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Integration of Cloud Technologies in Teaching Foreign Languages in Higher Education Institutions

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Abstract. This study was aimed at summarizing theoretical knowledge of students studying Economics, enhancing the educational process and training skills of independent long-term professional upgrade of students (sustainability training) through the use of an English-taught training program implemented through the use of *MS Office 365* cloud services. The variational traits studied were identified: educational motivation, self-confidence, cognitive and creative skills. The study used methods that are recommended for quantitative research, namely: Rasch's models for measuring academic motivation, methods for determining the level of academic confidence; methods of diagnosis of cognitive reflection and decision making, and a questionnaire to

determine the level of creativity of thinking. The results of the diagnostic tests on academic motivation were processed using the Rasch Unidimensional Measurement Model (RUMM-2010) software, and the results of other tests were processed using SPSS 10.0.5., Statistica v. 5.5 A., MathCAD 2000 Pro. It has been found that the problem of integrating cloud technologies into the teaching foreign languages has been of interest of scholars, as the former are gradually becoming a full-fledged educational tool, allowing all institutions to create their own online spaces. In terms of language teaching methods, the used in this study teaching approach proved to create the learning environment helping to deal with the students' communication and interaction barriers, reluctance to being engaged resulted in the enhanced students' learning activity, their motivation for learning. This approach addressed the students' needs in developed logical (critical) thinking and creative tactic to problem-solving, student memory (cognitive component). The integration of cloud (education) services in general proved to increase the efficiency of the learning process.

Keywords: cloud technologies; foreign language teaching; higher education institutions; MS Office 365 services

1. Introduction

The integration of cloud technologies into the educational process as a whole, and in the foreign language teaching in particular, in higher education institutions allows not only modernizing the content of academic subjects, but also improving teaching methods, expanding the range of teaching techniques and enhancing learning activity of students (Genç İlter, 2015; Ahmadi, 2018). The topicality of studying the problem of integration of cloud technologies in the educational process is determined by a number of advantages, including but not limited to: *cost-effectiveness* – optimize the cost of software procurement and its systematic updating; *flexibility and efficiency* – customization of services for the needs of educational institutions, the possibility of unlimited data storage and automatic scaling of resources, minimum time consumption and financial costs for processing and analysis of data; *environmental friendliness* – electricity consumption is much lower than traditional computing; *mobility* - ongoing access to the information environment of higher education institutions (Lakshminarayanan, Kumar & Raju, 2013; Goyal, 2017; Siddiqui et al., 2019).

1.1. Literature review

This study found that the key issues (seen as causes of failure) in teaching foreign languages had been *insufficient learner engagement* leading to lack of desire to study languages and discouraging students' experiences in their attempts to raise language fluency (Akbari et al., 2016; Jang, Kim & Reeve, 2016), *drilling-activities-based or reading-translation format* (Bolitho & West, 2017) of the classes that do not develop the students' cognitive and creative spheres. It implies that students' motivation and self-confidence in academic settings are related to language teaching methods. Furthermore, language teaching methods are mainly about employing pedagogic tools to create a relaxed learning environment to influence brain neuroplasticity that results in better cognitive

and critical thinking activity obtained through increased learner motivation and self-confidence as long as their inner tensions are eliminated, the learning process gets contextualized and linked to the person's experience (Li, Legault & Litcofsky, 2014; Gözüyeşil & Dikici, 2014).

