

CONSTRUCTION AND VALIDATION OF A PSYCHOMETRIC SCALE TO MEASURE ACADEMIC ENGAGEMENT

Liliya Babakova¹

Abstract: This study looks at the phenomenon of engagement at university. Here are described the initial procedures for the standardization and validation of the Schoolwork Engagement Inventory that measures energy, dedication and learning in terms of academic activity and work. To assess the validity and reliability of the scale among students, an exploratory factor analysis and structural modeling was used. A total of 152 first year students from two universities participated in the completion of this scale. The results show that the two-factor solution has the highest reliability. In terms of constructive validity, it was found that academic stressors correlated negatively with both scales of engagement, and the scale of resilience was positively linked to the engagement scale. There were no gender differences.

UDC Classification: 005, 378, **DOI:** 10.12955/cbup.v7.1386

Keywords: Academic Engagement scale, University students, energy, dedication, validation

Introduction

Student engagement in learning is a key topic in the psychology of education that affects other phenomena and formations such as motivation and efficiency of the educational process itself. The transition from high school to higher education involves an increasing number of adolescents. Entry into the university is challenging and stressing for students as they face unanticipated expectations: academic work is growing suddenly, new and unknown disciplines are being studied, there is less support from teachers and professors, there are new colleagues, it's difficult to combine work with training sessions, etc. As a result, many students face the threat of low academic outcomes, which negatively affects their commitment to the university.

Theoretical Aspects

The engagement approach was originally developed in a clinical environment to encourage and help people with problems such as anxiety or depression (Ruiz, 2010). Recently, it has been observed that it is also being implemented in the educational environment to promote the well-being and psychological health of students. It is defined as "a positive emotional state characterized by energy, dedication and absorption" (Schaufeli et al., 2002). Energy is characterized by high levels of energy, strong psychological resilience and learning, readiness to use the learning material, and a tenacity to difficult situations. Devotion is associated with the search for meaning, enthusiasm, inspiration, pride and competition. Learning is characterized by full concentration on work and in-depth mastering of tasks. Time passes quickly and the individual finds it difficult to move away from the learning / work (Schaufeli et al., 2002).

Other authors such as Appleton, et al. (2006) define engagement as a broad and multidimensional construct involving several components: emotionality (emotions such as pleasure and interest in learning), cognition (knowledge accumulation and area learning), and behavioral (presence, initiative actions) in an academic environment. If looked a little closer, it will be found that the approaches of Schaufeli et al. (2002) and Appleton et al (2006) are similar: initiation can be assumed to be a cognitive element, energy is the emotional component, and absorption is behavioral.

According to Brault-Labbe and Dubé (2008), the student's academic commitment is based on three dimensions: 1) their enthusiasm for their training; (2) its ability to reconcile the positive and negative aspects of it; 3) their persistence over the difficulties he encounters.

Some studies have found that engagement in school work correlates with depression: the lower the values of engagement, the higher the depressive symptoms or the mischievous results in adolescents (Salmela-Aro & Upadaya, 2012). The engagement of students in University education has some differences compared to the pupils' commitment to school, especially in the context of the new academic environment. Unlike the school, where students study many different disciplines, students at the university choose a more specialized field of study in which they build on their knowledge and therefore tend to attach greater value and use of to the university. The sense of belonging and the various opportunities for engaging in certain events increase student engagement (Gunuc, 2014; Pike & Kuh, 2005). According to Goodenow (cited in Gunuc, 2014), a sense of belonging occurs when

¹ Plovdiv University „Paisii Hilendaski“, "Faculty of pedagogy“, Plovdiv, Bulgaria, babakova_lilia@abv.bg

students feel that they are accepted, supported and engaged by other people in the social environment of a university /a school (other students, teachers, etc.). It has a positive or an indirect influence on academic achievement and motivation (Kember, et al., 2001). Gregoire, et al. (2016) found that the more students develop skills such as concentration, flexibility and attention, the more they engage in actions that are in line with their values. Hence, the indicators for psychological health and academic engagement also increase.

Commitment is not only an activity but also a desire and motivation for academic achievement in the learning process. According to Stovall (2003), student engagement involves not only the time the students work on their assignments but also their willingness to participate in activities. Krause and Coates (2008) believe that the engagement of students is correlated with high scores and academic achievements.

In recent years, the concept of learning engagement has become increasingly popular, and most of the research on this subject is being conducted at school (Fredricks et al., 2004). Still less is research on student engagement at university. The university is a place where students receive basic knowledge in a given field, work and attend classes and seminars and engage in joint projects and tasks so that the concept of engagement can also be applied in the context of the university and the acquisition of academic knowledge. However, at this stage, there is no valid and reliable scale for academic engagement with students. K. Salmela-Aro & K. Upadaya (2012) developed a scale to measure engagement that includes factors such as energy, dedication, and absorption.

The aim of the present study is to develop a scale for Academic Engagement and to verify its validity and reliability among students studying in art disciplines, music, dance and fine arts. Other variables such as academic stressors and resilience were used to determine the discretionary validity. The following hypotheses were made:

Hypothesis 1. The structure of the academic engagement scale will confirm the author model, i.e. the three-component structure: absorption, dedication and energy.

