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Measurement of the Sense of Educational Efficacy. Tool Construction and Adaptation

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Abstract

The article presents studies accompanying the construction of tools used in the measurement of educational efficacy in Poland and Slovakia. The Slovak tool is an adaptation of its Polish version. The authors compare psychometric properties of both tools, reveal the details of their construction and analyse the results of comparative tests within demographic variables. The research is based on Albert Bandura's social-cognitive theory and show an example of application of his ideas concerned with micro-analytical tests in pedagogy.

Key words: sense of educational efficacy, micro-analytical tests, situational testing, teacher survey in Poland and Slovakia

Theoretical bases

The research on the sense of efficacy understood as an individual assessment of one's capabilities to deal with particular tasks and behave in particular situations was initiated by Albert Bandura (1994). Although the source of the said research was rooted in the social education theory coined by W. Mischel, the current conceptualisation of the sense of self-efficacy is strongly anchored in

the conceptual system of social-cognitive theory. Hence, the judgement of one's capabilities to manage certain conditions influences ways of thinking, emotions that instigate action, thinking of oneself in the context of a social role, motivation and success of one's efforts or, following Bandura's words, task performance. Such an impact has been documented in numerous experimental studies (Bandura 1994; Bussey, Bandura, 1999). Looking at the theoretical situation of the sense of efficacy we see that it is included among intrapsychological – cognitive factors of one's actions, including cognitive capabilities, perceptive capabilities, preferences, level of agitation, attention and memory processes, conceptual-associational processes and internal sanctions and self-assessment standards. The two last factors are especially important, as they form a strong correlation with the sense of self-efficacy. Besides the intrapsychological factors, one's behaviour – according to social-cognitive theory – is affected by biological factors (understood as potentialities modified by cultural factors) and cultural factors, among which a significant role is attributed to stereotypes, social enforcements, pressures of socialisation, social stratification and sanctions (Bussey, Bandura, 1999). These three groups of factors (biological, intrapsychological and cultural) directly or indirectly affect human behaviour. The linking element between a part of factors and one's behaviour is constituted by development mechanisms: modelling, indirect experiencing and direct learning (cf. Chomczyńska-Miliszkiwicz, 2002). Therefore, it should not come as a surprise that in Bandura's research the sense of efficacy was commonly used as an independent fixed variable, which at the same time was an object of manipulation. It is the variability of the sense of efficacy that allowed explanation of numerous variables related to activity.

Bandura's approach is not the only attempt to conceptualise the sense of efficacy, as this variable can be treated not as a judgement that is relativised to the situation, thus a relatively variable one, but rather as a relatively constant disposition (Mischel 1988, Pervin, John, 2002). This way, the sense of efficacy consists of cognitive, emotional, motivational and activity-related dispositions. An approach that integrated various theoretical perspectives was used by M. Chomczyńska-Rubacha and K. Rubacha (2013) consisting in the conceptualisation and operationalisation of the sense of efficacy. With the use of factor and cluster analysis they positively verified the hypothesis of existence of two types of dispositions understood as personal resources (factors, clusters): cognitive-action and motivational. The first encompasses one's capability to translate objectives into an action programme, resistance into frustration and stress, sense of causation, internal control. The second factor, motivational, is on the other

hand composed of: capability to postpone gratification, belief in one's own strengths, developmental motivation, persistence in action. Both traditions are subject to a scientific discussion, which often oscillates around the hypothesis concerning the existence of a correlation between the sense of efficacy in a situational and dispositional depiction (Rubacha 2013, Rubacha, Sirotova, 2014). However, the matter still remains unresolved, with both conceptualisations being subject to continuous research. Nonetheless, while it is not the intention of this text to contest the dispositional approach, it focuses on the understanding resulting from social-cognitive theory. This facilitates dealing with the variable mentioned in the title – the sense of educational efficacy.