1.2. Use of technology in language teaching

The use of technology is reported to have significantly changed foreign language teaching methods as technologies offer alternatives that make learning comprehensive, engaging and more productive in terms of student progress (Patel, 2013; Gilakjani, 2017) through a structured, person-to-person, man-machine and machine-machine interaction (İşman, 2012). The organization of educational activities of students when learning foreign languages based on cloud services allows bringing the educational process closer to the realities of the student's life and experience, gives access to both the student and the lecturer to authentic materials and authentic environment for communication and practice of all speech skills: reading, speaking, listening and writing that motivates the student to learn a foreign language (Kissling, 2012). The above goes in line with findings of Wu, Marek and Yen (2012) and Alotebi (2016) reporting that if 'properly channelled' through Computer-Mediated Communication (CMC), learners show improved motivation, confidence, satisfaction, and greater actual academic performance. In addition, studies confirm that using the Internet also contributes to students' learning motivation.
The literature review identified a gap to address that is related to the influence of cloud-based approaches to teaching foreign languages on the motivation of academic achievements, academic self-confidence, cognitive and creative skills in tertiary students.

Therefore, the purpose of this study was to identify how an English-taught training program delivered through *MS Office 365* cloud services (as a case of integration of cloud technology into the teaching foreign languages in higher education institutions) influences academic achievement motivation, academic self-confidence, cognitive and creative students' skills.

2. Materials and methods

This study was conducted in 2018 and aimed to summarize the theoretical knowledge of students studying Economics, to enhance the learning process and to train the skills of independent long-term professional upgrade of students (sustainability training) through the use of English- taught training program implemented through the *MS Office 365* cloud services. The dependent variables to be investigated within this study framework were educational motivation, self-confidence, cognitive and creative skills. The study was conducted in three stages – empirical, experimental and ascertaining, and used the methods recommended for quantitative studies (Hancock, Stapleton & Mueller, 2018; Bhatia, 2018). Diagnosis of educational motivation, self-confidence, cognitive and creative skills at the pre-experimental and post-experimental stage was performed using: Rasch's measurement model (Boone, 2016), Byrne, Flood and Griffin (2014) and Matotti (2011) academic confidence measurement techniques in modification of Sachitra and Bandara (2017); methods of diagnostics of

cognitive reflection and decision making by Frederick (2005) and a questionnaire to determine the level of thinking creativity of Kumar, Kemmler and Holman (1997).

2.1. Description of a training program

The training program was English-taught and was based on the use of *MS Office 365* cloud services – *OneDrive, OneNote* – for organizing and managing the project work of students studying Economics in their learning of professional English. *Prime Decisions* was additionally used to make informed decisions and MS Project - to plan the sequence of project implementation. The essence of the project was to develop a product of the future (based on our checklist) and packaging for it that would meet the concepts of triple sustainable development criteria (3P - People-Planet-Profit). With regard to the product, students had to take the following parameters into account: target audience, product benefit in solving a specific audience problem, environmental friendliness, profitability, and packaging, shape, size, colour, logo, relevant photo and text and competitive appearance, etc. To implement the project, students were divided into five cross-functional task forces, which were guided by a lecturer and consisted of students studying Marketing, Economics, Design, Consumption, Ecology, Psychology, etc. Typical forms of interaction between project team members were: online meetings for: brainstorming, analysis, presentation of information, negotiations, voting; correspondence, joint copywriting work, surveys of target audience through social networks (other Internet resources); creation of a promo-video and advertising campaign through the constituents of the "sales funnel" (website, YouTube channel, Instagram, etc.).

The evaluation of the projects in the voting format involved experts from among lecturers and business representatives, taking into account the number of likes to the promo-videos and social media pages. Let us visualize the course of the study (see Figure 1).

