



JOURNAL
OF • BALTIC
SCIENCE
EDUCATION

ISSN 1648-3898

Abstract. *The rapid expansion of social networking websites is raising several issues regarding the influence on the individual and social behavior of users. It is without doubt, that social networking websites are a phenomenon of a contemporary society, which has to be explored in various aspects. It is only because SNW are becoming more and more important for the whole society, especially for the youth, after all, they undoubtedly change the world. Their penetration is observed in various society life spheres. Education is not an exception. It can be stated, that SNW change educational processes. However, the main question is: how change? Can they harm, or maybe on the contrary – help in terms of education. Having carried out empiric research, a hierarchical and multidimensional measurement model was developed to explore the negative effects of these websites. The model has been tested on one sample and cross validated on another sample. It has been stated, that SNW negative effects is a multidimensional construct, having several facets that describe distinct aspects.*

Key words: *measurement models, science education, social networking websites, university students.*

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A MULTIDIMENSIONAL MODEL FOR THE EXPLORATION OF NEGATIVE EFFECTS OF SOCIAL NETWORKING WEBSITES AS PERCEIVED BY STUDENTS

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Introduction

Social networking websites are continuously expanding and changing in order to satisfy the various needs of their users. Their popularity is constantly growing. However, it does not mean, that the usage of SNW is only a positive phenomenon. Possible negative aspects of this phenomenon are more often discussed in various layers of society. It is quite natural in this sense, that every phenomenon has both positive and negative sides. Researchers draw attention to the fact, that real-life networking cannot replace virtual networking on the Internet (Romiszowski, 2009), thus it is necessary to think about proper design in terms of usability and proper surveillance of such networks. The research studies of the latest years draw attention to various type of negative aspects: psychological, behavior changes (Buffardi, Campbell, 2008; Braun, 2013), information distribution, management and usage problems (Hugl, 2011), personal information safety (Kist, 2008) and other. Safety risks should be mentioned as a very negative aspect (e.g., such as sexual predators who target minors and cyber bullies) (Brady, 2008). Thus, several mentioned aspects obviously show, that the use of SNW has lots of negative sides – from purely psychological to technological, social, and even to economic outcomes. SNW spread even more “entangles” the internet and other ICT users into virtual world, increases certain addictions. After all, negative outcomes are different; their expression among different age and even sex consumers is different. Everyday use of SNW can become a hardly controlled and involuntary habit. The final outcome of this is the use of SNW not according to the need, but because of the formed habit. Active participants in social networks spend the biggest part of their time, „borrowing” it from sleep, sport, from communication in real



world and so on. Children and teenagers, spending the majority of their time in virtual space, don't use it up for the improvement of real communication skills and learning activities either. The survey of 15-74 year-old Lithuanian citizens, carried out on the initiative of research agency RAIT in 2011 showed, that 48.8% of that age group country citizens have already registered in social networks. And more than 34% of respondents asserted to be visiting the most popular social network in Lithuania "Facebook" (<http://www.veidas.lt/socialiniai-tinklai-prarasto-laiko-beieskant>).

Thus, it is unreal to expect, that the use of social networking websites will decrease or they completely will not be used. In terms of education, it is much more important to find a balance between ordinary instruments used in educational process and devices based on the newest 21st century technologies. The other aspect is to constantly observe the negative phenomena and find ways how to neutralize or at least to significantly decrease possible negative effect. From this standpoint, the research of possible negative effects using SNW is urgent.

In a recent study, Lamanuskas et al. (2012) presented the results of a survey to ascertain how Lithuanian university students use social networking websites, how they value them, what opinion they have about various social networking websites, and what they know about them.

The goal of this study is to further analyze the survey data collected in Lithuania in order to explore the negative effects of these kinds of websites. We hypothesized that the negative effects is a multidimensional construct having several facets that describe distinct aspects.

Related Work

A recent study showed that university students highly value social networking websites (Lamanuskas et al, 2013). SNW can be useful for communication and leisure time, finding friends, communicating with them, acquiring knowledge and getting the newest information from the whole world.