The sense of educational efficacy is understood as one's judgement of prognosticated success in complex daily activities aimed at achieving a particular educational and/or didactic goal. The problem of one's goals constitutes an important element of this definition, as it is a motivational factor that organises the educational activity. The objectives of teachers, educators, parents, guardians are determined by their priorities and help organise their activity in long-term perspectives, which is typical of the educational domain. They are not incidental but rather compound into a system of actions. Moreover, the objectives are confronted with the requirements and expectations of the environment, i.e. the communities of pupils/students, parents, teachers, local environment of the school, or family environment in the case of education within the family. And finally, there are goals organised on the basis of judgements made by teachers in relation to their own efficacy as compared with external performance standards. For this reason, undertaking and organising educational goals and the success in the implementation may depend on one's sense of self-efficacy. Besides the goals, the analysed definition also emphasises the assessment of one's activity which – according to Bandura – is a link between one's objectives and energy expenditure related to their accomplishment. The sense of efficacy as a judgement is based on exactly this type of criteria, which strongly emphasises the motivational character of the variable. The thus understood sense of efficacy will be subjected to operationalisation in the next part of the article.

Tool construction and adaptation

In this part we are going to present two tools, albeit in a sense it is actually a single tool used for the purpose of measurement of the sense of efficacy. Originally, the tool in question was established in a Polish language version and was used in the course of studies conducted among Polish teachers and parents. However,

after certain time we activated the adaptation procedure of this tool to Slovak conditions. The starting point was translation of the original version. As a result, the object of the analysis presented in this part of the article will consist of two research tools: Polish and Slovak.

The described operationalisation of the sense of educational efficacy refers to Bandura's idea, who initiated the so-called micro-analytical testing. It consisted in asking the respondents to present their judgement concerned with their ability to cope with particular life situations. Thus, we may assume that the sense of educational efficacy regards strictly defined types of social situations encompassing in their structure the following types of events: educational, didactic, connected with learning, described as a problem to be solved by a given respondent. If so, the most suitable data collection method seems to consist in situational testing, forcing the tested person to perform a particular task in relation to an explicitly defined problem. The said task consists in the formulation of a judgement to be expressed on a rating scale. What requirements should be met by the problem described in an educational situation presented to the respondents? Firstly, as it results from the definition of the sense of efficacy, the problem should be realistic, i.e. possible to encounter in everyday educational practice. Secondly, it needs to be formulated in a language of everyday educational experience of the researched teachers. Thirdly, it should be complex and difficult, yet possible to resolve in particular conditions. Fourthly, the accompanying conditions should be perceived by the respondents as typical. Fifthly, the action to which the respondents will refer should be anchored in more general educational objectives, significant ones and based on existing standards of their accomplishment. Sixthly, the researched person should have access to a tool allowing presentation of his/her qualitative judgement on an understandable quantitative scale. Seventhly, the measurement result should be expressed at least on an ordinal scale, or best – on an interval scale. The latter condition is linked to the possibilities of data analysis in the research characterised by this type of operationalisation. At this point we need to assign the sense of efficacy the roles of two variables: fixed (independent) and random (dependent). In the research aimed at verifying the social-cognitive theory the sense of efficacy was in the majority of cases considered it to be a fixed variable, i.e. a factor subject to manipulation. Since the quoted research was conducted in an experimental or quasiexperimental (comparative) scheme, the respondents were assigned in a non-random manner to the values which the variable could assume. Thus, it was sufficient to express the results on an ordinal scale or even be limited to nominal scale, e.g. defining low and high sense of efficacy. However, if the

research were to be conducted in such a way as to depict the sense of efficacy as a random variable, and the research objective required, for instance, application of variance analysis or even a simple comparison of mean values, e.g. in experimental and comparative studies, the level of measurement of this variable would need to have the character of an interval. Hence, it is worth to “optionally” secure both possibilities (ordinal and interval measurements) already at the operationalisation level.