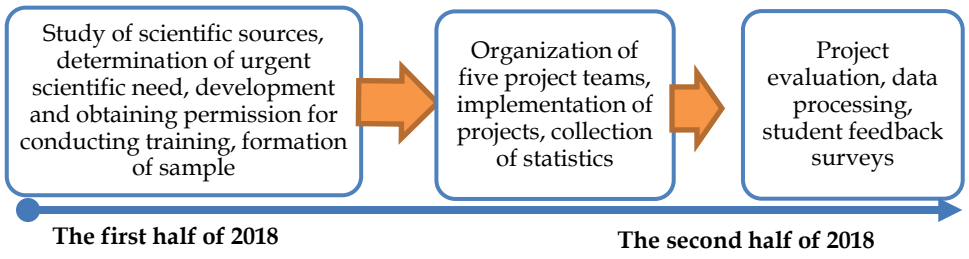

Figure 1: Course of the study

2.2. Population Sampling

This study relies on a random sampling technique. The general population for this study was 213 undergraduates in their 2nd-3rd year of the first (bachelor) level who were seeking a degree in Marketing and Advertising, International Economics, Finance, Green Economics and Ecology and Information Technology of the Vadym Hetman Kyiv National Economic University (KNEU) (133 persons) and the Kyiv National University of Trade and Economics (KNTEU)

(101 persons) with the same level of success. After calculating the size of the required (representative) sample using the Qualtrics (n./d.) (with 90% confidence probability, 9% error) and applying exclusion criteria, such as: student's consent to participate, level of proficiency in English, a student's self-assessment in computer skills, the total population was reduced by 96 people, **60** people left. This figure was the starting point for the formation of the experimental group (EG) ($n = 30$) and the control group (CG) ($n = 30$). For the implementation of the projects, five cross-functional groups of six each were created in the EG.

At the pre-experimental stage, we found that the results of the diagnostic tests for educational motivation, self-confidence, cognitive and creative skills in both groups were approximately the same, suggesting that the groups could be involved in the study. The test results and comments are presented in ***Appendix*** section (see Tables A1-A5).

Based on the above results, a *t*-test was conducted with the above variables to examine whether there had been a significant difference between the means of two groups and whether the EG and CG sampled groups could be involved in the experiment (see Table 1 below).

Table 1: Prior-the-treatment *T-test* results showing the homogeneity of the EG and CG

Axis	Groups	*Mean*	*SD*	*SE*	*t-test*	*df*	*p*
EM	EG, $n = 30$	2.31	0.32	21	0.47	47	0.008
	CG, $n = 30$	2.56	0.28				
SC	EG, $n = 30$	2.63	0.36	22	0.51	47	0.027
	CG, $n = 30$	2.67	0.41				
CgS	EG, $n = 30$	3.17	0.28	19	0.65	47	0.006
	CG, $n = 30$	3.13	0.29				
CrS	EG, $n = 30$	2.19	0.27	21	0.53	47	0.007
	CG, $n = 30$	2.23	0.31				
DMS	EG, $n = 30$	3.39	0.41	26	0. 67	47	0.063
	CG, $n = 30$	3.41	0.43				

Note. EM - educational motivation; SC-self-confidence, CgS – cognitive skills, CrS - creative skills, DMS - decision-making skills; p<.05; n – number of students; M - arithmetic mean; SD – standard deviations; SE – standard error.

The above results suggested that both groups were approximately the same in composition and could participate in the experiment.

2.3. Tools for collecting and processing statistics

The following tools were used to collect data in this study: Rasch academic motivation measurement models (Hancock, Stapleton & Mueller, 2018), Byrne and Matotti academic confidence measurement techniques in modification of Sachitra and Bandara (2017); methods of diagnostics of cognitive reflection and decision making by Frederick (2005) and a questionnaire to determine the level of thinking creativity of Kumar, Kemmler and Holman (1997). The Rasch Unidimensional Measurement Model (RUMM-2010) software (Andrich, Sheridan & Luo, 2000) was used to process the results of the diagnostic tests on educational motivation, and SPSS 10.0.5., Statistica v. 5.5 A., MathCAD 2000 Pro were used for the other tests.

3. Results

Five student-designed projects were the primary tangible and measurable result of this study. These included the ones entitled "Knowledge Pills for Lazy Students", "Laughing Gas for Rabbits", "Self-cleaning Plates", "Phone-lickspittle" and "Potable Lie Detector".

