

THE INFLUENCE OF TRANSFORMATIONAL LEADERSHIP ON NEW MEDIA LITERACY ABILITIES OF ENGINEERING PROFILE GYMNASIUM STUDENTS

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Abstract. *The article deals with the role of transformational leadership of engineering profile gymnasium (EPG) students on their new media literacy. New media literacy covers a complex of socio-cultural, emotional and technical abilities. The operationalization of the concept of new media literacy in this study is viewed like the interaction of the two continuums: the continuum from consuming media (how to access and understand content) towards producing media (creating and sharing of media content); the continuum from functional to critical media. The study focuses on the collective creation of innovative media, social interaction and transformational leadership of engineering profile gymnasium students. The aim of the article is to explore how engineering profile gymnasium students' transformational leadership influences to their new media literacy abilities. New media literacy (NML) inventory was used to assess the engineering profile gymnasium students' new media literacy abilities. Multifactor Leadership Questionnaire (MLQ) was used in the research of leadership expression. The collected data were analysed using path analysis (PA) and confirmatory factor analysis (CFA). The findings confirm that the transformational leadership statistically significantly influences new media literacy abilities: critical consuming, functional prosuming, and critical presuming abilities of engineering profile gymnasium students.*

Keywords: *new media literacy ability; transformational leadership.*

Introduction

The rapid development of technology changes not only the humans' life but also the school life. "It goes without saying that new media has a very important role in education" (Kara et al., 2018, p.2). Scholars state that shift from printing media (books, newspaper), traditional media (telephone, film, radio, television) toward the digital media including computer, internet and smart phone highlights the importance of new capabilities to participate in the new media education (Simons et al., 2017). These capabilities can be conceptualized as new media literacy.

The leaners in social media use five practices of transformational leadership: modeling the way of activity, inspiring a shared vision, challenging the process,

enable others to act, and encouraging the others (Cummins, 2007; Kouzes & Posner, 2007). The role of transformational leadership on media literacy abilities cannot be understood in isolation from the learning context: one relationship between these components may be in social studies and the other in science. This study aims to contribute to this body of literature by analyzing the role of transformational leadership on new media literacy abilities of engineering profile gymnasium (EPG) students. The discussed situation highlights the scientific problem, which is formulated as a question: how does transformational leadership influence new media literacy abilities of EPG students?

The object of the research is new media literacy abilities of EPG students.

The aim of the research is to disclose the influence of transformational leadership of EPG students for their media literacy abilities.

Literature review

The shift from the traditional media towards the digital media changed the attitude to the media literacy concept. Firstly, the term media literacy “has been defined as including classic literacy, audiovisual literacy, digital literacy, and information literacy” (Lee et al., 2015, p. 85). In the world of digital media, the concept became broader and “involves essential process skills, including access, analysis, evaluation, critique, production and/or participation with media content” (Lee et al., 2015, p. 85). The sociocultural facets are emphasized in a commonly used new media literacy definition, which state that new media literacy is “a set of cultural competencies and social skills that young people need in the new media landscape” (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2009, p. 3).

Scholars refined the content and structure of the media literacy describing four components of new media literacy: functional consuming (FC); functional prosuming (FP), critical consuming (CC), and critical presuming (CP) literacies (Chen, Wu, & Wang, 2011; Lin, Li, Deng, & Lee, 2013). Lee et al. (2015) state that “we limited functional consuming to technical skill and textual understanding of media contents, whereas critical consuming refers to the ability to read the embedded ideology and social values of media messages” (Lee et al., 2015, p.87). FC component encompasses technical ability necessary for consuming media contents, and ability to grasp the meaning of the media contents at a textual level. FP component consists of abilities necessary to create media contents, of abilities to disseminate information, and of abilities to mix media contents. CC component includes abilities to deconstruct media messages on its own, to remix media content in a different manner and ability to criticize media contents. CP component encompasses ability to participate interactively and critically in new media environments, “to create media contents especially with a critical

understanding of embedded socio-cultural values and ideology issues” (Lee et al., 2015, p.86).

Prosuming literacy (FP and CP) involves the abilities of sociocultural content that manifest themselves by participating in the creation of the media content, by interpretation of the media content during their media participation activities. Learners can enable others to act by fostering collaboration in using social media, by attracting followers and developing teams of followers.