Following these principles, the researchers gathered a Polish sample of teachers, later divided into focus groups. The researchers’ task was to generate, based on their own professional practice, examples of situations containing a difficult, however possible to resolve educational and didactic problem. The focus group was to ensure that the examples are based on educational reality and formulated in everyday language, allow more than one solution, etc. Based on this procedure, descriptions of such situations were formulated along with questions concerning the judgement operationalising the sense of efficacy and a scale of responses. The next step involved estimation of face validity of the thus constructed items of the situational test. Competent judges were requested to take a stance in relation to several questions checking the validity of all items. The provided assessments allowed elimination of two items and classification of five of them as experimental. This tool version was used to research teachers (N=245) and calculate the discriminant power coefficients for each tested item. Only three items passed the above verification, with biserial correlation coefficient (r_{bi}) ranging between 0.49 and 0.70. Once the items were translated into Slovak, an analogous calculation of the discriminant power was carried out. One of the coefficients reached the limit value, i.e. rather too low. Whereas the remaining ones equalled to $r_{bi} = 0.57$ and 0.82 . A part of the research was conducted on three items, and a part on only two based on high discrimination coefficients. Our comparative analyses are carried out on the two-item version. Next, we proceeded to estimate the reliability of both versions of situational tests with the use of Cronbach Alpha. The items of the Polish version had statistically significant coefficients of: 0.88; 0.88; 0.82. The Slovak items, on the other hand obtained the following statistically significant values: 0.79 and 0.93. Both cases do not raise any doubts concerning test accuracy. The reliability assessment was followed by constancy evaluation of our tools. Unfortunately, the Polish version did not obtain a high correlation coefficient between measurements conducted at an interval of one month (Pearson $r = 0.21$, n.s.), contrary to the Slovak version with the result of: $r = 0.72$, $p < 0.05$). Regrettably, the situation has not yet been justified. We are awaiting follow-up research.

The next measurement provided us with data necessary to evaluate theoretical validity. In the attempt to evaluate diagnostic validity, a theoretical risk was undertaken and the results of the discussed test were compared with SET, i.e. the Sense of Self-Efficacy Test available both in the Polish and Slovak versions. When we refer to the theoretical risk we mean the fact that SET measures the sense of self-efficacy as a disposition, while the tested tool is of a situational character. It is the theoretical contradiction, which due to lack of its resolution causes that we cannot be certain whether for the purpose of confirming the validity of our tools it is necessary to apply significant or insignificant correlation coefficients for the two tests. However, tentatively we decided to expect correlation between both tools, as in the end it is not known what are the constituents of a judgement on one's capabilities to cope with a given task, perhaps also – what Bandura did not mention – some personal dispositions. In the absence of a proper resolution we were allowed to adopt such working hypothesis, particularly since we did so prior to calculation of measurement results. And the results, the Polish and Slovak Pearson linear correlation coefficients respectively, confirmed the existence of such a correlation (0.52 and 0.63, $p < 0.05$). Thus far, other types of theoretical validity have not been tested.

Neither of the versions was standardised due to fairly limited result range, especially the Slovak one. Nonetheless, the results are expressed as an arithmetic mean, which raises them to the interval level.

The discussed tool for the measurement of the sense of educational efficacy consists of two (Slovak) and three (Polish) situational testing items. The respondents become familiar with the description of an educational situation. Next, they used a four-level scale to demonstrate to what degree they are able to predict their success in solving a particular educational problem. The values on the scale are defined as: I definitely cannot cope with this problem, I think I cannot cope with this problem, I think I can cope with this problem, I definitely can cope with this problem.

The analysis of the sense of self-efficacy in the context of demographic variables in the Polish and Slovak sample

Using the collected empirical data we present several statistical analyses performed on the basis of the Slovak and Polish tool (the two-item version). First, we conduct a comparison between the estimators of the Polish and Slovak samples. As shown in Table 1, each country provided 120 respondents. The subjects were students with completed teacher training and traineeships, with a part of

them having first experiences working as teachers. Regrettably, the age range was not diversified and oscillated between 23 and 25 years. Hence, it is possible to state that the subjects were prepared candidates for the job of a teacher. Altogether, we have tested 240 respondents from both countries, selected intentionally not randomly. As it results, the studies do not allow for a generalisation of conclusions and parameter calculation. Whereas when it comes to the obtained estimators – as it can be seen – in both countries we received

