The 8th International Scientific Conference
eLearning and software for Education
Bucharest, April 26-27, 2012
10.5682/2066-026X-12-052

COMPUTER-MEDIATED SELF-REGULATION OF LEARNING

Ionut-Dorin STANCIU, Musata BOCOS, Daniel Cosmin ANDRONACHE
Dept. of Psychology and Sciences of Education, Babes-Bolyai University of Cluj-Napoca, Romania
E-mail: ionut.stanciu@ubbcluj.ro, musata.bocos@yahoo.com, daniel.andronache@ubbcluj.ro

***Abstract**: The present study hypothesized that the utilization of ICT impacts positively on the self-regulation of learning and that the irrationality of individual's beliefs, the sense of academic control, and the IT-related variables, collaborate in their impact on the self-regulation of learning. A transversal, one-time correlational study was designed in order to determine the predictive value of information technology usage related measures on the students' self-regulation of learning, and ICT-related constructs variations with the academic control and rationality of the individual. Self-report measures of the variables were used to record data from high school participant students. The developed conceptual models accommodate all original hypotheses and introduce the possibility of further, experimental research that can prove the direction of hypothesized influence pathways. Education provider, in general, and teachers, in particular, can use the results to better understand, design and apply the new IT-based teaching methods*.

***Keywords:** self-regulated learning strategies, academic control, irrationality, information systems models, correlational research*

I. THEORETICAL BACKGROUND

The pervasiveness of information and communication technology (ICT) systems, both in daily and school activities, makes the utilization of computers not only an interesting research topic but also a relevant indicator of the student's academic learning activities. The learning activities become increasingly more self-regulated as the student's age increases and advances through the educational levels. The utilization of ICT for learning is ultimately intended to provide an efficient tool for enhancing the academic proficiency of the learner. However, this utilization depends on various other factors, including the computer literacy of the user, the acceptance of technology, and the purpose of utilization. Moreover, the use of learning tools, including ICT-based methods, may be impacted by other personal factors, such as the academic sense of control and the rationality of the individual. Rationality and academic control have a relevant contribution on most of the self-regulated learning strategies. The use of ICT in learning is also significantly approached, both theoretically and empirically. Nevertheless, there is limited empirical evidence as to the impact of ICT utilization practices on the self-regulation of learning, and even more scare evidence of the interplay between academic control, rationality and the use of ICT. There is positive evidence that self-determined computer usage, i.e. for learning, enhances the engagement of students in problem-solving activities (Wittwer & Senkweil, 2008), thus eliciting greater employment of cognitive and metacognitive learning processes. Therefore, in order manage the complexity of the pervasivity of computer usage, we focused our research on IT-related variables of a more psychological nature, such as the performance expectancy, the (perceived) compatibility of the users with the system, the complexity that a user perceives in using an information system in academic tasks, the intrinsic motivation for using a certain information system, i.e. the personal computer, and the overall attitude towards using it.

Self-regulation of learning. Self-regulation represents natural, often automatic, responses of the individual, aimed at reducing the disparities that occur between individual's expectancies and the perceived reality. Self-regulation involves cognitive and/or behavioral processes and is almost always accompanied by emotional control. An efficient self-regulation, which accomplishes control of thinking, emotions, and behavior, constitutes the basis of a healthy psychological functioning. As Zimmerman (2000) synthetically put it, self-regulation refers to thoughts, emotions and actions which are planned and adapted with a view to reach personal goals (Zimmerman, 2000). The most important attribute of self-regulated learning is that the agent of learning, that is the learner, actually controls his or her learning, directing his or her cognitive and motivational processes towards attaining learning goals. It is, thus, presumable that the self-regulation of learning requires a certain academic control of the learning processes, which in turn can have various degrees of adaptability.

