SciVerse ScienceDirect

Procedia - Social and Behavioral Sciences 30 (2011) 1096 – 1102

Procedia
Social and Behavioral Sciences

WCPCG-2011

Effects of learning styles and time management on academic achievement

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Abstract

The present paper presents an experiment conducted between November 2009 and February 2011. The main hypothesis of the study was that efficient time management, under the guidance of an educational counselor, lead to significant increases in students academic performances and, consequently, lead to academic success. A number of 130 participants with low academic performances after the first two semesters (October 2009 – February 2010 – First semester, March – June 2010 – The second semester) participated in the study. All participants had above average or superior intellectual abilities (according to baccalaureate results). The educational counselor elaborated individualized and flexible programs for each participant in the experimental condition according to students learning styles, circadian, and eating rhythms, and daily and weekly effort curves. The program included planning of all activities participants were to develop during the two months of the experimental intervention. The results confirmed the hypothesis, showing the efficiency of time management individualized programs.

Selection and/or peer-review under responsibility of the 2nd World Conference on Psychology, Counselling and Guidance.

Keywords: Time management, learning styles, academic succes;

1. Introduction

In Romania, college admission to many study programs is based on a file. Baccalaureate grade is the selection criteria for both budgeted and fee admission. We noticed, on an empirical basis, that a significant percentage of students have lower academic results in their first semester than the baccalaureate results. Most of students complain about the lack of time for learning. Considering this situation, we initiated an investigation in order to establish if efficient time management could be a solution.

Learning styles are defined as the personal preference for using certain learning strategies and techniques. According to some authors (Linksman, 1999), one can increase his or her academic results by knowing his learning style and adopting adequate learning techniques. Main characteristics of the four styles are presented as follows. *Auditory style* – learns by listening conversations, explanations or presentations; speaks loudly during the action taken in order to learn; speaks in mind; surrounding noises easily distract him; learns much more easily when reading aloud the material; prefers oral responses rather then written ones. *Visual style* – learns by perceiving the written material; processes information by using figures, maps, images, diagrams; learned material is fixed through re-reading or re-writing; places great importance on details; retains much easier what is seen than what is heard;

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Selection and/or peer-review under responsibility of the 2nd World Conference on Psychology, Counselling and Guidance.
doi:10.1016/j.sbspro.2011.10.214

forgets verbal instructions; reads fast and correct; prefers written responses rather then oral ones. *Kinesthetic style* – prefers to be physically involved in the learning activity; uses non-verbal communication; learns best in situation in which he can experience; lack of activity leads to agitation; builds models and manipulates objects in order to find explanations to abstract concepts; rarely talks; retains learning material while walking; uses body action to demonstrate what he learned.

2. Time management. Theoretical aspects

Transition from high-school program (with fix schedule for the whole week, mandatory attendance to courses, daily homework) to higher education program (with flexible schedule, long breaks during courses, non-mandatory attendance to courses, final evaluations only) may lead to time wasting. Almost 73% of students start learning or actually learn with less than one week before exams period. Overwhelmed by the volume of learning material and the short period available, they fail in reaching the previous performance, which was strongly associated to their intellectual abilities. Time management becomes important for each student, but it is most important for those students employed in a job or a volunteer activity. Students should be aware of their working rhythm and should learn to organize their activities according to all factors influencing performance. According to Carroll's model (Ionescu, 1995), psychological time can act in a constructive or destructive manner on intrinsic motivation, supporting or inhibiting activity, therefore constructing temporal perspective through setting objectives (or aspiration level) becomes necessary. Time is a major resource in learning, the way in which people perceive and invest time reflects on learning results. The evolution of beliefs regarding time organization (Covey, 1998) recorded four distinct generations, characterized as follows: keeping records through notes and lists; trying to look to the future through indexes, tables and agenda; setting priorities and planning through objectives; moving interest center from time to maintaining balance between production and production capacity (according to urgency and importance).

