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The Albanian Adaptation of the Science Motivation

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Abstract

Motivation is an important factor in learning. The purpose of the study is to adopt SMQ-II in Albanian language and to examine the motivation of secondary school students to learn physics and to report the validity and reliability of the study. The sample was 273 secondary school students from five high schools in Albania. The original questionnaire measures five motivation components: intrinsic motivation, self-determination, self-efficacy, career motivation, and grade motivation. The data collected from five high schools was analyzed and similar factor structures were found as in the original questionnaire. Based on the principal component analysis five dimensions for learning physics were found. The Cronbach's alpha reliability was found to be .894. Physics Motivation Questionnaire, the adopted version of SMQ-II, is a tool to assess secondary school students' motivation to learn physics.

Keywords: Physics, Secondary School Science, Newton's Laws of Motion, Motivation, Education, Gender, Science, Assessment.

1. Introduction and Literature Review

Stefan Hawking's father made him do chemistry because he thought there were no jobs for mathematicians while we wanted to study math and physics (Hawking, 2013). Career plans of students may be one of the important factors of their motivation. They can be also intrinsically motivated to learn and they may become scientist. Tegmark (2014) mentioned that physics is an ultimate adventure rather than making fascinating events boring "it helps us see more clearly, adding to the beauty and wonder of the world around us". In fact, making students feeling this way should be the goal of science courses since realizing the importance of science

courses will increase students' motivation to learn since motivation has positive effect on achievement (Singh, Granville, & Dika, 2002).

Gago et al. (2004) stated that, "student emotions, experiences, motivation and the relevance of the subject to their lives are more important recruitment factors than economic statistics".

There are so many studies on motivation expanding the knowledge on motivation, especially after 1990s research on motivation increased the available learning strategies (Alderman & Beyeler, 2008).

In earlier studies which are analyzing the learning processes focused on cognitive development where motivation was thought to be energy provider of cognitive development and it was not assumed to be relevant not only to cognitive development but also in the domain of physics education (Fischer & Horstendahl, 1997).

Motivation leads students to work hard and to achieve greater which may stem from personal interest or from praise and reward (Coşkun, 2015). As cited in Çetin-Dindar and Geban (2010) students' motivation to learn and learning outcomes are positively correlated as well as initiation or duration of behaviors (Zusho, Pintrich, & Coppalo, 2003; Jacobsen, Eggen, & Kauchak, 2002; Pintrich, Marx, & Boyle, 1993). Motivational tools and active learning environments should be developed (Çetin-Dindar & Geban, 2010).

As modern world is being shaped by and relays on science and technology, curriculum developers emphasizes the scientific literacy and the importance of motivation for scientific literate students (İlhan, Yıldırım, & Sadi Yılmaz, 2012).

For assessing students' motivation to learn physics, a questionnaire can be used. In order to evaluate students' motivation to learn physics the Physics Motivation Questionnaire II was adopted from Science Motivation Questionnaire II which has been developed by Glynn, Brickman, Armstrong, and Taasoobshirazi (2011). The aim of the study was to adapt and validate the Science Motivation Questionnaire II (SMQ-II) into Albanian as Physics Motivation Questionnaire (PMQ-II).

Social-Cognitive theory of Bandura (1991) explains learning by student characteristics, behaviors and interaction with environment. This theoretical frame implies that the learning becomes more meaningful when it is self regulated (İlhan et al., 2012). First version of Science Motivation questionnaire described self regulated learning composed of six components; intrinsic motivation, extrinsic motivation, goal orientation, self-determination, self-efficacy and assessment anxiety (Glynn, Taasoobshirazi, & Brickman, 2009). Later on Glynn et al. (2011) developed second version of SMQ. In this second version of SMQ it is stated that the students conceptualized some components of motivation differently where intrinsic motivation involved personal relevance, self efficacy involved assessment anxiety

and extrinsic motivation differentiated as grade motivation and career motivation (Glynn et al., 2011). The revised version, SMQ II has five components:

1. Intrinsic motivation (involves personal relevance)
2. Career motivation (differentiated from extrinsic motivation)
3. Self-determination
4. Self-efficacy (involves assessment anxiety)
5. Grade motivation (differentiated from extrinsic motivation)

2. Methodology

The methods section consists of three parts, which are instrument, translation, sample, and data analysis.