Rationality. People are not merely impartial cognitive processors of the inner or outer reality but also evaluators of this reality. The evaluating aspect of the person's beliefs system is best incorporated in Albert Ellis's Rational Emotive Behavior Therapy (Ellis, 1955 apud. Weinrach, 1996). The Rational Emotive Behavioral Theory (REBT) identifies four main irrationality factors: *demandingness* (DEM), *awfulizing* (AWF), *low frustration tolerance* (LFT) and *self-downing (or others-downing)/global evaluation*. These factors or categories of irrational beliefs hinder the adaptive responses of the individual to the objective circumstances of life and diminish the efficiency and productivity (Walen, DiGiuseppe, & Dryden, 1992). Therefore, it is presumable that the individual's capacity of optimal selection among control processes is related to the ability to be flexible and adaptive, thus rational, as opposed to dogmatic and rigid, which would denote irrationality.

Academic control. The bi-processual theory of control (Rothbaum, Weisz, & Snyder, 1982) differentiates between the person's beliefs that he or she can objectively change the external circumstances (primary control or PAC), change his or her internal processes and states (*secondary control* or SAC), or shift between the two (*reported congruence ability* or RCA), in order to achieve certain academic goals. According to the bi-processual theory of control, the student faced with a specific academic task or immersed in a specific academic context, perceives that he or she employs both primary and secondary mechanisms of control in order to achieve certain academic goals. The RCA can be seen as a measure of the coping used by the participants in their struggle to come to terms with their own understanding of control. This can be the case, for instance, for a situation when the student disengages from unsuccessful primary control attempts, which, according to the motivational theory of life-span development (Heckhausen & Wrosch, 2010) can lead to frustration and lack of alternatives. In turn, the ABC model (Ellis, 1984) explains how this feeds dysfunctional or maladaptive metaconsequences.

ICT-related models. There are many models that build on Information Systems—for instance, Venkatesh et al. (2003) reviews no less than 8 such models, all of whom can provide useful insight on the influence of computer and software usage on the learning processes. However, we were interested in how the perceived measures of *performance expectancy* and *attitude towards technology use*, *the compatibility (with the ICT system used)*, *the intrinsic motivation*, and the *complexity* (perceived by the user), relate to the self-regulation of learning. *Performance expectancy* (PE) and *attitude toward usage* (ATU) are central constructs in Venkatesh et al.'s Unified Theory of Acceptance and Use of Technology, or UTAUT (2003); *intrinsic motivation* (IM) was developed by Davis et al. (1992) for their *motivational model*; *complexity* (Complex) is a central construct in the *model of PC utilization (MPCU)* developed by Thompson and Higgins (1991), whereas *compatibility* (Compat) belongs in the innovation diffusion theory (IDT) of Moore and Benbasat (1991). For the purpose of the present paper, we will refer to the above mentioned constructs as information technology usage (ITU) related constructs.

Previous recent research showed that academic control, specifically, the (reported) congruence ability, mediates between the individual's rationality and the actual self-regulatory learning behaviors (Stanciu, 2012; Stanciu & Nistor, 2012). More specifically, in other words, the self-regulation of learning requires a certain degree of academic control, expressed or modulated via the (reported) congruence ability, and that the academic control is feasibly predicted by the individuals' irrationality. Furthermore, our next step, presented in this paper, was to consider the impact of the specified ICT-related measures, and their mediating role on the self-regulation of learning strategies. This assertion can be broken down into two main hypotheses: 1) the academic control mediates between irrationality and self-regulation of learning, 2) the ITU-related measures intermediate between the rationality and

the sense of control, on the one hand, and the self-regulation of learning strategies on the other hand. An additional, third hypothesis was that the utilization of higher levels of the ITU-related measures impacts positively or reflect into higher levels of self-regulation of learning.

II. METHOD

2.1. Participants

A number of N = 158 participant students (125 females and 33 males) enrolled in secondary education (high school), grades 9-12, ranging from 14 to 20 years of age, took part in the research. Mean age of participants was M = 16.91, SD = 1.15 (M females = 16.95, SD = 1.16; M males = 16.76, SD = 1.12), the mean school year was M = 10.59, SD = 1.01, and median Md and mode equal to 11.