Hypothesis 2. The academic engagement scale will correlate negatively with the academic stressors scale and positively with the scale for resilience.

Hypothesis 3. There is no difference in academic engagement between boys and girls.

Methods:

The Schoolwork Engagement Inventory (Salmela-Aro & Upadaya, 2012).

The above conceptualization of the construction of the scale for academic engagement is a prerequisite for it to be approved for Bulgarian students. The scale of students' answers is a 7-point Likert type scale ranging from 1 (= strongly disagree) to 7 (= fully agree).

Academic Resilience Scale (Martin & Marsh, 2006).

Consists of six statements about students' perceptions of their sustainability, broken down into a 7-point Likert type scale. The reliability of the scale for Bulgarian conditions is high ($\alpha = 0.851$).

Academic stressors scale.

Contains four subscales: stress related to parental expectations, stress related to the lack of knowledge, stress related to the learning material and the lecturers, and stress related to the auditorium activities. The reliability of the subscales for Bulgaria is high ($\alpha = 0.836\sim 0.786$).

Participants: 152 first-year students from two Plovdiv universities. Of these, 58% are male, 38% are female and 4% have not indicated their gender in the survey. The average age is 21 years. The students were representatives of three specialties: pedagogy of art education and pedagogy of music education.

Procedure: The data was collected for two months at the university. Students first reported their gender and age, and then were given two short scales: one is a scale for academic resilience, and the other is an author's scale for academic stressors.

Results

The scale contains 9 items. An analysis of the items and the scales was first done. An exhaustive factor analysis was used to check the validity of the structure. All items had high factor weights.

In our case, two factors were differentiated, not three as in the author's method. The KMO value is 0.861, which means that the data can be subjected to a factor analysis. Barlet's spherical value test was also statistically significant (391.646; $p < 0.001$) and an explanation of variance of 59.834% (first factor with 40.7% dispersion; second factor – 19.1%) resulted in the following factors: "Dedication" (Alpha of Cronbach = 0.868), "Energy" (Alpha of Cronbach = 0.831).

Below, Table 1 gives the factor excerpts of the Academic engagement scale.

	Component	
	Dedication	Energy
1. (ENE1) At school I am bursting with energy.		0.522
2. (DED1) I find the schoolwork full of meaning and purpose.	0.837	
3. (ABS1) Time flies when I am studying.	0.652	
4. (ENE2) I feel strong and vigorous when I am studying.		0.530
5. (DED2) I am enthusiastic about my studies.	0.792	
6. (ABS2) When I am working at school, I forget everything else around me.		0.833
7. (DED3) My schoolwork inspires me.	0.819	
8. (ENE3) I feel like going to school when I get up in the morning.		0.865
9. (ABS3) I feel happy when I am working intensively at school.	0.659	
Alpha of Cronbach	0.868	0.831
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
Source: Author		

Table 1 shows that two of the "Absorption" ("I'm happy when I'm working intensively at school." And "Time flies when I'm studying") fall into the "Dedication" scale for a Bulgarian sample and one item from the author's "Absorption" scale falls into the "Energy" scale. The Bulgarian students give a double meaning to the "Absorption" scale - on the one hand, the learning process presupposes a certain degree of dedication, and on the other hand, in order to be able to learn, you must first be filled with energy. The artifacts from the other two scales "Dedication" and "Energy" coincide completely with the original design.

Confirmatory Factor Analysis

In order to confirm the structure of the exploratory factor analysis, a confirmatory factor analysis was performed using the AMOS statistical software. The Confidence Factor Analysis (a) allows the researcher to see how well the data fits into a particular theoretical model (i.e., adapting data to a priori-defined model); (b) and it assists researchers to be precise in defining structures. In this case, the theoretical model consists of two correlated factors forming a model.

Multiple fitness indices were evaluated to support the model. We looked at two gradual adjustment indices, index (TLI) and (IFI), with values close to 0.95 indicating good fit. We have also included a Comparative Index of Fitness (CFI) with values greater than 0.90 considered to be a good fit. Finally, we examined the approximate square error of approximation (RMSEA). Values below 0.05 show good fit, and values that are above 0.08 represent reasonable approximation errors. The model we tested initially showed an RMSEA of 0.06, but after we put two correlation links between two of the errors in two of the subscales, we obtained good degree indices as follows: $\chi^2 = 298$ ($df = 320$), $p = 0.002$, $TLI = 0.923$, $IFI = 0.983$, $CFI = 0.941$, $RMSEA = 0.08$

The exploratory and confirmatory factor analysis partially confirms hypothesis 1. There is a two-factor structure with high internal reliability.

Determination of the reliability of the test is also confirmed by the internal correlations between the two subscales. In general, the correlations between the scales are in line with the theoretical concept of structure and the relationship between the two types of academic engagement. In tab. 2 we can see that the correlation between them is high - 0.614 and is statistically significant for the sample.

No differences were found between the subscales "Dedication" and "Energy" and the factors "gender". This confirms hypothesis 3.