Time management is an ability that can be developed at any age, if the person desires to improve the results of his actions (Dale, 1993). Previous research (Magher, 2005) shows that students are much more motivated if they can solve the task in a personal rhythm. Students should be aware of the hours of maximum effort and should adapt their personal rhythm to circadian and ultradian rhythm (Clinciu et al., 2005). Circadian rhythm is a result of light-dark alternation. Circadian rhythms repeat cyclic at every 24 hours, the duration of each component (light and dark) varies as a function of Earth position to the Sun. Most physiological processes relates to these rhythms. Each day, at regular periods, the human body needs food, sleep, activity, lack of activity, energy. Body temperature, heart beats, blood pressure, hormonal levels, urine flux increase and decrease in a predictable rhythm influenced by exposure to light or dark. In the absence of natural light, the circadian rhythms desynchronize leading to exhaustion. Under the impact of circadian rhythm, vigilance (Montagner, 2002) varies, these variations becoming the effort curve. The ultradian rhythm refers to activity-break alternation. The duration of an activity in post-adolescence period should be of no longer than 90 – 100 minutes (Clinciu et al., 2005). Active breaks are recommended: if the learning activity requires left hemisphere, the 10 – 15 minutes breaks will consists of an activity requiring right hemisphere. Food rhythm – dictated by body's need for food – influences learning, three meals a day are recommended in order to maintain under control its influence.

3. Methodology

The present paper is based on an experiment conducted during November 2009 and February 2011. The main ***hypothesis*** of the experiment is: efficient time management under the guidance of an educational counselor lead to significant increases in academic performance of students and, consequently, lead to academic success.

Methods: 1. Interests' constellation and time management grid (adapted for the experiment after Magher, 2005) – G.C.I.G.T. – consists of 28 observational domains, categorized in extra-curricular activities (Group A) and curricular activities (Group B), the 14 categories in each group are ranked. The grid was a measure of average time allocated for different activities; data were collected both in pre-test ant post-test. 2. Learning style questionnaire

(Linksman, 1999). 3. Analysis of school documents (in order to identify students evolution and oscillations in academic performance). 4. The experiment. 5. Statistical analysis of data.

Participants. In the experiment were included 130 participants, all students at Wood Engineering, Food and Tourism, Constructions, Mathematics and Informatics, Forestry, Economical Sciences. The participants had low learning performances after two exams periods (October 2009 – February 2010 – First semester, March – June 2010 – The second semester) and above average and superior intellectual abilities (according to baccalaureate results). By drawing lots, we divided participants in two groups, students with odd numbers were assigned to the experimental group (EG) and those with even numbers to the control group (CG). There were 65 students in the experimental group, 22 women and 43 men, and 65 students in the control group, 37 women and 28 men. The two groups were homogenous regarding material conditions and health.

The experiment. The educational counselor elaborated an individualized and flexible program for each participant according to students learning styles, circadian, ultradian, food, physical rhythms, and daily and weekly effort curves. The program included planning of all activities participants were to develop during the period of the experiment.

In pre-test, we applied G.C.I.G.T., the obtained results showing no significant differences between the experimental group and control group regarding average time allocated for learning, housekeeping activities, and lost time. In these phase, data on academic results obtained after the two semesters were collected.

In the intervention phase, we elaborated the time management programs according to individual characteristic of participants. The programs elaboration started with the analysis of interests' constellation and time management grid and continued with an activities plan for the next period. The analysis of G.C.I.G.T. revealed that from the total of 168 hours per week, the experimental group allocated, in average: 3.41 hours for learning activities, 17.33 hours for attending courses (from 20 hours maximum), 58.12 hours to entertainment activities (computer games, social activities with friends, watching TV), 38.54 hours for sleep, 9.37 hours for meals, 17.08 hours for personal hygiene, 34.15 hours for other activities (shopping, housekeeping, etc). Time management program included: setting of learning objectives; establishing criteria for success (according to learning style); identifying aspects that required development and their inclusion in well specified time intervals; mandatory activities and academic schedule; active breaks; complementary activities (in case of postponement or cancelation of mandatory activities); daily time for individual study; entertainment activities (flexible program, but with mentioned time intervals); sleep program (8 – 9 hours a day); meals program (without recommendations regarding nutrition). On the circadian rhythm, the waking hour was 6.00 a.m. (with one hour variation in weekends) and bedtime at 22.00 – 22.30 p.m. Meals were compulsory and were taken at 06.30 – 07.00 a.m. – breakfast, 13.00 – 14.00 hours lunch, and 19.00 – 21.00 hours – dinner, according to academic schedule. The optimal time intervals for intellectual activities were 09.00 – 12.00 a.m. and 16.00 – 19.00 p.m.