2.2. Research design

A cross-sectional, one-time, correlational design was employed in order to extract, process, and interpret the participants' responses. The data was processed using descriptive and inferential statistical analyses using IBM SPSS ™ and IBM SPSS AMOS ™ statistical software. The total number of participants was appropriate for the structural equation modeling, with respect to the cases-to-independent variables ratio of $N \geq 50+8m$ (where m is the number of IVs) rule of thumb (Tabachnick & Fidell, 2007).

2.3. Measures

Independent (predictor) variables. The dimensions of academic control were measured along three scales. Primary Academic Control (PAC)—a 10 item 7-step Likert scale for primary academic control scale, based on the Perry et al.'s (2001) Primary Academic Control Scale, and successfully used by Hall in his achievement settings control research (Hall, 2006). The Second Academic Control Scale, developed by Perry et al. (1998), was also a 7-point Likert scale comprised of 4 items. Internal consistency measured for the academic control scales was Cronbach's α = .74 for *primary academic control*, .50 for *secondary academic control*, and .74 for the *reported congruence ability*. The combined primary and secondary academic control scales had a Cronbach's α = .70. The reported congruence ability scale was a 7-point, 14-item measure translated and adapted from Hall's (2006) study on optimization of primary and secondary control.

The irrationality of individual's beliefs was measured using DiGiuseppe et al.'s Absolute Beliefs Scale (2007), which is a 5-points Likert scale, comprised of direct and reverse items measuring the four dimensions of irrationality: *demandingness (DEM), awfulizing (AWF), low frustration tolerance (LFT),* and *self- or others-downing/global evaluations (SD/GE)*. Cronbach's α = .78 for DEM, .68 for AWF, .73 for LFT, and .84 for SD/GE. The overall internal consistency of the irrationality scale had a Cronbach's α = .91.

ITU-related measures were recorded using scales adapted from Venkatesh et al.'s (2003) UTAUT—*performance expectancy* (PE) and *attitude towards use* (ATU) which presented Cronbach's α = .76 and, respectively .73; Davis et al.'s (1992) Motivational Model—*intrinsic motivation* with a Cronbach's α = .64; Thompson and Higgins's (1991) Model of PC utilization—*complexity* with Cronbach's α = .66; and Moore and Benbasat's (1991) *information diffusion theory—compatibility* with a Cronbach's α = .77. All ITU-related measures were recorded on 7-point Likert scales.

Dependent (predicted) variables. The self-regulation of learning strategies were measured using the *Learning Strategies and Study Skills Survey* developed by Ruban and Reis (1999), a 5-point Likert scale, comprised of 6 subscales measuring *conceptual skills (CS)*, *study routines (SR)*, *routine memorization (RM), reading and writing metacognitive strategies (RWMS), compensatory support (CoSu)* and *help seeking*. For our study's purposes we retained the first five scales, which showed acceptable internal consistencies: Cronbach's α = .76 for CS, Cronbach's α = .71 for SR, Cronbach's α = .68 for RM, Cronbach's α = .77 for RWMS, and Cronbach's α = .73 for CoSu.

In accordance with Tabachnick and Fidell (2007) we used the terms "independent variable (IV)" and "dependent variable (DV)" to conveniently describe the predictor (IV) and, respectively, the outcome or response variables (DV) without assuming an explicit causal relationship. Moreover, in a

certain situation, the DV can become and IV. For instance, *compatibility* is treated as a DV (predicted) in relation with *reported congruence ability*, but becomes IV (predictor) in relation with *study routines*. The questionnaires were checked for construct validity by two independent experts from the Faculty of Psychology and Educational Sciences of Babeş-Bolyai University of Cluj-Napoca.

2.4. Procedure

A paper-pencil version of the questionnaire containing the scales was delivered and completed in a school setting, during the coordination classes, in order not to interfere with the normal teaching activities. The participants were asked if they use computers in their everyday life and only those respondents who did were selected for the study. Next, the participants were also asked if and how often they use computers for academic tasks, such as projects, presentations, calculations, diagrams, etc.. Only 2 out of 158 participants responded that they don't use the computer for academic tasks. The expression of voluntary participation consent was explained and included in the questionnaires. The researchers conducted the observation and recording of date throughout the entire process.