Methodology

The research methodology. The study is focused on social cognitive theory. This theory states that learners functioning is the product of personal factors (cognition, affect); behavior, and environmental influences (Bandura, 2001). Social cognitive theory has four cornerstones that play an important role in media environment: human agency, human capabilities, vicarious learning, and self-efficacy (Bandura, 2001; Khang et al., 2014). New media change all cornerstones: “new media may be better suited to meet some of the challenges of testing social cognitive theory, such as portraying a range of behavioral reinforcements, increasing identification between the model and the target audience, and building self-efficacy” (Pajares et al., 2009, p.20). Social media provide a base to explore causation between social determinants and social media consumption behaviors in our daily routines (Khang et al., 2014).

Method of research. The study was conducted in Lithuania. Gymnasiums have the right to choose a training profile in Lithuania. There are engineering profile gymnasiums (EPG) in the country that provide students with a deeper knowledge of exact and natural sciences, help prepare students for technological and physical sciences, and allow students to learn programming and new technology. The education in the EPG is based on the principles of reasonableness, pragmatism and applicability, creativity and innovation, holism, coherence and sustainability, individualized and differentiated education, communication and cooperation. EPG promote the leadership, the creativity, and an initiative of students. EPG educate the students capable of generating and implementing new ideas, adapting quickly and effectively to changing external conditions, successfully developing careers, and combining engineering, subject and generic competencies to make decisions. A lot of EPG from Lithuania cooperate with Vilnius Gediminas Technical University, the students of EPG use this university's training base, laboratories and their equipment. The influence of transformational leadership of EPG students from Lithuania was disclosed by testing four hypotheses on path analysis:

H₁. The transformational leadership directly affects EPG students' FC media ability.

- H₂. The transformational leadership directly affects EPG students' FP media ability.
- H₃. The transformational leadership directly affects EPG students' CC media ability.
- H₄. The transformational leadership directly affects EPG students' CP media ability.

The instrument of the quantitative research. Multifactor Leadership Questionnaire (MLQ) was used in the research of leadership expression. Multifactor Leadership Questionnaire, devised by Bass and Avolio (1990), is meant for the identification of transformational, transactional and passive leadership styles. The current article explores exclusively the transformational leadership style.

New media literacy (NML) inventory was used to assess the engineering profile gymnasium students' new media literacy abilities. New media literacy (NML) questionnaire was created on the basis of New Media Literacy Scale (NMLS). NMLS is validated for university students (Koc & Barut, 2016). We simplified this questionnaire and applied it to gymnasium students. From the test results of the validity of EPG students new media literacy variable using Pearson's Product Moment Correlation with value ($df = n-2$) $df = 326-2 = 324$ at the 5% significance level is $r_{table} = 0.113$. All items statement for new media literacy variable r -value count was greater than the r_{table} . It concluded that all items statements were valid. The results of reliability test questionnaire showed that the instrument used was reliable. Cronbach's Alpha was greater than the critical number that has been set at ($0.72 > 0.6$).

The sample and sampling of the quantitative research. The research sample (the confidence interval being 5%, and the confidence level being 95%) was reliable as it involved 324 school students. The total population was 140112 gymnasium students (Lithuanian education in numbers, 2018). Therefore, the probability (confidence level) is 95%, so the obtained data can shift only by 5% from the population parameters (confidence interval). The research clusters were the largest EPG of Lithuania. The classes of EPG were selected on the basis of probability cluster sampling and all the learners of the selected classes were tested.

Results

This research aimed to measure the influence of transformational leadership on EGP students' media literacy. For this purpose, simple linear regression and path analysis procedure was chosen. Simple linear regression allows summarizing and studying relationships between two continuous (quantitative) variables. The path analysis procedure was chosen in order to test four hypotheses about the

influence of transformational leadership on EPG students’ media literacy components: FC; FP; CC; CP. The variables of all components were directly observable.

When performing a regression analysis, the normality test of Kolmogorov-Smirnov was used in this study (Table 1). This test was conducted to determine if the data were normally distributed. The results of Kolmogorov-Smirnov test show that the data of EPG students’ media literacy were normally distributed: ($p_{FC} = 0.123 > 0.05$), ($p_{FP} = 0.442 > 0.05$), ($p_{CC} = 0.116 > 0.05$), ($p_{CP} = 0.379 > 0.05$) (Table 1). The normality of the transformational leadership variables was also confirmed by the Kolmogorov-Smirnov test ($p_{TL} = 0.159 > 0.05$) (Table 2).