Analyzing SNW usage questions in natural science education it is necessary to notice, that in the latest years the attention is mostly concentrated to positive usability aspects, practically not analyzing possible negative effects. It is understandable, because it is a conditionally new phenomenon in educational practice. In fact, a lot of research studies only draw attention, that negative effects are plausible; however they do not analyze them more exhaustively. Rapid SNW change is another important aspect, which is practically not discussed. Even such networks as Facebook, Google+ and others are constantly being improved, functional supply is expanding. Therefore, to analyze only generally the use of such networking websites is not sensible. Some functions offered by such networking websites can be very effective in terms of education, and the other quite the opposite. It is natural, that a very big part of scientific studies are devoted to one of the most well-known networking websites – Facebook (Bosch, 2009; Mazman, & Usluel, 2010; Hsu-Wan Chen, 2010; Kirschner, & Karpinski, 2010; Rambe, 2012; Irwin, Ball, Desbrow, & Leveritt, 2012). Taiwanese researchers accentuate, that using social networking in science teaching, useful resources are able to be shared and updated in a collaborative way (Hsu-Wan Chen, 2010). Palestinian researchers state, that SNW are a perfect instrument seeking to increase pupils' interest in natural sciences, to expand natural science literacy (Battrawi, Muhtaseb, 2012). However, they also notice, that SNW integration with the other recourses devoted to natural science education, remains problematic. On the other hand, the authors draw attention that the problem how to ensure the quality of the posted information remains topical and has to be analyzed exhaustively. Australian researchers, having analyzed facebook usage in the university study process, acknowledge this networking website as a proper educational instrument, however express a doubt, that it is still unclear if and how *Facebook* can enhance student learning outcomes (Irwin, Ball, Desbrow, & Leveritt, 2012). Speaking in a wider context, natural science literacy of the society is very important as well. SNW give a lot of this field information in various formats – visual material, forums, discussions and so on. One of the main drawbacks mentioned by the researchers is enlisting non-expert citizens in scientific debate that may represent inaccurate or biased representations of knowledge, and other issues (Scalone, 2011). Representing closer relationship between science and society, especially supplying society with the newest science knowledge, the researchers acknowledge



SNW significance and advantages, but also draw attention to such moments as certain financial and time investments (Racaniello, 2010). This can be interpreted as indirect SNW use drawbacks in natural science education. Generally speaking, privacy, real friendship, taking up time and miscommunication are the most important challenges facing education through the social networking (Zaidieh, 2012). Moreover, some researchers express a very negative position in respect of SNW, asserting, that they could ruin the future of teenagers and children and it had a very bad impact on education (Tariq, Mehboob, Khan, & Ullah, 2012). It is obvious, that cultural differences of the countries can determine such point of view as well.

It is fairly obvious, that the use of SNW has negative moments as well, which are not analyzed exhaustively. This can be clearly seen from the accomplished research results. (Wilson, Fornasier, White, 2010). Speaking about the cognitive ability development, SNW positive influence is doubtful (Alloway, Horton, Alloway, Dawson, 2013).

Nevertheless, in spite of existing both known and unknown negative effects, the use of SNW, teaching natural science subjects, is inevitable. Most SNW are perfectly integrated with the other ICT and fit well both in comprehensive school and university studies. The researchers emphasize, that young people must be educated to participate responsibly, ethically, and safely, because in this way their digital citizenship is being developed (Wang, Shiang-Kwei, Hsu Hui-Yin, Green, 2013).

Research Model

In this study, a multidimensional and hierarchical model measuring the negative effects of social networking websites is proposed, as shown in Figure 1.

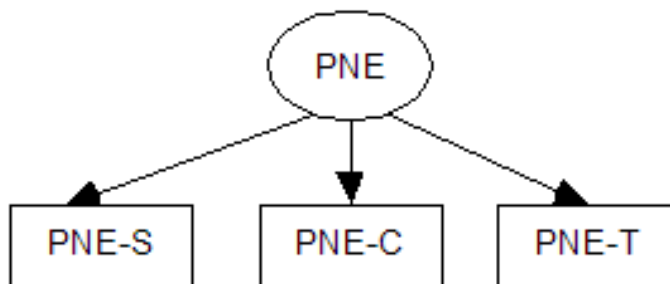


Figure 1: The research model.

This model describes three dimensions of the construct PNE (Perceived Negative Effects) which was conceptualized as a second order construct. Each dimension (distinct aspect) was conceptualized as a first order construct.

PNE-S refers to the negative social effects of these websites: distract people from reality, estrangement, dehumanize the society, encourage people estrangement, encourage young people to suicide (Reid, 2009; Junco, 2011; Meintel, 2012).