The repeated measurements of the investigated variable which were educational motivation and self-confidence, along with cognitive, creative and decision-making skills showed the changes to have taken place in every variable in both groups. The results of the post-experimental diagnostics applying the above tools for collecting and processing statistics to the CG and EG students are provided in the ***Appendix*** section (see Tables A6-A10).

The *t*-test was conducted again to identify whether there was any shift in the mean figures of EG and CG sampled groups (see Table 2).

Table 2: Post-the-treatment *T-test* results to identify the shift in the mean figures of the variables for the EG and CG sampled groups

Axis	Groups	*Mean*	*SD*	*SE*	*t-test*	*df*	*p*
EM	EG, $n = 30$	2.92	0.41	19	0.43	47	0.088
	CG, $n = 30$	2.63	0.31				
SC	EG, $n = 30$	3.12	0.39	21	0.56	47	0.032
	CG, $n = 30$	2.93	0.37				
CgS	EG, $n = 30$	3.86	0.29	16	0.72	47	0.016
	CG, $n = 30$	3.25	0.28				
CrS	EG, $n = 30$	3.02	0.31	17	0.58	47	0.071
	CG, $n = 30$	2.69	0.27				
DMS	EG, $n = 30$	3.94	0.39	22	0. 73	47	0.074
	CG, $n = 30$	3.55	0.42				

Note.EM - educational motivation; SC-self-confidence, CgS – cognitive skills, CrS - creative skills, DMS - decision-making skills; p<.05; n – number of students; M - arithmetic mean; SD – standard deviations; SE – standard error.

It can be seen that there was a greater shift in the mean figures for all the variables for the EG than the ones for the CG that might be considered the result of the participation of the EG students in the project.

The consolidated results of diagnostic tests on educational motivation, self-confidence, cognitive and creative skills at the pre-experimental and post-experimental stages can be seen in Figures 2, 3 below.

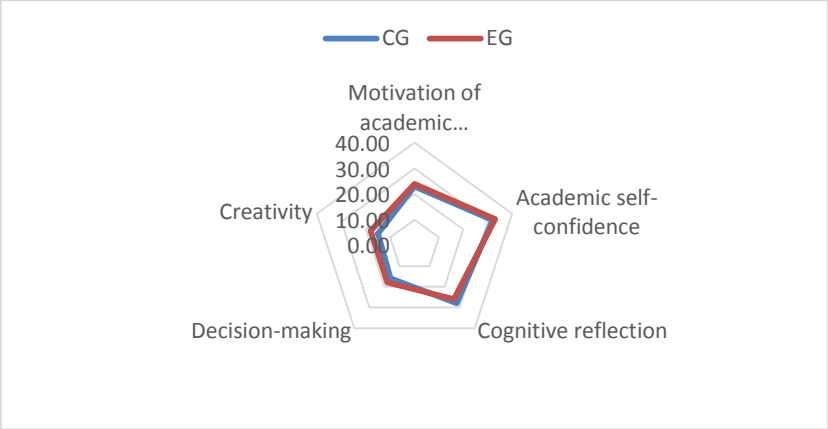

Figure 2: Consolidated results of diagnostic tests on educational motivation, self-confidence, cognitive and creative skills at the pre-experimental stage, in %

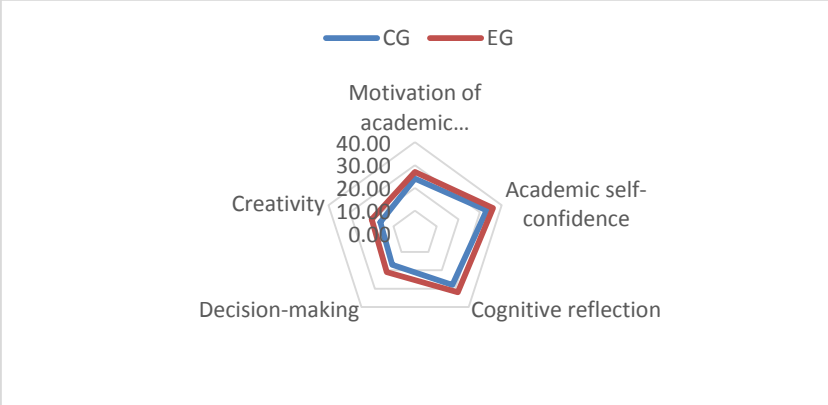

Figure 3: Consolidated results of diagnostic tests on educational motivation, self-confidence, cognitive and creative skills at the post-experimental stage, in %