Table 1 Results of the One-Sample Kolmogorov-Smirnov Normality Test of media literacy abilities of EPG students

		FC	CC	FP	CP
N		324	324	324	324
Normal Parameters ^{a,b}	Mean	79,7235	79,2082	83,7788	71,6129
	Std. Deviation	8,50863	11,01511	12,11388	12,98323
Most Extreme Differences	Absolute	,106	,078	,107	,082
	Positive	,101	,078	,090	,082
	Negative	-,106	-,072	-,107	-,065
Kolmogorov-Smirnov Z		1,181	,865	1,193	,910
Asymp. Sig. (2-tailed)		,123	,442	,116	,379
a. Test distribution is Normal.					
b. Calculated from data.					

Table 2 Results of the One-Sample Kolmogorov-Smirnov Normality Test of transformational leadership of EPG students

One-Sample Kolmogorov-Smirnov Test		
N	324	
Normal Parameters ^{a,b}	Mean	61,7339
	Std. Deviation	12,81187
Most Extreme Differences	Absolute	,101
	Positive	,101
	Negative	-,075
Kolmogorov-Smirnov Z	1,125	
Asymp. Sig. (2-tailed)	,159	
a. Test distribution is Normal.		
b. Calculated from data.		

A simple linear regression was used to predict EGP student’s media literacy based on their transformational leadership. A significant regression equation was found ($F(1,122) = 48.966, p < .001$), with an R^2 of .286. The coefficient of determination (R^2) indicates that 28.6% of the variation in new media literacy can

be explained by the model containing only transformational leadership. This coefficient is sufficient, so the predictions from the regression equation are fairly reliable. The coefficient of students' motivation for learning science was 0.390 and the constant number was 54.526. Based on these data, the regression line equation can be written as follows:

$$\text{Media literacy (y)} = 54.5264 + 0.390 (\text{Transformational leadership}) (x) \quad (1)$$

Table 3 Simple linear regression analysis: motivation for learning science and basic psychological needs

Model		Unstandardized Coefficients		Standardized Coefficients		95.0% Confidence Interval for B		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	54.526	3.511		15.530	.000	47.576	61.477
	Transform- leadership	.390	.056	.535	6.998	.000	.279	.500

a. Dependent Variable: Media literacy

The equation (1) shows that if the EPG students' transformational leadership increases by 1 unit, then students' media literacy will increase by 0.390 units. Therefore, the EGP students' transformational leadership has a positive influence on their media literacy (Table 3).

Using path analysis procedure with AMOS 17, we tested the theoretical model of EPG students' transformational leadership (Leadership in figure 1) and media literacy components: FC, FP, CC, CP (Figure 1).

According Bentler (1990), the measurement model fits the data well if:

- χ^2/df is less than 5, describes the distance between model and data, but depends on sample size;
- RMSEA (Root Mean Square Error of Approximation) is less than .08, describes how much error or unexplained variance remain after fitting model;
- NFI (Normed Fit Index) is larger than .80;
- IFI (Incremental Fit Index) exceed .90;
- TLI (Non-Normed Fit Index NNFI, also known as TLI) exceed .90, describe the 'power' of model compared to 'the situation without the model';
- CFI (Comparative Fit Index) exceed .90, describe the 'power' of model compared to 'the situation without the model' (Bentler, 1990).

Table 4 The fitness of items of EPG students’ transformational leadership and media literacy

	Absolute fit index			Relative fit index		
	χ^2/df	RMSEA	GFI	IFI	TLI	CFI
Assumed model	2.611	.030	.959	0.951	0.943	0.949
Acceptance value	1-5	<.08	>.80	>.90	>.90	>.90

The main purpose of this study was to reveal the *role of transformational leadership of EPG students on their new media literacy*. We examined direct effects for significance and magnitudes (Table 5). We found that all direct paths were significant in the final model (Table 5). The most significant paths’ coefficients in the model was: the transformational leadership (leader) effects on EPG students’ CC abilities ($\beta = 0.390$); the transformational leadership (leader) effects on EPG students’ FP abilities ($\beta = .374$). The least significant coefficient was found of EPG students’ transformational leadership on their FC ability ($\beta = .187$).