2.1.1. Instrument

Original SMQ-II was developed to measure students' motivation to learn science. Previously first version of SMQ and SMQ-II were translated and validated not only other languages (Çetin-Dindar & Geban, 2010; Reinfried, 2010) and also adopted to other disciplines like chemistry, biology and etc. (Dindar Çetin & Geban, 2015; Ekici, 2009). Adaptation of the test was made while physics word substituted for the word science. Each component is measured by five items. There are 25 items where 16 items from the first version and nine new items on a 5-point Likert-type scale. The response categories were "never", "rarely", "sometimes", "usually", and "always" (see appendix). The Cronbach's alpha reliability coefficient is 0.89, which means that at least 89% of the total score variance is due to true score variance.

2.1.2. Translation

In terms of validity, three independent bilingual researchers made Albanian translation individually then the inconsistencies were compared. Later on, back translation into English was made by other two researchers to check consistency. Before the final revision was administered to 273 high school students, the translated version is reviewed to check the face and content validity while administering to 17 high school students.

2.2. Sample

The sample of this study was 273 high school students from four different high school in Albania. The test was administered during physics courses to 139 female students, 132 male students, two students did not report gender, and it has taken around fifteen minutes.

Data Analysis

The data collected from high school students analyzed via SPSS 21.0 for Windows. Students' response were coded according to their response never (1), rarely (2), sometimes (3), often (4), or always (5). The score range between maximum 125 to minimum 25.

The reliability of the PMQ-II was analyzed by internal consistency which is assessed via Cronbach's alpha. For educational studies, the suggested alpha value is at least . 70 and preferably higher (Fraenkel & Wallen, 2003, pp. 168).

2.3. Analysis and Findings

The PMQ-II items were subjected to principal component analysis (PCA) the Kaiser-Meyer-Olkin value was .837, expressing the suitability of data for factor analysis, exceed the recommended value of 0.6 (Field, 2000). Additionally, Barlett's Test of Sphericity reach statistical significance supporting the factorability of the correlation matrix (=2955.401, df = 300, 0.000). The PCA revealed five components (factors) exceeding eigen-values 1, which were 7.593, 2.809, 2.199, 1.340, and 1.118 respectively.

The components were categorized with respect to the meanings of the items loaded as intrinsic motivation (6 items), selfdetermination (5 items), grade motivation (4 items), self-efficacy (6 items), and career motivation (4 items), respectively. Factor loadings for each of the components are given in

Table 1.

The reliability coefficient for the full questionnaire estimated by Cronbach's alpha was .894, indicating high internal consistency. The five factors explained a total of 60.232% of the variance, with component intrinsic explaining 30.372%, component self-determination explaining 11.234%, component grade motivation explaining 8.795%, component selfefficacy explaining 5.361%, and component career motivation explaining 4.471% (

The five components of PMQ-II are intrinsic motivation, self-determination, grade motivation, self-efficacy and career. According to DeVellis (2003) (as cited in Glynn et al., 2011), a coefficient above 0.80 is ''very good,''. The Cronbach's alpha of 25 items (α=.894) for the PMQ-II was very good. The Albanian adopted version of the PMQ-II's internal consistency (α=.894) is just a bit smaller than the English version of SMQ-II's internal consistency (α=0.92).

Table 2).

Discussion

The previous study SMQ-II (Glynn et al., 2011) with five components that is theoretically and statistically justified is consistent with the Physics Motivation questionnaire PMQ-II.

Table 1 - Exploratory Factor Analysis: Factor Loadings of Items

	Factors				
	1	2	3	4	5
Factor 1. Intrinsic motivation					
01. The physics I learn is relevant to my life.	.828				
03. Learning physics is interesting.	.821				
12. Learning physics makes my life more meaningful.	.820				
17. I am curious about discoveries in physics.	.804			.315	
19. I enjoy learning physics.	.769				
Factor 2. Self-determination					
22. I study hard to learn physics.		.849			
05. I put enough effort into learning physics.		.833			
16. I prepare well for physics tests and labs.		.705			
06. I use strategies to learn physics well.		.690			
11. I spend a lot of time learning physics.	.544	.308			
Factor 3. Grade motivation					
24. Scoring high on physics tests and labs matters to me.			.814		
20. I think about the grade I will get in physics.			.757		
04. Getting a good physics grade is important to me.			.726		
02. I like to do better than other students on physics tests.			.704		
08. It is important that I get a "10" in physics.			.434	.569	-.285
Factor 4. Self-efficacy					
09. I am confident I will do well on physics tests.				.700	
14. I am confident I will do well on physics labs and projects.	.278			.626	.279
21. I am sure I can understand physics.	.446			.626	
18. I believe I can earn a grade of “10” in physics.	.304		.251	.545	
15. I believe I can master physics knowledge and skills.	.258	.626		.321	
Factor 5. Career motivation					
07. Learning physics will help me get a good job.	.386	.365		.395	.284
25. I will use physics problem-solving skills in my career.			.288		.713
23. My career will involve physics.					.704

10. Knowing physics will give me a career advantage.		.540
13. Understanding physics will benefit me in my career.	.307	.406
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
Note. Only loadings above .25 are displayed.		