III. RESULTS

The hypotheses for the model were that: 1) the individuals' measures or dimensions of academic control mediate between the individual's irrationality and his or her (perceived) *compatibility*. Then, in turn, 2) the (perceived) *compatibility* is a valid predictor for the individual's *performance expectancy*, *attitude toward usage*, and *intrinsic motivation.* More specifically, we expected that individuals that reported higher *compatibility* to present also higher levels of *intrinsic motivation*. 3) More so, *intrinsic motivation* is a predictor in itself for the performance expectancy and the *attitude towards usage*. This can be also stated as expecting that people with higher levels *of intrinsic motivation* to expect better performances and a more positive attitude towards usage. 4) Finally, the *performance expectancy* predicts the *attitude towards usage*. In other words, that expecting better *performance* in the use of computer system was a valid predictor for a person's having a more positive *attitude towards usage*.

Multiple regression analyses were conducted to identify the unique predictors for each SRLS: *conceptual skills*, *study routines*, *routine memorization*, *reading and writing metacognitive strategies* and *compensatory support*. *Performance expectancy* was the sole unique predictor for *study routines* (standardized $\beta = .32$, $\eta^2 = 4\%$, $p = .008$, at a total variance explained by the model of $R^2 = 8\%$, F (5, 152) = 2.546, $p = .030$), *conceptual skills* (standardized $\beta = .30$, $\eta^2 = 4\%$, $p = .013$, at a total variance explained by the model of $R^2 = 8\%$, F (5, 152) = 2.489, $p = .034$), *routine memorization* (standardized $\beta = .29$, $\eta^2 = 3\%$, $p = .018$, at a total variance explained by the model of $R^2 = 8\%$, F (5, 152) = 2.683, $p = .024$), whereas *performance expectancy* (standardized $\beta = .26$, $\eta^2 = 3\%$, $p = .019$), *complexity* (standardized $\beta = .24$, $\eta^2 = 5\%$, $p = .002$) and *compatibility* (standardized $\beta = .30$, $\eta^2 = 3\%$, $p = .015$) were unique contributors for *compensatory support*, at a total variance explained by the model of $R^2 = 19\%$, F (5, 152) = 7.181, $p < .001$). None of the IT-usage related variables showed a unique contribution to the *reading and writing metacognitive strategies*. A follow-up multiple regression analysis was conducted to identify the unique predictors of *compensatory support* which identified *complexity* as the unique predictor (standardized $\beta = .07$, $\eta^2 = 7\%$, $p < .001$, at a total variance explained by the model of $R^2 = 14\%$, F (3, 157) = 8.179, $p < .001$).

However, the unique individual contributions of the above-mentioned variables to the SRLS do no exclude the possibility of combinations of multiple variables. Thus, structural equations conceptual models can provide a better explanatory view on the interplay of various variables in the total final variance of SRLS. Based on the previous developed models, as well as our previous research which showed a mediating role of academic control between irrationality and SRLS (Stanciu, 2012), we developed a series of conceptual models which accommodated for the mediating role of academic control, via the considered IT-usage related variables, between irrationality and SRLS. The fit indices of the models are presented in Table 1, bellow.

Table 1.Comparative fit indices for each SRLS model

SRLS model	*Chi-square* χ^2	*df*	*p*	*CFI*	*RMSEA*	*SRMR*	*Total variance explained in SRLS*
Conceptual skills model	54.123	30	.004	.95	.072	.064	14%
Routine memorization model	51.730	31	.011	.96	.065	.060	7%
Compensatory strategies model	59.752	360	.008	.96	.065	.066	7%
Study routines model	50.170	30	.010	.96	.066	.062	6%
Reading and writing metacognitive strategies model	56.684	39	.033	.96	.054	.063	6%

Figure 1, bellow, presents the developed models into a single, combined picture, accounting for the influence of ITU-related variables into the total final variance of each SRLS.