PNE-C refers to the negative effects of the communication in virtual environment: sharing personal information with unknown people, less socialization, and less direct relations (Krakovsky, 2004; Perkins, 2008).

PNE-T refers to the negative effects on teenagers; behavior, health, and ability to concentrate (Pociūtė, Krancaitė, 2012; Forest, Wood, 2012).

The questionnaire items measuring the usefulness of social networks are detailed in Appendix 1.



Research Methodology

Samples and Data Analysis

In this study two independent samples were analyzed. Data from the first sample was used for establishing the factor structure and for scale testing. Data from the second sample was used to cross-validate the structure derived from the first sample.

The 11 items from the questionnaire were positively phrased and measured on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The data was analyzed with SPSS 16.0 for Windows, according to the recommendations from the literature (Hair et al., 2006).

The first sample consists of 202 university students from technical faculties. After dropping a response with excessive missing data, 201 usable responses were obtained (response rate 99,5%).

Then the sample was examined for the presence of outliers. Only two distinct univariate outliers with z-scores of 3.35 were identified (no multivariate outliers).

Also the normality of each of the 11 variables was investigated in terms of skewness and kurtosis. With one exception, the values were all within the robustness threshold [-1, +1] for normality (Hair et al., 2006). Mean scores ranged from 2.00 to 3.51, with standard deviations from 0.77 to 1.04.

The working sample has 201 observations from which 163 males (81.1%) and 38 females (18.9%). Most respondents have previous experience with social networks.

The second sample comes from science education faculties. 169 questionnaires were returned. After dropping responses from incomplete questionnaires and those with excessive missing data, 163 usable responses were obtained (response rate 96.4%).

Three distinct univariate outliers and four multivariate outliers above the critical value were identified. After examining the data and carrying out several verification tests and analysis of results, one case was eliminated.

The data were investigated in terms of its skewness and kurtosis. With two exceptions, the values were all within the robustness threshold [-1, +1] for normality as suggested by Hair et al. (2006). All mean scores are greater than 2.0, with a range of 2.43–3.61 and the standard deviations ranged from 0.61 to 0.99.

The working sample has 162 observations from which 20 males (12.3%) and 142 females (87.7%). Most respondents have previous experience with social networks. The size of each sample is acceptable, according to the literature (Hair et al., 2006).

Analytical Procedures

In order to assess the proposed scale, a confirmatory factor analysis (CFA) using structural equation modeling (SEM) approach was conducted. The models were analyzed using the AMOS 7.0 software using a covariance matrix as input and maximum likelihood estimation method. Each construct was modeled as a reflective construct accounting for its indicators.

To analyze the measurement models and assess whether a second-order is plausible, various fit indices can be compared (Koufteros et al., 2009). The overall fit of a model can be tested by using the chi-square statistic. Although the chi-square (χ^2) statistic provides the best inferential test of overall model fit, it has been found sensitive to sample size and normality. Consequently, it is necessary to rely on other goodness of fit indices (Byrne, 2001). The following goodness-of-fit measures were used in this study (Hu & Bentler, 1999): normed chi-square (χ^2/df), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA) .

The next step was to assess the convergent and discriminant validity (Koufteros et al., 2009). Convergent validity can be assessed by examining the loading and their statistical significance through t-values, the item reliability, the construct reliability (composite reliability), and the average variance extracted. To be considered adequate, the factor loadings of all standardized items should be greater than 0.50, ideally exceed 0.7 and t-values greater than $|2|$ at 0.05 level. Item reliability



indicates the amount of variance in an item due to the underlying construct rather than error and it should be greater than 0.50. The composite reliability (CR) measures the internal consistency on the indicators measuring given construct and should be at least 0.70 or 0.60 (Hair et al., 2006). The average variance extracted (AVE) measures the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error and it should be greater than 0.50 (Fornell & Larcker, 1981).

Within the context of higher-order modeling, the first-order factors are expected to be highly correlated. When constructs are highly correlated, discriminant validity may be difficult to support (Koufteros et al., 2009).

Research Results

Study 1 (N=201)

In this study two alternative measurement models were tested. The first model (M1) hypothesizes three correlated first-order factors, as shown in Figure 2. The second model (M2) includes one second-order construct and three first-order factors with corresponding indicators, as shown in Figure 3.