In each evening, a list with all the activities for the next day was made. The list included the order of priorities according to urgency, the hour for each activity, the complementary activities. Some of the principles taken under consideration in programs elaboration were: time interval for serving meals was not overlapped with any other activity, regardless of its nature (activities before meals were ended with 10 minutes earlier), short period of time for unpredicted activities were allocated (during the experiment, most unpredicted activities were associated with social activities with friends). Usually, the program was flexible during the time intervals in which vigilance was low. During the program, the scheduled time for study and the actual time were measured, the preparation time for an activity and the time necessary for its completion, the estimated time and the consumed time for planned activities were also taken into account. There were many adaptations during the program implementation, but the critic points remained constant (waking hour, bedtime hours, meals time, and individual study time).

In the post-test phase of the experiment, the interests' constellation and time management grid was applied, the obtained results showing significant differences between experimental group and control group regarding the average time allocated for learning, the average time allocated for housekeeping activities, and average lost time. Academic performances obtained in the second semester were collected in this phase. The analysis of G.C.I.G.T. in post-test showed, for the experimental group, a mean of 27.42 hours allocated for learning activities, 15.40 hours for course attendance, 19.50 hours for entertainment activities, 49.37 hours for sleep, 11.23 hours for meals, 18.41 hours for personal hygiene, and 26.67 hours for other activities.

4. Results

The analysis of obtained results regarding time management of the experimental group, in pretest and posttest, shows an improvement; the time allocated for individual study increased from 03.41 to 27.42 hours, while the time allocated for entertainment decreased from 58.12 to 19.50 hours.

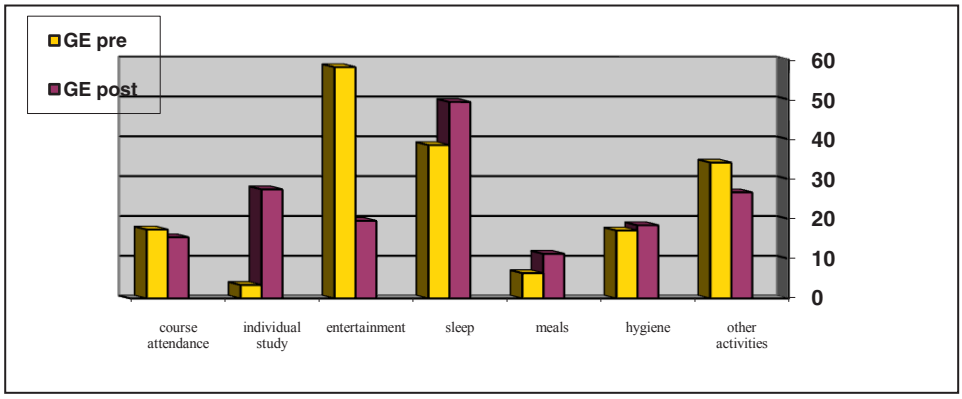


Figure 1. Time management in pretest and posttest – experimental group

The t test for independent samples shows no significant differences in pretest between the two groups (the control and the experimental one), which proves that the two groups were equivalent

Table 1. Pearson correlations between high school results (grades) and academic results (N = 130)

	Pearson correlation	Mean pretest First semester	Mean pretest Second semester	Mean posttest Third semester
Baccalaureate grade + Highschool grades	r	.123	.199	.105
	p	.165	.023	.234

Pearson correlations coefficients reveal no significant association between the grades mean during high school and the grades mean obtained in the first semester in university, which proves that the grades during high school and baccalaureate results are not a good predictor of academic results in the first year of study. We can explain these results by the fact that adaptation to a new environment (a new study program, new colleagues, leaving home, integration in a new group, new academic requests) seems to influence academic results of students. High school grades positively associate with academic results from the second semester ($r(129) = 0,19$, $p= 0,02$). Once the students accomodate to a new learning style and living style, adaptation dificulties no longer influence academic results, which now reflect the level of anterior results (Table 1).