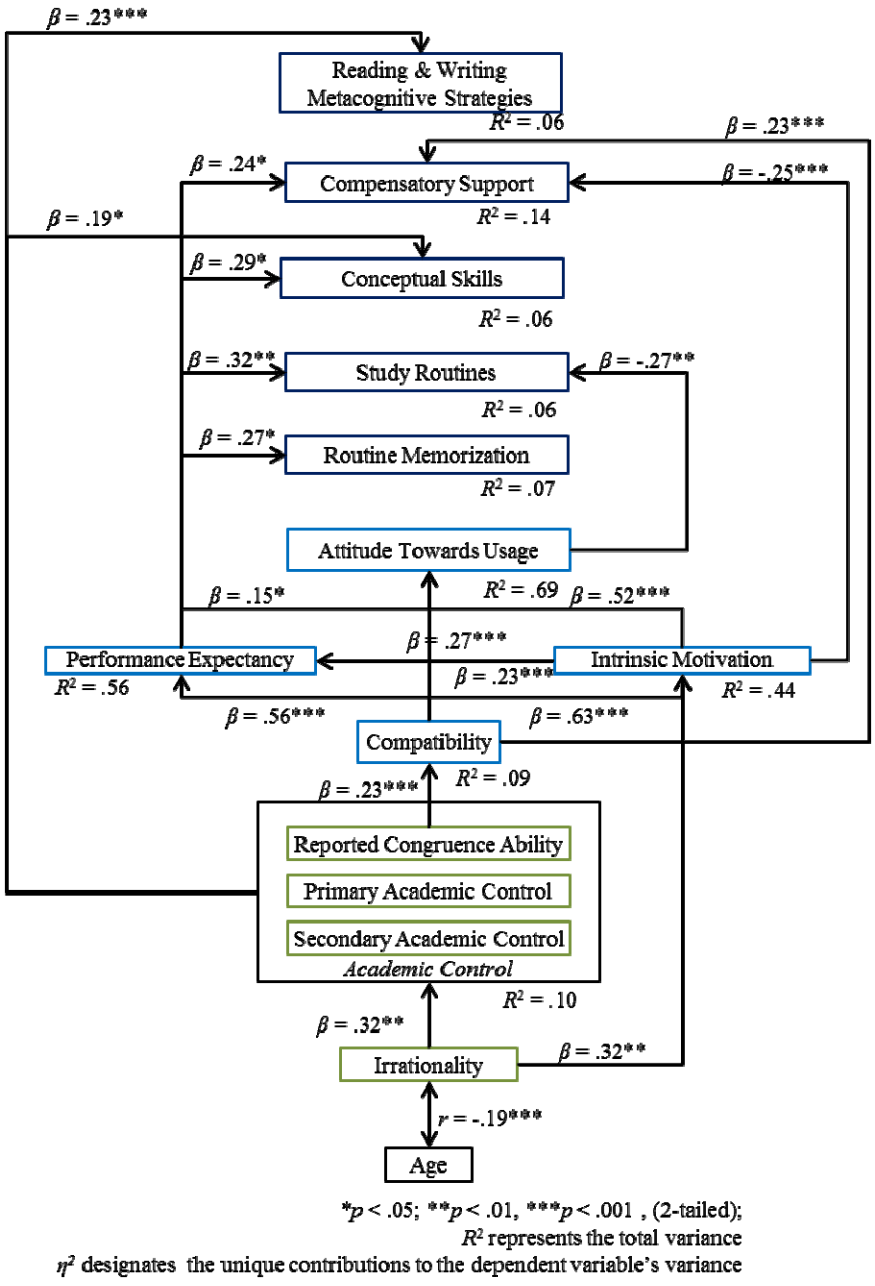

Figure 1. Hypothesized combined conceptual model of self-regulated learning strategies