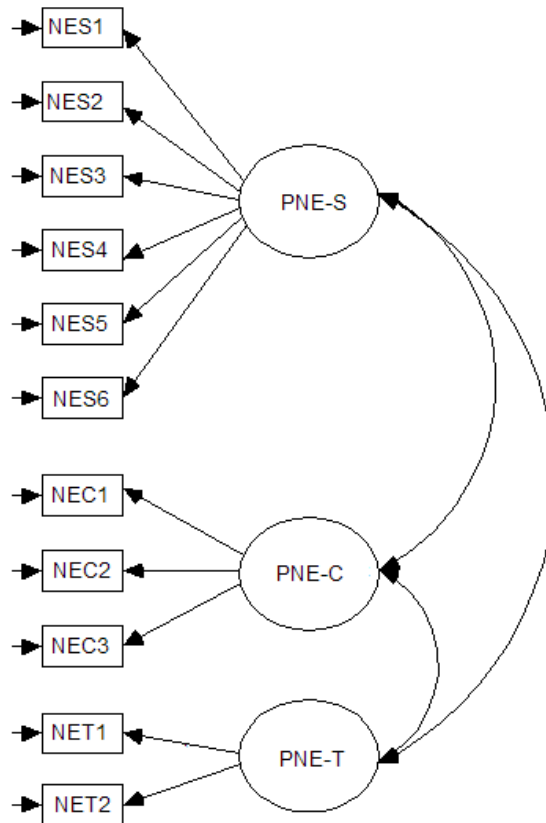


Figure 2: Three first-order correlated factors (M1).

The results for Model M1 indicate an acceptable level of fit of the proposed model with these data ($\chi^2=52.268$, $df=41$, $p=0.112$) and other indices indicated a good fit with $\chi^2/df=1.275$, $TLI=0.969$, $CFI=0.977$, $SRMR=0.046$, $RMSEA=0.037$. The examination of the standardized residuals values of the covariance matrix has shown that these don't exceed the value of $|2.58|$, and there is no need for re-



specification. Also, the inspection of the modification indices and the completely standard expected change has shown that it does not appear to be a reason for re-specification.

The correlations between first-order factors are high, with values ranging from 0.75 to 0.80. As argued by Koufteros et al. (2009) in instances where first-order factors exhibit moderate correlations, a measurement model specification such as the one represented by our model, would be advisable. The results provided acceptable support for convergent validity. All standardized factor loadings were statistically significant (t -values > 1.96), and ranged from 0.41 to 0.71. With the exception for NES2 and NES6, other factor loadings were above the minimally acceptable threshold of 0.50. The item reliability (R^2) values are above the suggested standard of 0.5 (Hu & Bentler, 1999) only for NES1.

The composite reliability (CR) of each construct is above the minimum level of 0.60. This suggests that the items are sufficiently representative on their respective construct. The value of average variance extracted (AVE) are marginally acceptable.

Although several items did not meet the cut-off, these were retained considering that they were important indicators and the content validity associated with these items was high. This was also because other estimate such as factor loading and composite reliability remained satisfactory. Further, deleting these items would leave fewer items on some construct that might lead to subsequent identification problem (Byrne, 2001; Hair et al., 2006).

The results for Model M2 indicate an acceptable level of fit of the proposed model with these data ($\chi^2=52.268$, $df=41$, $p=0.112$) and other indices indicated a good fit with $\chi^2/df=1.275$, $TLI=0.969$, $CFI=0.977$, $SRMR = 0.046$, $RMSEA=0.037$.