Table 5 The hypothesis testing of EPG students’ transformational leadership and media literacy: direct effects

Hypothesis	Paths	Paths coefficients	P	R ²	Results	Effect
H1. The transformational leadership directly affects EPG students’ FC media ability	Leader→ FC	.187	.001	.080	Support	Direct
H2. The transformational leadership directly affects EPG students’ FP media ability	Leader → FP	.374	***	.307	Support	Direct
H3. The transformational leadership directly affects EPG students’ CC media ability	Leader → CC	.390	***	.407	Support	Direct
H4. The transformational leadership directly affects EPG students’ CP media ability	Leader→ CP	.292	***	.432	Support	Direct

The explanatory power of the EPG students’ innovative behavior model (Figure 1; Table 5) was assessed by calculating the coefficient of determination (R²) of media literacy abilities: FC; FP; CC; CP (Table 5). The data indicate that

40.7% of the variation in EPG students' CC media ability can be accounted by their transformational leadership. Also, 43.2% of the variance of EPG students' CP media ability can be accounted by their transformational leadership. The smallest R^2 value was detected checking the hypothesis how the transformational leadership affects EPG students' FC media ability ($R^2 = 0.080$). It means that only 8.0% of the variance of EPG students' FC media ability can be accounted by their transformational leadership (Figure 1; Table 5).

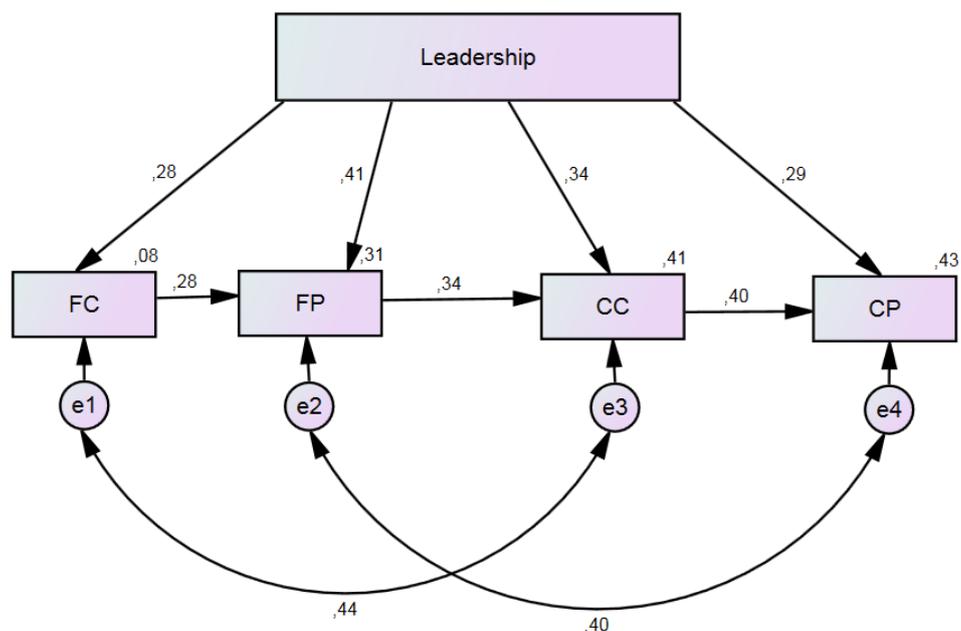


Figure 1 The hypothesis testing model of EPG students transformational leadership and media literacy: standardized Regression Weights

Discussion

At the time without digital media Burns (1978) stated that “leadership is one the most observed and least understood phenomena on earth” (Burns, 1978, p.1-2). Bennis (2007) simplested the problem of the leadership concept using “a tripod: a leader, followers, and common goal they want to achieve” (Bennis, 2007, p.3). We analysed the phenomenon of transformational leadership of EPG students in the time of digital media by tripod aspect: “transformational leadership is the process whereby a person engages with others and creates a connection that raises the level of motivation and morality in both the leader and the follower” (Nourthouse, 2013, p.186). The objective of this study was to determine the influence of transformational leadership on new media literacy of EPG students. In line with prior findings (Khan & Khan, 2019), we showed that transformational

leadership positively influenced new media literacy abilities of EPG students. Scholars (Khan & Khan, 2019) analyzed the relationship of transformational leadership and employees' task performance. We analyzed the relationship between transformational leadership and media literacy of school students (not of employees) and reached the similar result.

