there are many problems that are difficult to solve without international cooperation.
6	The authorities have the right to control public statements so that they are consistent with the interests of the nation.			The comfort of living depends on a sense of security and freedom of expression.
7	Production plants and companies providing services should be state-owned. Their privatization (often re-sold to foreign owners) was a mistake.			The private ownership of companies and a market economy are essential for effective functioning of the state, however, it is necessary to help social groups that are disadvantaged.
8	The mass media should be in the hands of the state and not in private hands.			When the mass media are under the control of only one social group, then the country is moving towards authoritarian power.
9	The history of our nation demonstrates that we have always had enemies around us. At present, we also have to deal with greed and foreign interests.			The misfortunes that our nation encountered resulted from our ineptitude and selfishness.
10	Corruption is everywhere and there is always a game of interests.			It is possible to organize society fairly enough
	<b>Sum</b>			

Table 3. The repertory grid No. II used to performed the survey

Answers are given here by inserting an X in column 3, 4, 5. The sign in the column 3 determines the value indicating the attitude unfavorable to the quality of education and we attributed then the value of +1. Answers given by inserting the X in column No. 4 were assigned the value -1. The total result for a particular person is determined by the calculated algebraic sum of the points obtained. The total number of points in marginal situations can be +10 or - 10. The total results obtained for individual people can be used to calculate the average results for a considered group of people.

Using these two repertory grids, we have obtained data from several groups of nursing students. The survey was completed by 114 first-cycle students and 54 masters degree students. We obtained the results from students of the first, second and third year of bachelor studies and from students of the first and second year of Master's studies. Some groups of students realize in our University nursing study on so-called weekend studies, that is, studies carried out on weekdays from Friday to Sunday. Such studies are usually carried out by working people who, on average, are older than students of ordinary full-time studies.

We collected data in such different student groups aiming to making comparisons between inexperienced people, and older people with significant life experience and advanced education.

## Results

We present the results of our study in Table 4 and Table 5. The tables present the average values of results, calculated for individual student groups for both repertory grids nr I and II. Data obtained for individual groups of students as well as summary data for the entire examined group is given.

<b>Table 4</b>	Number of persons	Mean age of persons in the group	Mean of points for Grid I	Standard Deviation for number of points for Grid I	Mean of points for Grid II	Standard Deviation for number of points for Grid II
I year of I cycle intramural nursing studies	22	20.00	-2.14	3.37	- 0.77	3.48
I year of I cycle extramural nursing studies	29	33.14	-3.93	3.86	- 1.79	3.24
II year of I cycle intramural nursing studies	7	21.71	-2.71	4.64	- 2.29	2.14
II year of I cycle extramural nursing studies	28	33.07	-3.07	4.52	- 1.14	3.73
III year of I cycle extramural nursing studies	28	31.04	-3.86	3.72	- 2.11	3.47
I year of II cycle intramural nursing study	26	31.46	-1.65	4.43	- 1.65	2.21
I year of II cycle extramural nursing studies	14	41.36	-5.93	2.89	- 2.64	2.41
II year of II cycle extramural nursing studies	14	40.86	-4.21	4.21	- 3.43	3.30
In general	168		-3.33	4.07	- 1.81	3.19

**Table 4.** Number of persons, mean age, mean number of points and standard deviation for number of points gathered by the repertory grid No. I and No. II for all examined group of students

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## Table 5

Item of the grid No.	1	2	3	4	5	6	7	8	9	10
Chi – square for Grid No I	12,39	2,86	1,47	13,48	4,9	5,85	2,15	5,12	3,21	3,04
p <	0,002	0,26	0,48	0,001	0,086	0,054	0,34	0,077	0,2	0,22
Chi – square for Grid No II	0.65	1.23	3.01	21.57	13.78	1.24	1.76	1.87	0.29	2.62
p <	0.72	0.54	0.22	0.001	0.01	0.54	0,41	0.39	0.86	0.27

**Table 5** Results of statistical verification of comparison between proportions of answers to statements of the Grid No. I and II for I year of I cycle students of nursing and I year of II cycle students of nursing.