IV. DISCUSSIONS

A series of conceptual model were developed, which allowed the fitting of ITU-related measures in the self-regulation of learning and their relation with academic control and irrationality. The models accommodated successfully the original hypotheses of academic control mediating between irrationality and self-regulation of learning, the ITU-related variables mediating between irrationality and academic control and the self-regulated learning strategies. However, not all ITU-related variables showed unique contributions to the SRLS. The models were best fitted in those cases were *compatibility* was a predictor for *performance expectancy* and *intrinsic motivation*, *intrinsic motivation* predicted *performance expectancy* and *attitude toward usage*, and *performance expectancy* predicted the *attitude toward usage*. This last predictive pathway requires further investigation, especially considering that in Venkatesh et al.'s (2003) UTAUT they *performance expectancy* and *attitude toward usage* are retained as factors in the User Acceptance questionnaire. Additionally, the models required direct influence pathways for academic control, on the one hand, and conceptual skills and compensatory support, on the other hand. Direct influence pathways were required for irrationality and compensatory support, also. These latter additional pathways are consistent with the results that our previous recent research have shown (Stanciu, 2012).

One of the aspects that may elicit a critical debate is the selection of ITU-related variables. Whereas there are significantly numerous models related to information systems, our research makes use of only a few of the constructs used in these models. The main technical reasons for the present selection of ITU-related variables are that, on the one hand, it would have been impractical to try to reconcile all existing models, and, on the other hand, correlational self-reported studies has field limitations as to the number of variables that can be recorded via self-reported measures. Better fitted models: although better fitted models in terms of probability levels, mostly, were achieved at the cost of reducing the number of ITU-related variables, we presented here the models which accommodated most of the variables considered originally. The main epistemic reason for retaining these models as opposed to the reduced models is that the present research is mostly an exploratory research, which attempts at identifying the most relevant variables that impact the self-regulation of learning and still can be considered together with irrationality of the system of beliefs and the academic control. Further research could emphasize a confirmatory approach as well as other ITU-related variables that may prove relevant. Also, in relation with the selection of variables, further research could consider using alternative measures of SRLS, such as Pintrich et al.'s (1991) *Motivated Strategies for Learning Questionnaire (MSLQ)*, or more recent measures, such as Barnard et al.'s (2009) *Online Self-Regulated Learning Questionnaire (OSLQ).*

Another aspect that needs further investigation concerns the nature of mediator versus moderator of the academic control and the ITU-related variables. Our models presented the academic control dimensions (primary, secondary, and the congruence ability) and the ITU-related measures as mediators between irrationality and self-regulation of learning. However, the extent to which they are indeed true mediators is still to be clarified. Self-regulation of learning takes place without students using computer, which is to say that ITU-related measures are not true mediators, but rather moderators of SRLS. Still, the ITU-related measures taken into account in the present research are the actual expression of underlying psychological dispositions, which may indeed be true mediators. While we observed the behavior of mediating variables within our models, we acknowledge the need for further clarification as to the true moderator or mediator nature of the encompassed variables.

The study confirmed our initial hypothesis regarding the influence of ITU-related variables on self-regulated learning strategies and open new direction of research regarding more discriminatory analysis of the variables involved. The relevance for the educational research stems mainly from the explanatory power of the model upon the interplay of academic control, rationality and the selected ITU-related measures for learning, as independent variables. The relevance for the educational practice comes from allowing teachers to employ the utilization of ICT-based methods in the learning activities of their students, with an aim to increase academic performance and self-regulation of learning. The limitations of the study, residing in its transversal, one-time correlational nature, requires further, experimental research to verify the constructed influence pathways as well as to better determine the amount of variance induced by the independent variable in the self-regulation of

learning. Additionally, longitudinal studies can provide relevant results regarding the stability of the impact that the use of ICT-based academic tasks has on the self-regulation of learning.

References

[1] Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S. L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education, 12*, 1-6.

[2] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology, 22*(14), 1111-1132. doi: 10.1111/j.1559-1816.1992.tb00945.x

[3] DiGiuseppe, R., Leaf, R., Exner, T., & Robin, M. (2007). The Absolute Beliefs Scale (B. Macavei, Trans.). In D. David (Ed.), *Clinical assessment system*. Cluj-Napoca: RTS.

[4] Ellis, A. (1984). Expanding the ABCs of RET. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 2*(2), 20-24. doi: 10.1007/bf02281207

[5] Hall, N. C. (2006). *Optimizing primary and secondary control in achievement settings: An examination of Rothbaum et al.'s (1982) congruence hypothesis.* Ph.D. NR12262, University of Manitoba (Canada), Canada.