We also focused specifically on the components (FC, FP, CC, and CP) of new media literacy abilities by analyzing the influence of transformational leadership. We found that transformational leadership statistically significantly influences both components of prosuming (FP, and CP). Scholars (Koc & Barut, 2016) noticed that the activities of the prosumer are more related to tripod of leadership (a leader, the followers, and common goal they want to achieve) as the activities of consumer.

The limitation of our study is based on operationalization of the prosuming (FC, and CP) literacy concept. Scholars analyzed FC and CP structure even under a more detail level (Lin et al., 2013). They distinguished three details in FC structure (prosuming skill, distribution, and production), and two details in CP structure (participation and creation) (Lin et al., 2013). We didn't examine the influence of transformational leadership on the FC and CP details but rather on FC and CP themselves. The analysis using the details of FC (prosuming skill, distribution, and production) and CP (participation and creation) could be the object of further studies.

Conclusions

Linear regression analysis reveals the influence of transformational leadership on EPG students' new media literacy abilities. If the EPG students' transformational leadership increases by 1 unit, then students' new media literacy will increase by 0.390 units. Therefore, the EGP students' transformational leadership has a positive influence on their new media literacy.

Path analysis reveals the influence of transformational leadership on EPG students' new media literacy components: FC, FP, CC, and CP. The highest effect of transformational leadership occurs on CC component, the least effect – on FC component of new media literacy abilities of EPG students.

References

- Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, 3(3), 265-299. DOI:10.1207/S1532785XMEP0303_03
- Bass, B.M., & Avolio, B.J. (1990). *Multifactor Leadership Questionnaire*. Palo Alto, CA: Consulting Psychologists Press.
- Bennis, W. (2007). The challenges of leadership in the modern world: Introduction to the special issue. *American Psychologist*, 62(1), 2-5.

- Burns, J. (1978). *Leadership*. New York, NY: Harper & Row.
- Chen, D.-T., Wu, J., & Wang, Y.-M. (2011). Unpacking new media literacy. *Journal on Systemics, Cybernetics and Informatics*, 9(2), 84-88.
- Jenkins, H., Purushotma, R., Clinton, K., Weigel, M., & Robison, A. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century*. Cambridge, MA: MIT Press.
- Kara, M., Caner, S., Günay Gökben, A., Cengiz, C., İşgör Şimşek, E., & Yıldırım, S. (2018). Validation of an instrument for preservice teachers and an investigation of their new media literacy. *Journal of Educational Computing Research*, 56(7), 1005-1029. DOI:10.1177/0735633117731380
- Khan, A.N., Ali, A., Khan, N.A., & Jehan, N. (2019). A study of relationship between Transformational leadership and task performance: The Role of social media and affective organizational commitment. *International Journal of Business Information Systems*, 31(4), 499-516. DOI: 10.1504/IJBIS.2019.10023057.
- Khang, H., Han, E-K., & Ki, E-J. (2014). Exploring influential social cognitive determinants of social media use. *Computers in Human Behavior*, 36, 48-55.
- Koc, M., & Barut, E. (2016). Development and validation of new media literacy scale (NMLS) for university students. *Computers in Human Behavior*, 63, 834-843. DOI: 10.1016/j.chb.2016.06.035
- Lee, L., Chen, D., Li, J., & Lin, T. (2015). Understanding new media literacy: The development of a measuring instrument. *Computers & Education*, 85, 84-93. DOI: 10.1016/j.compedu.2015.02.006
- Lin, T.-B., Li, J.-Y., Deng, F., & Lee, L. (2013). Understanding new media literacy: an explorative theoretical framework. *Journal of Educational Technology & Society*, 16(4), 160-170.
- Lithuanian education in numbers (2018). [In Lithuanian: Lietuvos švietimas skaičiais]. Vilnius: SCA.
- Northouse, P. (2013). *Leadership Theory and Practice*. Sage, Thousand Oaks, CA.
- Pajares, F., Prestin, A., Chen, J.A., & Nabi, R.L. (2009). *Social Cognitive Theory and Mass Media Effects*. Book Chapters. 3. Retrieved from <https://scholarworks.wm.edu/bookchapters/3>
- Simons, M., Meeus, W., & T'Sas, J. (2017). Measuring media literacy for media education: Development of a questionnaire for teachers' competencies. *Journal of Media Literacy Education*, 9(1), 99-115. DOI:10.23860/JMLE-2017-9-1-7