In order to check whether the differences between particular groups are statistically significant, one-way analysis of variance for independent samples was performed. As a result, it was shown that the average results from the survey I in the compared groups differ significantly in terms of the mode and level of study  $F(7; 160) = 2.09$ ;  $p < 0.05$ ;  $\eta^2 = 0.84$ . On the other hand, the average results in the II survey do not differ statistically significantly depending on the mode and level of study.

In order to investigate which of the studied groups differ significantly between each other in terms of average results for repertory grid nr I a post hoc LSD test (least significant differences test) was performed. His results show that for the group of first-year MA students in the weekend mode  $M = -5.93$ ,  $SD = 2.89$  and it is statistically significantly lower than in the first-year MA students on a daily basis, where  $M = -1.65$ ,  $SD = 2.21$ , as well as in the group of first-year bachelor students where  $M = -2.14$ ,  $SD = 3.37$  ( $p < 0.01$ ). Differences between the remaining groups were statistically insignificant.

We also analyzed differences in the proportions of responses to selected individual questions using the chi square test..

Table 6 presents results of statistical verification of comparison between proportions of answers for statements of the questionnaire nr I for students of nursing of first year of study for bachelor's degree and students of first year of study for MA degree. This verification showed that the differences in the proportions of responses are statistically significant for items no: 1, 4, 5, 6, 8

Table 7 presents results of statistical verification of comparison between proportions of answers for statements of the questionnaire nr II for students of nursing of first year of study for bachelor degree and students of first year of study for MA degree. This verification showed that the differences in the proportions of responses are statistically significant for items no: 4, 5.

Thus, we conclude that a relatively good reference point for students' attitudes are differences in responses to statements contained in questionnaires I and II between persons starting first and second cycle studies. The unfavorable characterological figure could be realized by consideration of the content of the statements, for which statistical differences were found.

Thus, the unfavorable attitude for gaining an effective education and social empathy is characterized by accepting of the following statements:

I.1. I focus mainly on contacts with family, friends and messages received from Facebook. Ideological discussions, politics do not interest me.

I.4. I think that I have the right to say what I think without looking at meritorious people, authorities and experts. I know what the truth is best. I do not have to support the opinion of other people.

I.5. It is right to demand your own, even if it is selfish.

I.6. I do not like sophistry, I like simple, understandable explanations. I do not like philosophizing.

I.8. Most people around me have views similar to mine. I like to spend time and talk with people who have views similar to mine.

II.4. I am a patriot, I have a sense of belonging to our nation and I do not understand the arguments about feeling European identity.

II.5. Globalization causes many problems and even disasters. We should be self-sufficient.

## **Discussion**

The interpretation of the results obtained both for an individual and for a group of people can be explained as follows. If we list a sequence of all the formulations given on the left side of Table 2, we will get a description of the following personality (mental attitude):

[ I focus mainly on contacts with family, friends and colleagues and on Facebook messages. I am not interested in ideological discussions or politics. I do not have a clear opinion about the characters and conduct of individual politicians and publicists. It is not easy to decide which views are true. Most often it is impossible. I am not interested in such disputes. I believe that I have the right to say what I think without looking at meritorious people, authorities and experts. I myself know best what the truth is. I do not have to support myself with the opinion of others. It is right to demand your own, even if it is selfish. I do not like sophistry, I like simple, understandable explanations. I do not like philosophizing. My views are quite similar to those of my parents. Traditional values must be respected. Most people around me have similar views to mine. I like to stay and talk with people who have similar views to mine. I do not feel threats about my rights and freedoms. I do not read novels. ]

It seems to us that a person who anonymously describes his or her attitude in this way does not have the predisposition to obtain an effective education. We suggest to compare this attitude with the mentality of the person you pointed out by answering the survey questions on reverse. Its description is as follows:

[ In addition to meeting the requirements of everyday life, I make sure that I do not lose track of what is happening in the world in politics, cultural events and technology. I usually assess the attitude and sensibility of politicians and journalists. I am not gullible. I can see that someone is trying to turn the cat's tail. I believe that it is worth investigating the truth. For

each problem, you can finally formulate an explanation that comes quite close to the real state. Thorough, accurate commenting on many problems requires knowledge and experience, which is gained over the years. That is why I take into account the opinion of people with high authority. One should not allow oneself to be deceived, but one should take into account the needs of others and respect their dignity. I have no resistance to becoming acquainted with philosophical or psychological speculations. My views result from the whole upbringing and education. They do not always coincide with the views of people close to me. I don't care if my views are similar to those of people around me. However, I am communicative, I can establish friendly relations with others and take care to have friends and acquaintances. One should anticipate the consequences. I try to estimate the events that will occur in the future. I like to read novels.]

A similar excerpt can be formulated on the basis of the repertory grid II, which characterize less abstract attitudes.

We believe that the adopted assumptions are consistent with the views of John Eigenauer, who urges all teachers to pay attention and promote rationality of thinking [7,8]. Eigenauer refers to the work of psychologist Keith Stanovich, who in dozens of articles considered the problem of the existence of so-called dysrationality [9,10]. These authors point out that irrational thinking often leads to disadvantageous financial and life decisions. Sometimes, for this reason, the right methods of treatment are rejected or people are susceptible to pseudoscientific theories, conspiracy theories and other forms of demagoguery.

According to Stanovich, dysrationality results from the tendency to use the stereotype of "quick, reflexive, unreflective decision-making" [10]. They were already described by Daniel Kahneman [11]. Eigenauer and Stanovich argue that the reflexive use of this "quick thinking" results from the lack of learning appropriate reflection strategies (lack of proper "mindware"). According to the cited researchers, one can also distinguish so-called warped thinking strategies ("contaminated mindware").

Effective thought processes are based not only on the criticism of thinking discussed here, but also on other features of the mind [12,13].

Eigenauer states that modern schools and colleges do not pay proper attention to learning critical thinking. Critical thinking requires effort [14,15,16]. It is necessary to use learned skills in the field of interpretation and analysis of facts and opinions, reflexes to assess the credibility of opinions, appropriate methods of inference and explanation.

Recently, the importance of forming critical thinking for improving activities has been noticed in the field of nursing and medical education [17-21]. Preliminary data on brain structures responsible for the ability to think critically have also been established [22, 23].

The two different thinking strategies discussed here should also be considered in the light of new arrangements regarding authoritarian personality [24-26], changes in right-wing views [27] and the spreading populism [28, 29].

The explanations of the assumptions adopted in the development of proposed surveys, presented here are descriptive, although the methodology of the repertory grids make possible to express the result of the assessment quantitatively.

The results obtained by a specific person can be used to outline a program to modify their thinking strategies to make it more effective. The way of using the obtained result for self-improvement is a separate issue. Here, we emphasize only that actions that improve our thinking strategies are determined by the content of the statements contained in the survey. The effort should be focused on changes of behaviors in the direction specified by the sentences written to the right side of the forms.

## **Conclusions**

1. It is possible to formulate tools that evaluate the mental attitude, favorable to gain effective education and social empathy.
2. The teaching staff of an educational institution should master some methods, which make possible to check to what extent the attitude described above concerns a particular person or a specific group of students.
3. One of the possible ways to estimate students' cognitive and mental strategies is the formulation of repertory grids, containing statements expressed in such a way, that the intention of including a given question is not obvious. These questions should check some of the important determinants of the way of thinking and action, but their content should not reveal intentions in an immediate and obvious manner.
4. Data collected using repertory grids, formulated in accordance with the above assumptions show statistically significant differences of proportions of answers specific for discussed thinking strategy among in the youngest and the oldest group of nursing students
5. The results obtained by a particular person can be used for determination of a program of modification of thinking strategies so, as to make it more effective. Actions that improve the thinking strategy are determined by content of the statements of the questionnaires.

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