[6] Heckhausen, J., & Wrosch, C. (2010). A motivational theory of life-span development. *Psychological Review*. doi: 10.1037/a0017668

[7] Hladkyj, S., Pelletier, S. T., Drewniak, E. P., & Perry, R. P. (1998, 1998). *Evidence for the role of secondary control in students' adaptation to college*, San Diego, CA.

[8] Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*(3), 192-222.

[9] Perry, R. P., Hladkyj, S., Pekrun, R. H., & Pelletier, S. T. (2001). Academic control and action control in the achievement of college students: A longitudinal field study. *Journal of Educational Psychology, 93*(4), 776-789. doi: 10.1037/0022-0663.93.4.776

[10] Pintrich, P. R., Smith, D., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor: University of Michigan, School of Education.

[11] Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self. *Journal of Personality and Social Psychology, 42*, 5-37. doi: 10.1037//0022-3514.42.1.5

[12] Ruban, L., & Reis, S. M. (1999). *Learning strategies and study skills survey*. University of Connecticut. Storrs.

[13] Stanciu, D. (2012). *Rationality and control in collegiate students' self-regulation of learning*. Unpublished doctoral dissertation. Psychology and Sciences of Education. Babes-Bolyai University of Cluj-Napoca.

[14] Stanciu, D., & Nistor, N. (2012). *Rationality and control in achievement motivation*. Manuscript submitted for publication.

[15] Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston, MA: Pearson : Allyn and Bacon.

[16] Thompson, R. L., & Higgins, C. A. (1991). Personal Computing: Toward a Conceptual Model of Utilization. *MIS Quarterly, 15*(1), 125-143.

[17] Venkatesh, V., Morris, M. G., Gordon, B. D., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*(3), 425-478.

[18] Walen, S. R., DiGiuseppe, R., & Dryden, W. (1992). *A practitioner's guide to rational-emotive therapy*. New York: Oxford University Press.

[19] Weinrach, S. G. (1996). Nine experts describe the essence of rational-emotive therapy while standing on one foot. [Article]. *Journal of Counseling & Development, 74*(4), 326.

[20] Wittwer, J., & Senkweil, M. (2008). Is students' computer use at home related to their mathematical performance at school? *Computers and Education, 50*, 1558-1571.

[21] Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego, CA: Academic Press.

Final note

Muşata Bocoş, PhD, is a professor at the Dept. of Educational Sciences of the Faculty of Pedagogy and Educational Sciences of Babeş-Bolyai University of Cluj-Napoca. Professor Muşata Bocoş can be contacted at email: musata.bocos@yahoo.com, address: 7th Sindicatelor Street, Cluj-Napoca, Romania.

Dorin Stanciu, Dipl. Psych., is a doctoral student at the Faculty of Psychology and Educational Sciences of Babeş-Bolyai University, with a thesis in Educational Sciences. Dorin Stanciu can be contacted at email: ionut.stanciu@ubbcluj.ro, address: 7th Sindicatelor Street, Cluj-Napoca, Romania.

Daniel Andronache, Dipl. Ped., is also a doctoral student at the Faculty of Psychology and Educational Sciences of Babeş-Bolyai University, with a thesis in Educational Sciences. Daniel

Andronache can be contacted at email: daniel.andronache@ubbcluj.ro, address: 7th Sindicatelor Street, Cluj-Napoca, Romania.

During the presented research, both Dorin Stanciu and Daniel Andronache were beneficiaries of scholarships from the Sectoral Operational Programme Human Resources Development, POSDRU/88/1.5/S/60185 and, respectively POSDRU/88/1.5/S/76841.

The paper builds on previous recent research concerning the relation between irrationality, academic control and self-regulation of learning done by Dorin Stanciu as part of his doctoral research (Stanciu, 2012), using a different participants' pool and setting, with a view to exploring the role of the ITU- related variables in the self-regulation of learning.