The five components of PMQ-II are intrinsic motivation, self-determination, grade motivation, self-efficacy and career. According to DeVellis (2003) (as cited in Glynn et al., 2011), a coefficient above 0.80 is ''very good,''. The Cronbach's alpha of 25 items (α=.894) for the PMQ-II was very good. The Albanian adopted version of the PMQ-II's internal consistency (α=.894) is just a bit smaller than the English version of SMQ-II's internal consistency (α=0.92).

Table 2 - Factor analysis scores for each component.

		Eigen Values	% Variance explained	% Cumulative Varience Explained
Components	Intrinsic motivation	7.592	30.372	30.372
	Self-determination	2.809	11.234	41.606
	Grade motivation	2.199	8.795	50.401
	Self-efficacy	1.340	5.361	55.762
	Career motivation	1.118	4.471	60.232
Total variance explained				60.232
Cronbach's alpha				0.894

Based on these findings, it can be interpreted that the adaptation of this questionnaire is successful because of showing satisfactory reliability and validity results and is appropriate to use PMQ-II in the Albanian culture to assess students' motivation to learn physics. Additionally, the similar versions of this questionnaire could be adapted to the other disciplines like chemistry, mathematics or biology.

It can be recommended that researchers, instructors, etc. can use to evaluate students' motivation to learn physics in secondary school courses.

According to Glynn et al. (2009) the questionnaire can also be used with "essays, interviews, case studies, and other qualitative methods to provide comprehensive insight into students' motivation to learn science".

The relationships between students' motivation and student characteristics (Lee, 2001), teacher characteristics (Lumpe, Haney, & Czerniak, 2000), and learning

methods (Krajcik & Blumenfeld, 2006) can be studied as a research tool (as cited in Glynn et al., 2011).

It can be recommended for the further studies, similar adaptations to other disciplines like chemistry, mathematics, and biology can be made just replacing physics word with the name of respective discipline.

Future studies in the field may use this adopted version of motivation questionnaire for the research regarding the gender differences on motivation to learn physics.

Bibliography

[1] Alderman, M. K., & Beyeler, J. (2008). Motivation in Preservice Teacher Education: Possibilities for Transfer of Learning. *Teaching Educational Psychology, 3*(2), n2.

[2] Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational behavior and human decision processes, 50*(2), 248-287.

[3] Çetin-Dindar, A., & Geban, Ö. (2010). The Turkish adaptation of the science motivation questionnaire. *Contemporary Science Education Research: Pre-Service and In Service Teacher Education*, 119-127.

[4] Coşkun, L. (2015). *Motivational Factors on Foreign Language Learning From Pedagogical Point Of View: A Case of Albanian Universities.* (Doctoral Degree), European University of Tirana, Tirana - Albania.

[5] Dindar Çetin, A., & Geban, Ö. (2015). Fen Bilimleri Motivasyon Ölçeğinin Türkçe'ye ve Kimya'ya Uyarlanması: Geçerlilik Çalışması. *Pegem Eğitim ve Öğretim Dergisi, 5*(1), 15-34.

[6] Ekici, G. (2009). Biyoloji Dersi Motivasyon Anketinin Türkçe'ye Uyarlanması. *Cagdas Egitim Dergisi*(365), 6-15.

[7] Fischer, H. E., & Horstendahl, M. (1997). Motivation and learning physics. *Research in Science Education, 27*(3), 411-424.

[8] Gago, J., Ziman, J., Caro, P., Constantinou, C., Davies, G., & Parchmann, I. (2004). Europe needs more scientists *Report by the High Level Group on Increasing Human Resources for Science and Technology in Europe*.

[9] Glynn, S. M., Brickman, P., Armstrong, N., & Taasoobshirazi, G. (2011). Science motivation questionnaire II: Validation with science majors and nonscience majors. *Journal of Research In Science Teaching, 48*(10), 1159-1176.

[10] Glynn, S. M., Taasoobshirazi, G., & Brickman, P. (2009). Science motivation questionnaire: Construct validation with nonscience majors. *Journal of Research In Science Teaching, 46*(2), 127-146.

[11] Hawking, S. (2013). Stephen Hawking Looks Back. In I. Flatow (Ed.), *Science Friday*.