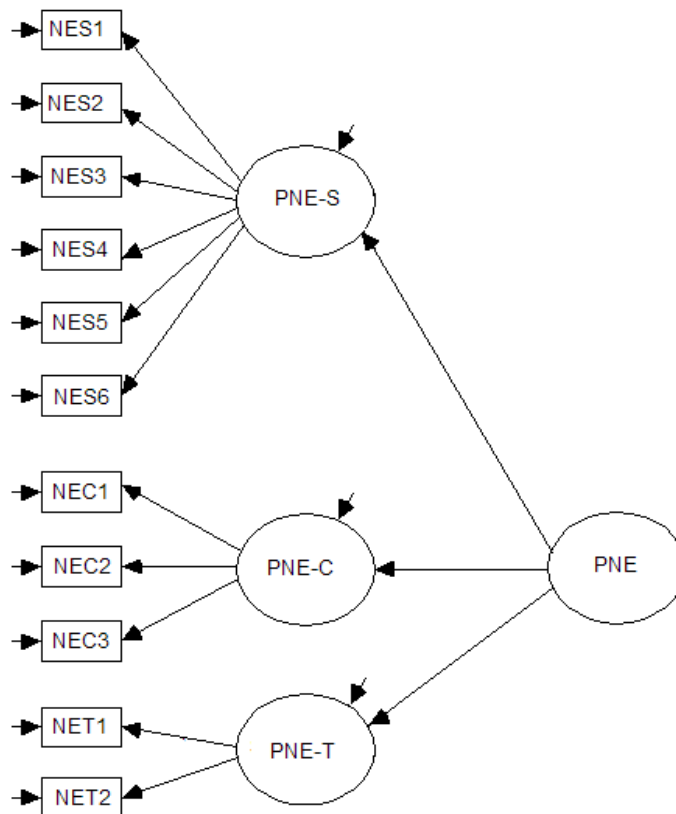


Figure 3: Three first-order factors, one second-order factor (M2).

For second-order constructs with reflective dimensions, the convergent validity of the indicators of the first-order factors (dimensions) can be assessed as previously described for first-order



measurement model. Estimates of item validity and reliability are not sensitive to the addition of a second-order factor. Conclusions concerning the validity and reliability of the items would be the same. The second-order model has the additional advantage of provide estimates of the validity and reliability of the dimensions.

Further empirical support for convergent validity and for acceptance of the second-order factor model is found in the magnitude and significance of estimated parameters as well as the amount of variance explained (Koufteros et al., 2009).

All standardized factor loadings (the gamma coefficients) of the first-order factors on the second-order factor are large and exhibit high t-values at the 0.001 significance level. Specifically, the results indicated that PNE-T ($\gamma = 0.91$, t-value = 8.32) was the strongest dimension of the second-order factor (PNE), followed by PNE-C ($\gamma=0.88$, t-value=5.07), and PNE-S ($\gamma=0.86$, t-value=6.45). These results suggest that the users evaluate the social network on the confirmed three dimensions, but they also viewed the social network as a higher-order factor that captured a meaning common to all the dimensions.

The reliability of each dimension was evaluated by examining the squared multiple correlation (SMC). The SMC values are above the suggested standard of 0.50 (0.74 PNE-S, 0.77 PNE-C, and 0.82 PNE-T) and indicate that more than half of the variance in the each dimension is due to the second-order construct.

The construct reliability (CR) for the second-order construct is 0.908, above the minimum recommended level of 0.60. This suggests that the dimensions are sufficiently representative on the second-order construct. The value of average variance extracted (AVE) for second-order construct is 0.777, above the minimum level of 0.50. These results suggest that, on average, the majority of the variance in the first-order dimensions is shared with second-order construct and thus provide evidence of convergent validity.

Study 2 (N=162)

The models M1 (three correlated first-order factors) and M2 (one second-order construct and three first-order factors) were tested with the second sample.

The results for Model M1 indicate an acceptable level of fit of the proposed model with these data. Although the χ^2 test is significant ($\chi^2=59.731$, $df=41$, $p=0.029$) all other indices indicated a good fit with $\chi^2/df=1.457$, TLI=0.950, CFI=0.963, SRMR=0.052, RMSEA=0.053. The examination of the standardized residuals values and the inspection of the modification indices have shown that there is no reason for re-specification.

The model showed a clean three-factor structure, with all items loading significantly onto their a priori dimension. The results also provided support for convergent validity, as all factor loadings were statistically significant, with critical t values ranging from 4.47 to 7.86 ($p<.001$) and the standardized factor loadings values ranging from 0.40 to 0.85. The correlations between first-order factors are high, with values ranging from 0.62 to 0.80.

The composite reliability (CR) of each construct is above the minimum level of 0.60, ranging from 0.64 to 0.79. The value of average variance extracted (AVE) for PNE-T (0.59) is above the suggested standard of 0.50 and the values of AVE for PNE-S (0.39) and PNE-C (0.38) are marginally acceptable. Although several items did not meet the cut-off, these items were retained considering that they were important indicators and the content validity associated with these items was high (Hair et al., 2006).

The results for Model M2 also indicate a good level of fit with sample data ($\chi^2=59.731$, $df=41$, $p=0.029$) all other indices indicated a good fit with $\chi^2/df=1.457$, TLI=0.950, CFI= 0.963, SRMR = 0.052, RMSEA=0.053.