As we can see from the tables and charts, both groups (CG and EG) showed positive changes (towards reduction) in overcoming students' attitude and behavioural difficulties, levels of academic self-confidence, cognitive reflection, decision-making, and creativity of thinking, however, these changes are more significant in the EG group, making up about 18%. The results are illustrative of the effectiveness of the English-taught training program implemented through the use of *MS Office 365* cloud services.

3.1. Limitations of the study

The type of cloud services (*MS Office 365*), the student specialization, the age of the general population, the tools for collecting statistics can be considered as limitations of this study.

4. Discussion

The results of this study suggest that integration of cloud technologies into the process of teaching foreign languages at higher education institutions could be possible and effective, as evidenced by implemented English-taught training program based on the use of *MS Office 365* cloud services.

The findings presented here are consistent with the ones from other national and international studies (Al-Zoube, El-Seoud & Wyne, 2010; Altun, 2015; Barhate & Narale, 2015; Khampusaen, 2014; Negoescu & Boştină-Bratu, 2016; Patel, 2013; Siddiqui et al., 2019). The latter revealed the use of cloud-based teaching from the perspective of benefits like customising, cost-effectiveness, reaching the students, availability. Furthermore, some studies did not sufficiently present the content and the experimental process. This research followed it up and examined the benefits of the use of *MS Office 365* cloud services from the perspective of a student.

This study found that the use of these services extended the pedagogical opportunities and increased the potential for influence on academic self-confidence, cognitive reflection, speed of decision-making, creativity of thinking and helps to overcome students' attitude and behavioural difficulties by creating informal, creative and liberal environment. The students of EG had enhanced the desire for excellence and personal incentives, the desire to learn. They had gained more self-confidence in learning activities, had become more informed and prompter to make decisions. In the creative component of the personality of EG students there had been noticeable shifts in their behavioural self-regulation, the use of other people's help (team skills), the use of senses.

This study has complemented and deepened the study of the problem of cloud technology integration in higher education institutions in such areas as: integrating cloud technology into teaching and learning (Barhate & Narale, 2015; Al-Zoube, El-Seoud & Wyne, 2010); implementation of technologies in the process of teaching foreign languages (Altun, 2015; Negoescu & Boştină-Bratu, 2016; Ahmadi, 2018) and the application of cloud technologies in teaching foreign languages (Khampusaen, 2014; Kravtsov & Gnedkova, 2016). The theoretical and practical experience of the author of the publication outlined a niche for further research on the problem of integration of cloud technologies into the teaching process in higher education institutions.

5. Conclusion

It has been found that the problem of integrating cloud technologies into the teaching process in higher education institutions and into the teaching foreign languages, in particular, is a point of interest of academic scholars, as they gradually become a full-fledged educational tool, allowing all institutions to

create their own online spaces. In terms of language teaching methods, the used in this study teaching approach proved to create the learning environment helping to deal with the students' communication and interaction barriers, reluctance to being engaged resulted in the enhanced students' learning activity, their motivation for learning.

This approach addressed the students' needs in developed logical (critical) thinking and creative tactic to problem-solving, student memory (cognitive component). Cloud services allowed visualizing complex content in a simple and convenient format (live scribing, interactive images (based on Thinglink and LearningApps.org) infographics, video presentations, etc.), which in turn engaged different channels of information perception: hearing and vision, as well as the imagination of a person, and contributes to its better understanding and memorization. The integration of cloud (education) services in general proved to increase the efficiency of the learning process.
The further research is needed in developing a model of professional training or advanced training of philologists in the use of cloud technologies in pedagogical activity.