The constructive validity of the test is confirmed by the measurement of the correlations between the two subscales on the "Academic Engagement" scale and the subscales of the scale for academic

stressors, as well as by the scale of resilience. There are negative correlations with subscales for academic stressors and a positive and statistically significant correlation with the scale for resilience. This confirms hypothesis 2. The results are presented in Table 2.

	Resilience	Dedication	Energy	Stress related to parental expectations	Stress related to the auditorium activities	Stress related to the lack of knowledge	Stress related to the learning material
Resilience	1	0.438**	0.355**	-0.269*	-0.386**	-0.461**	-0.306**
Dedication	0.438**	1	0.614**	-0.237*	-0.282**	-0.303**	-0.277*
Energy	0.355**	0.614**	1	-0.180	-0.379**	-0.363**	-0.282**
Stress related to parental expectations	-0.269*	-0.237*	-0.180	1	0.412**	0.201	0.472**
Stress related to the auditorium activities	-0.386**	-0.282**	-0.379**	0.412**	1	0.608**	0.531**
Stress related to the lack of knowledge	-0.461**	-0.303**	-0.363**	0.201	0.608**	1	0.526**
Stress related to the learning material	-0.306**	-0.277*	-0.282**	0.472**	0.531**	0.526**	1
	0.005	0.011	0.009	0.000	0.000	0.000	0.000

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

Source: Author

Limitations

Although this study was carefully conducted, it has its limitations and shortcomings. For example, no study was conducted among other groups of students in engineering or humanities. In addition, the study was conducted only among first year students as it is assumed that during the first year of study students still do not know what learning is like in a new environment such as a university and will try to be fully committed due to the new academic environment and expectations. But it is not clear whether the academic commitment levels are higher in the first year or in the last year of study. It would be better for the same group of students to fill the academic engagement scale periodically and thus to test the results over time. In addition, comparisons can be made between students at secondary school and students in University in order to verify differences in their engagement.

Conclusion

The main objectives of this study were to check the factorial structure of a scale measuring the academic engagement among Bulgarian students. A two-factor model, consisting of the Energy scale and the Dedication scale, was established.

The two-factor structure has good fitness indicators, indicating that this model is suitable for explaining the data received from Bulgarian students. The two subscales show good inner coherence.

The correlations between the individual subscales show that they all interact statistically significantly between them, indicating good internal interconnections between subscales.

Correlations between the subscales of the Academic Stress Scale, as well as the "Resilience" scale, and the scales associated with academic engagement as dedication and energy, indicate results that show good internal validity and correspond to the theoretical model.

The value of the "Academic Engagement" scale is that with a brief scale, one can look at whether students feel engaged in an academic environment. The results of the present study indicate the factor structure and invariance among the Bulgarian sample, the reliability and the predictable validity.

Reference

Schaufeli, W., Salanova, M., Gonzalez-Roma, V. and Bakker, A. (2002). The Measurement of Engagement and Burnout: A Two Sample Confirmatory Factor Analytic Approach. *Journal of Happiness Studies*, 3, 71-92.

Gregoire, S., Lachance, L., Bouffard, T., Hontoy, L., De Mondehare, L. (2016). L'efficacité de l'approche d'acceptation et d'engagement en regard de la santé psychologique et de l'engagement scolaire des étudiants universitaires. *Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement*. 48. 10.1037/cbs0000040.

- Brault-Labbé, A., & Dubé, L. (2008). Engagement, surengagement et sous-engagement scolaires au collégial : pour mieux comprendre le bien-être des étudiants. *Revue des sciences de l'éducation*, 34, 729–751. <http://dx.doi.org/10.7202/029516ar>
- Ruiz, F. J. (2010). A review of Acceptance and Commitment Therapy (ACT) empirical evidence: Correlational, experimental psychopathology, component and outcome studies. *International Journal of Psychology & Psychological Therapy*, 10, 125–162.
- Gunuc, S. (2014). The relationships between student engagement and their academic achievement. *International Journal on New Trends in Education and Their Implications (IJONTE)*. 5. 216-231.
- Stovall, I. (2003). Engagement and Online Learning. UIS Community of Practice for E-Learning. <http://otel.uis.edu/copel/EngagementandOnlineLearning.ppt>
- Pike, G. R., & Kuh, G. D. (2005). First and second-generation college students: A comparison of their engagement and intellectual development. *Journal of Higher Education*, 76, 276-300.
- Krause, K. and Coates, H. (2008). Students' engagement in first-year university. *Assessment and Evaluation in Higher Education*, 33(5), 493-505.
- Kember, D., Lee, K., & Li, N. (2001). Cultivating a sense of belonging in part-time students. *International Journal of Lifelong Education*, 20(4), 326-341.
- Appleton, J. J., Christenson, S.L., Kim, D., & Reschly, A.L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, 44, 427–445.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109.
- Martin, A. J., & Marsh, H. W. (2006). Academic resilience and its psychological and educational correlates: A construct validity approach. *Psychology in the Schools*, 43, 267–281.
- Salmela-Aro, K., & Upadaya, K. (2012). The Schoolwork Engagement Inventory: Energy, dedication, and absorption (EDA). *European Journal of Psychological Assessment*, 28(1), 60-67.