[12] İlhan, N., Yıldırım, A., & Sadi Yılmaz, S. (2012). Chemistry Motivation Questionnaire: The Study of Validity and Reliability. *Mustafa Kemal University Journal of Social Sciences Institute, 9*(18), 297-310.

[13] Reinfried, S. (2010). Motivation To Learn Science And Cognitive Style. *Contemporary Science Education Research: Learning And Assessment*, 135-144.

[14] Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. *The journal of educational research, 95*(6), 323-332.

[15] Tegmark, M. (2014). *Our mathematical universe: my quest for the ultimate nature of reality*: Penguin UK.

Appendix - Physics Motivation Questionnaire II

Science Motivation Questionnaire II (SMQ-II) Albanian Language Version adopted as Physics Motivation Questionnaire II (PMQ-II) © 2011 Shawn M. Glynn, University of Georgia, USA

Physics Motivation Questionnaire / Pyetësor Motivues për Fizikën

Adopted by Ahmed Fatih Ersoy, Epoka University, Tirana - Albania

In order to better understand what you think and feel about your physics courses, please respond to each of the following statements from the perspective of: "**When I am in a physics course…**"

Për të kuptuar më mirë se çfarë mendoni dhe ndjeni rreth lëndës së fizikës në shkollë, ju lutem përgjigjuni secilit nga pohimet e mëposhtme nga këndvështrimi: "**Kur jam në një orë mësimi Fizike…**"

Response Scale:

O Never O Rarely O Sometimes O Usually O Always

O Kurrë O Rrallëherë O Ndonjëherë O Zakonisht O Gjithmonë

01. The physics I learn is relevant to my life.

01. Fizika që mësoj ka lidhje me jetën time

02. I like to do better than other students on physics tests.

02. Më pëlqen të dal më mirë se nxënësit e tjerë në testet e fizikës.

03. Learning physics is interesting.

03. Të mësuarit e fizikës është interesante.

04. Getting a good physics grade is important to me.

04. Për mua është e rëndësishme të marr një notë të mirë në Fizikë.

05. I put enough effort into learning physics.

05. Përpiqem mjaftueshëm të mësoj Fizikën.

06. I use strategies to learn physics well.

06. Përdor strategji për të mësuar mirë Fizikën.
07. Learning physics will help me get a good job.
07. Të mësuarit e Fizikës do të më ndihmojë të gjej një punë të mirë.
08. It is important that I get a "10" in physics.
08. Fizika që mësoj ka përputhet me synimet e mia
09. I am confident I will do well on physics tests.
09. Jam i bindur se do dal mirë në testet e Fizikës.
10. Knowing physics will give me a career advantage.
10. Njohuritë mbi fizikë më mundësojnë epërsi në karrierë.
11. I spend a lot of time learning physics.
11. Shpenzoj shumë kohë duke mësuar Fizikë.
12. Learning physics makes my life more meaningful.
12. Të mësuarit e Fizikës e bën jetën time më kuptimplotë.
13. Understanding physics will benefit me in my career.
13. Të kuptuarit e Fizikës do të më sjelli përfitime në karrierën time.
14. I am confident I will do well on physics labs and projects.
14. Jam i bindur se do të dal mirë në laboratorët dhe projektet e Fizikës.
15. I believe I can master physics knowledge and skills.
15. Besoj se mund t'i zotëroj njohuritë dhe aftësitë e Fizikës.
16. I prepare well for physics tests and labs.
16. Përgatitem mirë për testet dhe punën laboratorike të Fizikës.
17. I am curious about discoveries in physics.
17. Jam kurioz rreth zbulimeve në Fizikë.
18. I believe I can earn a grade of "10" in physics.
18. Besoj se mund të marr 10 në Fizikë.
19. I enjoy learning physics.
19. Më pëlqen të mësoj Fizikë
20. I think about the grade I will get in physics.
20. Mendoj për notën që do të marr në Fizikë.

21. I am sure I can understand physics.

21. Jam i sigurtë që mund ta kuptoj Fizikën.

22. I study hard to learn physics.

22. Studioj shumë për të mësuar Fizikë.

23. My career will involve physics.

23. Karriera ime do të ketë të përfshijë Fizikën.

24. Scoring high on physics tests and labs matters to me.

24. Notat e mira në testet dhe laboratorët e Fizikës kanë rëndësi për mua.

25. I will use physics problem-solving skills in my career.

25. Aftësitë e mia për zgjidhjen e problemeve të Fizikës do t'i përdor në karrierën time.

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