All standardized factor loadings (the gamma coefficients) of the first-order factors on the second-order factor are large and exhibit high t-values at the 0.001 level. Specifically, the results indicated that PNE-C ($\gamma = 0.98$, t-value = 6.78) was the strongest dimension of the second-order factor (PNE), followed by PNE-S ($\gamma=0.81$, t-value=6.89), and PNE-T ($\gamma=0.77$, t-value=6.25). The reliabilities of the three dimensions PNE-S, PNE-C, and PNE-T were .66, .96, and .59, respectively.



For the second-order construct, CR is 0.893 and the value of AVE is 0.737. This suggests that the dimensions are sufficiently representative on the second-order construct and most of the variance in the first-order dimensions is shared with the second-order construct. In turn, this provides evidence for the convergent validity.

Discussion

Analysis results confirmed the raised research hypothesis and proved that Social network (SN) negative effect is a multidimensional construct, having several facets that describe distinct aspects.

Constructed PNE model revealed that both sample respondents, having participated in the research, very highly value negative effect made by Social networks in all three dimensions (PNE-S, PNE-C and PNE-T). Both Technology and Education science faculty representatives, being active Social network users, discern a considerable negative influence both on socialization and on communication in virtual space, on teenagers' behavior, concentration and so on. They are very strongly convinced, that SN distract people from reality, weaken real relationship between people, encourage people's estrangement, even encourage them to suicide. Besides, spread of personal and not only personal information to unknown people raises a big concern. These results correlate well with the earlier research studies (Lamanauskas et al., 2012), which showed, that consumers have little knowledge about how personal information is used, which is stored in social networking websites. This is obviously connected with the person's rights and ethical things. Even 55% of the respondents do not know how SN use published personal and other type of information. This shows, that the problem earlier raised by the researchers, remains urgent. Brydolf (2007) states, that it is very important to find a certain balance between the use and possible risks using SNW.

Comparing both sample results, some differences can be discerned in SN evaluation. From the results one can see, that in the group of Technology faculty respondents (sample 1), the effect on teenagers (PNE-T) factor has the strongest expression. Then follow communication in virtual space (PNE-C) and socialization (PNE-S) factors. In the group of respondents from Educology faculties (sample 2) factors ranged as follows: communication in virtual space (PNE-C), socialization (PNE-S) and effect on teenagers (PNE-T) factors. It follows, that technology faculty students are mostly concerned with SN negative effect on teenagers' health and behavior and think, that SN make negative influence on students' grades and their ability to concentrate. Communication in virtual space and spread of information to unknown people are of a big threat. People's estrangement, breaking-off from reality, society's dehumanization are less accentuated. Whilst Educology faculty representatives, acknowledging, that SN make a negative influence on teenagers' health, behavior, ability to concentrate and accentuating SN influence on people's estrangement, breaking-off from reality, still the biggest threat discern in the communication in virtual space and information spread to unknown people.

Such difference in the evaluation of SN negative effect can be determined by various reasons. Belonging to a certain social group (according to faculty, future speciality), learning and free time peculiarities, the style of communication with contemporaries and adults, make quite a big influence on attitude and value system formation. J. Holand (Spokane, 1996) states, that not the interests are which determine the choice of profession, but personality's own features, his social environment. According to the author, similar people choose similar professions. On the other hand, samples, taking part in the research are not equivalent in terms of sex. The first sample (Technology faculty) comprised 81 % of male and 19 % of female. The second one (Educology faculties) on the contrary, even 88 % - of female and only 12 % of male. It is natural to think, that sex also could have influence on opinion differences. As earlier research studies show (Lamanauskas et al., 2012), girls more than boys tend to communicate in SN, more than boys they pay attention to learning and information exchange in virtual environment. Therefore, it can be thought, that girls (Education faculties), communicating more in virtual space, discern more negative outcomes of such communication as well. They are also more concerned with information spread among unknown people. Whilst boys (Technology faculty), being more rational, notice the biggest danger of SN in teenagers' health, behavior and concentration.

It is obvious, that both positive and negative effect of SN on every personality and on the whole



society is not a univocal phenomenon. Therefore, its evaluation can't be univocal either. It is determined by different reasons, which need to be distinguished and investigated more exhaustively.