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Appendix A

Table A1: Pre-experimental mean values form diagnostic tests on educational motivation (by Rasch Academic Motivation Measurement Model (Njiru, 2003)

Aspects of motivation / Groups	*SP*		DL		*PI*		*Chi Sq.*	Probability	*SE*	Residual
	A	B	A	B	A	B				
CG, $n = 30$	*- 0.67*	*0.49*	*- 0.41*	*0.62*	*- 0.89*	*0.41*	8.76	0.69	0.05	*1.21*
EG, $n = 30$	*- 0.71*	*0.52*	*- 0.43*	*0.63*	*- 0.88*	*0.39*				*1.16*

Note: *SP - Striving for Perfection* (standards, goals, objectives, efforts, values and capabilities); *DL - Desire to Learn* (interest, learning from others and being responsible for their own learning); *PI - Personal Incentives* (external, internal and social benefits); A - attitude difficulties, B - behavioral difficulties.

The residual figures being 1.21 for the CG and 1.16 for the EG, which are supposed to vary between $-2 < x < +2$ suggest that they were acceptable. Even though the figures seemed to fit the Rasch's model, attitudinal aspects of personal incentives were inclined to be the lowest while behavioural features of desire to learn reached its high of 0.62 in the CG and 0.63 in the EG.

Table A2: Pre-experimental mean values from diagnostic tests to determine the level of academic self-confidence (by Byrne, Flood and Griffin (2014) and Matoti (2011) method in modification of Sachitra and Bandara (2017))

Groups	The mean value of student responses(a five-point Likert scale)	*SD*	Cronbach's alpha	*p*-value	Average level of academic confidence, %	
					Yes	No
CG, $n = 30$	3.24	*.946*	0.791 (> 0.7)	<0.05	64	36
EG, $n = 30$	3.21	*.944*			62	38

It seemed clear the figures for the level of academic self-confidence mwasured with a five-point Likert scale were almost similar in both groups (CG - 3.24 and EG – 3.21).

Table A3: Pre-experimental mean figures for the diagnosis of cognitive reflection (by the method of Frederick (2005))

Groups	*The average indicator for the results of the diagnosis of cognitive reflection*	*Low level*		*High level*	
		0	*1*	*2*	*3*
CG, $n = 30$	1.51	25%	25%	25%	25%
EG, $n = 30$	1.53	24%	24%	26%	26%

Judging by the mean values for cognitive reflection, the mean values suggested that both groups performed approximately equally (CG – 1.51 and EG – 1.53).

Table A4: Mean figures from decision-making diagnostics (by the method of Frederick (2005))

Decision type	*Low level of cognitive reflection*		*High level of cognitive reflection*		*Statistical significance*
	CG	*EG*	*CG*	*EG*	
Impulsive	+1.01	+1.02	-0.21	-0.23	$p < 0.001$
Delayed	+1.05	+1.07	+1.06	+1.08	n.s.
Determined by the foreseeable consequences	+2.49	+2.47	+1.64	+1.59	$p < 0.01$
Determined by hesitation	-1.16	-1.15	+0.11	+0.13	$p < 0.01$

The mean figures distributed by the decision type, the one entitled "Determined by the foreseeable consequences" appeared dominant.