Table 1. Descriptive statistics for the Slovak (SLV) and Polish (PL) samples

		SLV	PL
N	Important	120	120
Mean		2.7375	2.6542
Median		3.0000	2.5000
Dominant		2.00	2.00
Standard deviation		.93477	.98261
Skewness		-.058	.072
Standard skewness error		.221	.221

Source: own study.

similar data. Mean values do not reveal much difference between each other. The result of single factor Anova presented in Table 2 allows to maintain zero hypothesis. No statistically significant differences occur between mean values. Moreover, they are average. The result range is 1–4. However, looking at the median we see that the Slovak sample's mean value falls left from the median, i.e. with skewness towards low results. The asymmetry is minimal, similarly to the Polish sample, where

Table 2. Single factor ANOVA. Country x sense of educational efficacy

	Sum of squares	df	Mean square	F	Significance
Between groups	.417	1	.417	.453	.502
Inside groups	218.879	238	.920		
Total	219.296	239			

Source: own study.

it is slightly positive (with mean falling to the right from the median). Generally, in both cases the distribution is close to normal with zero asymmetry. Although

by looking at the mean values we could conclude the the sense of educational efficacy in the respondents is rather high than low, the dominant suggests that it is average as the majority of subjects fall at the half-length of the result range. It is difficult to interpret this state in the context of reasons. Of course, we may speak of consequences based on the social-cognitive theory. The higher the sense of efficacy the greater the motivation to act, determinedness in achieving goals or not withdrawing from difficult situations that tend to abound in the educational practice in both countries.

The other available data are concerned with sex as a differentiated variable, even more so when compared with population differentiation. The Slovak sample consisted of 71 women and 49 men, whereas the Polish one 61 women and 59 men. Thus, the comparisons

Table 3. Single factor ANOVA. Slovak sample. Sex x sense of educational efficacy

	Sum of squares	df	Mean square	F	Significance
Between groups	.742	1	.742	.848	.359
Inside groups	103.239	118	.875		
Total	103.981	119			

Source: own study.

are justified. The Slovak males and females obtained similar results, with single factor Anova not revealing any statistically significant differences. The situation is similar in the case of

Table 4. Single factor ANOVA. Polish sample. Sex x sense of educational efficacy

	Sum of squares	df	Mean square	F	Significance
Between groups	.225	1	.225	.231	.632
Inside groups	114.673	118	.972		
Total	114.898	119			

Source: own study.

data from Poland. No statistically significant differences between sexes were observed with regard to the sense of educational efficacy. This is interesting, as the meta-analyses concerning differences between sexes generally indicated a higher generalised sense of efficacy in men than in women (Lytton, Romney

1991). Presumably it is the result of different socialisation training and social conditions in which both sexes live. Societies tend to value masculine properties higher than feminine, which is confirmed in the proportions of property distribution between them, usually favouring men. Such a state of affairs raises the self-esteem in men, which may further be transposed onto their sense of efficacy. Unfortunately, we do not have data concerning the sense of educational efficacy. However, since in this respect no differences are noted, perhaps we should follow the stereotype of femininity and assume that “raising” of the sense of efficacy among women is due to the fact that they feel good in the role of educators. Nonetheless, one may also state that male subjects obtained lower results, close to those of the females, as – according to the stereotype – they are not as capable when it comes to raising children (cf. Chomczyńska-Rubacha, 2007). On the other hand, utilising stereotypes is not the best strategy in the formulation of scientific interpretations. Hence, the obtained results may be the effect of a gradual increase in the sense of efficacy among females in general, which can be perceived as a political achievement of feminism.

However, returning to the main topic of this article, it is worth noting that both tools require further development. Particularly, it seems that the pool of analysed situations to which the respondents are to react should be expanded, and, perhaps, special attention should be paid to ensure their proportional representation of such areas of educational practice as educational and didactic activities, care provision, assessment and maintenance of discipline.

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