Conclusions and Implications

In this study two alternative measurement models were tested. The first model (M1) hypothesizes three correlated first-order factors and the second model (M2) one second-order construct and three first-order factors with corresponding indicators. Having carried out estimation with one sample and cross validation with a second sample, it was obtained that both alternative models M1 and M2 indicate a good level of fit with sample data. Based on the obtained results, it can be stated, that social network (SN) negative effect is a multidimensional construct, having several facets that describe distinct aspects.

Carried out analysis revealed, that both sample respondents, having participated in the research very highly value negative effect made by Social networks according to all three dimensions (PNE-S, PNE-C and PNE-T), at the same time discerning SN as a higher order factor, giving general meaning to all dimensions. University students, being active Social network users discern a considerable negative influence both on socialization and communication in virtual space, on teenagers' behavior, concentration and so on. They are very strongly convinced that SN distract people from reality, weaken real relationship between people, encourage people's estrangement, even encourage to suicide. Besides, spread of personal and not only personal information to unknown people is of a big concern.

There are inherent limitations since the study is exploratory and the questionnaire was primarily targeted to the usage of social networking websites. Future work will focus on the development of a new evaluation instrument in order to target more dimensions of the usefulness of social networking websites, particularly in the science education area.

References

- Alloway, T. P., Horton, J., Alloway, R. G., Dawson, C. (2013) Social networking sites and cognitive abilities: Do they make you smarter? *Computers & Education*, 63, 10-16.
- Batrawi, B., Muhtaseb, R. (2012). The Use of Social Networks as a Tool to Increase Interest in Science and Science Literacy: A Case Study of 'Creative Minds' Facebook Page. In *Proceedings of The International Conference New Perspectives in Science Education* (Florence, Italy, 8-9 March 2012). Florence. Retrieved from, http://conference.pixel-online.net/npse2013/common/download/Paper_pdf/043-SPI08-FP-Batrawi-NPSE2013.pdf
- Bosch, T. E. (2009). Using online social networking for teaching and learning: Facebook use at the University of Cape Town. *Communicatio: South African Journal for Communication Theory and Research*, 35 (2), 185-200. <http://dx.doi.org/10.1080/02500160903250648>.
- Byrne, B. (2001). *Structural Equation Modeling with AMOS. Basic Concepts, Applications, and Programming*. Lawrence Erlbaum Association, Publishers.
- Brady, K. (2008). The Promises and Pitfalls of Social-Networking Websites. *School Business Affairs*, 74 (9), 24-28.
- Braun, M. T. (2013). Obstacles to social networking website use among older adults. *Computers in Human Behavior*, 29 (3), 673-680.
- Brydolf C. (2007). Minding MySpace: Balancing the benefits and risks of students' online social networks. *Education Digest*, 73 (2), 4-8.
- Buffardi, L. E., Campbell, W. K. (2008). Narcissism and Social Networking Web Sites. *Personality & Social Psychology Bulletin*, 34 (10), 1303-1314.
- Forest, A. L., Wood, J. V. (2012). When Social Networking Is Not Working: Individuals With Low Self-Esteem Recognize but Do Not Reap the Benefits of Self-Disclosure on Facebook. *Psychological Science*, 23 (3), 295-302.
- Fornell, C., Larcker, D. F. (1981). Evaluating structural equations models with unobservable variables and measurement error. *Journal of Marketing Research*, 18 (1), 39-50.
- Irwin, C., Ball, L., Desbrow, B., & Leveritt, M. (2012). Students' perceptions of using Facebook as an interactive learning resource at university. *Australasian Journal of Educational Technology*, 28 (7), 1221-1232. Retrieved from, <http://www.ascilite.org.au/ajet/ajet28/irwin.html>.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. (2006). *Multivariate Data Analysis*. 6th Ed., Prentice Hall.
- Hsu-Wan Chen (2010). Applying Social Networking to Construct an Elementary Science Learning Community. In: *e-Science Workshops, 2010 Sixth IEEE International Conference on e-Science* (Brisbane, Australia from 7th - 10th December 2010). Brisbane.