Table A5: Pre-experimental mean values from the diagnosis of the level of thinking creativity on eight scales (5-point rating scale) (by the methodology and questionnaire of Kumar, Kemmler and Holman (1997))

Scales / Groups	1	2	3	4	5	6	7	8	Cronbach's alpha (average)
CG, $n = 30$	3.4	3.7	2.9	3.1	2.6	2.1	3.1	2.3	.76
EG, $n = 30$	3.1	3.5	2.6	3.6	2.4	2.3	3.5	2.5	

Conventions: Questionnaire scales: 1 - Kumar and Holman's global measure of creativity; 2- Belief in Unconscious Processes; 3 - Use of techniques; 4 - Use of other people; 5 - Final Product Orientation; 6 - Environmental control/ Behavioral self-regulation; 7 - Superstition; 8 - Use of Senses

It looks undoubtful that the figures for creativity parameters are more or less the same and more or less equally distributed on the scale.

Table A6: Post-experimental mean results of diagnostic tests on educational motivation (by Rasch Academic Motivation Measurement Model (Njiru, 2003))

Aspects of motivation of academic achievements / Groups	*SP*		DL		*PI*		*Chi Sq.*	Probability	*SE*	Residual
	A	B	A	B	A	B				
CG, $n = 30$	*- 0.65*	*0.47*	*- 0.39*	*0.60*	*- 0.86*	*0.39*	*7.76*	0.65	0.05	*1.19*
EG, $n = 30$	*- 0.65*	*0.46*	*- 0.39*	*0.57*	*-0.83*	*0.34*				*1.13*

Conventions: *SP - Striving for Perfection* (standards, goals, objectives, efforts, values and capabilities); *DL - Desire to Learn* (interest, learning from others and being responsible for their own learning); *PI - Personal Incentives* (external, internal and social benefits); A - attitude difficulties, B - behavioral difficulties.

Table A7: Post-experimental mean results of diagnostic tests to determine the level of academic self-confidence (by Byrne, Flood and Griffin (2014) and Matoti (2011) method in modification of Sachitra and Bandara (2017))

Groups	The average value of student responses(a five-point Likert scale)	*SD*	Cronbach's alpha	*p*-value	Average level of academic confidence, %	
					Yes	No
CG, $n = 30$	3.28	*.945*	0,793 (> 0,7)	<0.05	68	32
EG, $n = 30$	3.88	*.945*			72	28

Table A8: Post-experimental mean results of the diagnosis of cognitive reflection (by the method of Frederick (2005))

Groups	*The average indicator for the results of the diagnosis of cognitive reflection*	*Low level*		*High level*	
		0	*1*	*2*	*3*
CG, $n = 30$	1.52	25%	25%	24%	26%
EG, $n = 30$	1.58	20%	24%	28%	28%

Table A9: Post-experimental mean results of decision-making diagnostics (by the method of Frederick (2005))

Decision type	*Low level of cognitive reflection*		*High level of cognitive reflection*		*Statistical significance*
	CG	*EG*	*CG*	*EG*	
Impilsive	+1.00	+0.79	-0.20	-0.20	$p < 0.001$
Delayed	+1.03	+0.98	+1.02	+1.26	n.s.
Determined by the foreseeable consequences	+2.51	+2.68	+1.65	+1.73	$p < 0.01$
Determined by hesitation	-1.02	-0.94	+0.12	+0.18	$p < 0.01$

Table A10: Pre-experimental mean results of the diagnosis of the level of thinking creativity on eight scales (5-point rating scale), post-experimental stage (by the methodology and questionnaire of Kumar, Kemmler and Holman (1997))

Scales / Groups	1	2	3	4	5	6	7	8	Cronbach's alpha (average)
CG, $n = 30$	3.5	3.9	3.1	3.2	2.8	2.2	3.3	2.5	.79
EG, $n = 30$	3.8	4.1	2.9	3.9	2.8	2.7	3.9	2.9	

Conventions: Questionnaire scales: 1 - Kumar and Holman's global measure of creativity; 2- Belief in Unconscious Processes; 3 - Use of techniques; 4 - Use of other people; 5 - Final Product Orientation; 6 - Environmental control/ Behavioral self-regulation; 7 - Superstition; 8 - Use of Senses.