- Hu, L. T., Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structural Equation Modelling*, 6 (1), 1-55.
- Hugl, U. (2011). Reviewing person's value of privacy of online social networking. *Internet Research*, 21 (4), 384-407.
- Junco, R. (2011). The Need for Student Social Media Policies. *Educause Review*, 46 (1), 60-61.
- Kist, W. (2008). "I Gave Up My Space for Lent": New Teachers and Social Netowrking Sites. *Journal of Adolescent & Adult Literacy*, 52 (3), 245-247.
- Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, 26 (6), 1237-1245. <http://dx.doi.org/10.1016/j.chb.2010.03.024>.
- Koufteros, X. A., Babbar, S., Kaighobadi, M. (2009). A paradigm for examining second-order factor models employ- ing structural equation modeling. *International Journal of Production Economics*, 120 (2), 633-652.
- Krakovsky, M. (2004). Virtual Social Climbing. *Psychology Today*, 37 (3), 81.
- Lamanauskas, V., Šlekiene, V., Ragulienė, L. Usage of social networking websites: Lithuanian university students' position. *Problems of Education in the 21st Century*, 45, 2012, 27-39.
- Lamanauskas V., Šlekiene, V., Balog, A., Pribeanu, C. (2013). Exploring the usefulness of social networking websites: a multidimensional model. *Studies in Informatics and Control*, 22 (2), 175-184.
- Mazman, S. G., & Usluel, Y. K. (2010). Modeling educational use of Facebook. *Journal of Computers and Education*, 55, 444-453.
- Meintel, J. (2012). Think before you tweet. *Mobility Forum: The Journal of the Air Mobility Command's Magazine*, 21 (1), 24-25.
- Perkins, B. (2008). The Pitfalls of Social Networking. *Computerworld*, 42 (7), 44.
- Pociūtė, B., Krancaitė, E. (2012). Paauglių aktyvumas vs. pasyvumas interneto socialiniame tinkle „Facebook“ ir sąsajos su jaučiamu vienišumu bei asmenybės bruožais. *Psichologija*, 46, 60-79.
- Scalone, G. (2011). Engaging the public with science and scientists on social networking sites: An ISE brief discussing Watermeyer's *Social network science: pedagogy, dialogue, deliberation*. Seattle: University of Washington.
- Spokane, A. R. (1996). *Holland's Theory. Career choice and development*. San Francisko: Jossey-Bass Publisher, 1996, p. 33-74.
- Racaniello, V. (2010). Social Media and Microbiology Education. *PLoS Pathogens*, 6 (10), e1001095. doi:10.1371/journal.ppat.1001095.
- Rambe, P. (2012). Critical discourse analysis of collaborative engagement in Facebook postings. *Australasian Journal of Educational Technology*, 28 (2), 295-314. Retrieved from <http://www.ascilite.org.au/ajet/ajet28/rambe.html>
- Reid, K. (2009). The rise of social networking sites. *Education Journal*, 119, 22.
- Romiszowski, A. J. (2009). Observations on Social Networking in Education. *Educational Technology*, 49 (2), 62-63.
- Tariq, W., Mehboob, M., Khan, M., & Ullah, F. (2012). The Impact of Social Media and Social Networks on Education and Students of Pakistan. *IJCSI International Journal of Computer Science Issues*, 9 (4). Retrieved from, <http://www.ijcsi.org/papers/IJCSI-9-4-3-407-411.pdf>
- Wang, Shiang-Kwei, Hsu Hui-Yin, Green, S. (2013). Using social networking sites to facilitate teaching and learning in the science classroom. *Science Scope*, 36 (7), 74-80.
- Wilson, K., Fornasier, S., White, K. M. (2010). Psychological Predictors of Young Adults' Use of Social Networking Sites. *Cyberpsychology, Behavior, and Social Networking*, 13 (2), 173-177.
- Zaidieh, Ashraf J. Y. (2012). The Use of Social Networking in Education: Challenges and Opportunities. *World of Computer Science and Information Technology Journal (WCSIT)*, 2 (1), 18-21.

Appendix 1: Constructs and items.

Item	Description
NES1	SN websites distract people from reality
NES2	SN websites earn a lot of money using free personal information
NES3	SN websites can encourage the youth for suicide
NES4	SN websites dehumanise society
NES5	SN websites encourage people estrangement
NES6	Staying in SN websites is more fashionable than useful
NEC1	Constant staying in virtual environment causes damage to person's socialization



Item	Description
NEC1	Communication in virtual space will never substitute direct peoples' relations
NEC2	Most people belonging to SN websites don't know, who they share information with about themselves, their hobbies and life
NET1	Information conveyed by SN websites can have negative influence on teenagers' behaviour and health
NET2	SN websites make negative influence on pupils' marks and ability to concentrate

Received: April 30, 2013

Accepted: June 15, 2013

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