Table 2. Mean differences between academic results according to dominant learning style

	Learning style	N	Mean	Std. Deviation	F	df	p
Baccalaureate grade + high school gades	*visual*	40	8.92	.67	.397	(2,129)	.673
	auditory	61	8.98	.62			
	kinesthetic	29	8.85	.70			
Mean pretest First semester	*visual*	40	5.87	.69	.488	(2,129)	.615
	auditory	61	5.82	.60			
	kinesthetic	29	5.72	.62			
Mean pretest Second semester	*visual*	40	5.73	.58	.113	(2,129)	.893
	auditory	61	5.70	.56			
	kinesthetic	29	5.66	.62			
Mean pretest Third semester	*visual*	40	7.15	1.49	.363	(2,129)	.696
	auditory	61	7.33	1.62			
	kinesthetic	29	7.46	1.42			

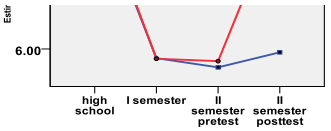
Analysis of variance revealed that in pretest, as well as in posttest, there are no significant differences between academic performances of students according to their learning styles (Table 2).

Regarding the efficiency of the experimental intervention program, the t test for independent samples revealed that participants in experimental group significantly improved their academic results compared to participants in the control group. Cohen's d coefficient reveals a strong effect size, which demonstrates the efficiency of the program.

Table 3. Mean differences for academic results in posttest

	Group	N	Mean	Std. Deviation	t	df	p	d Cohen
Academic results in posttest	control	65	5,93	0,72	-23,31	128	.000	4,49
	experimental	65	8,68	0,61				

The use of Anova with repeated measurements in order to highlight the differences on the levels of academic results between different testing phases revealed distinct patterns of the evolution of academic success according to participants inclusion in the experimental program, as follows. Participants in the control group obtained lower academic results after the first two semesters of the academic year; their results were significantly lower than their anterior level (high school grades). Their results improve at the end of the second semester, but this improvement is less significant than that of the experimental group; the results at the end of the academic year are significantly lower than their initial results (during high school) ($t(64) = 22, 83$, $p < 0.001$). The participants in the experimental group obtain lower results than their anterior level (high school grades) during the first and second semester of the first academic year (as revealed in pretest), but their results significantly increase after attendance in experimental program; academic results reached a level similar with that of anterior results ($t(64) = 3,24$, $p = 0,002$) (Figure 2).



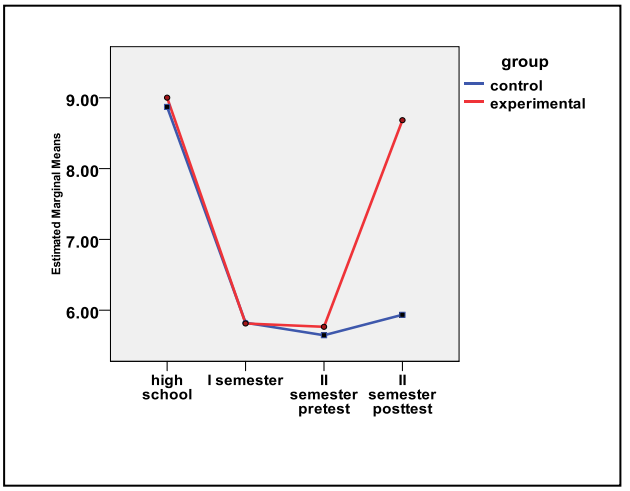


Figure 2. Differences between academic results in four distinct testing phases

Obtained results demonstrate that efficient time management under the guidance of a educational counselor, lead to significant increases in the academic performances of students, and, consequently, to academic success.

Table 4. ANOVA results for differences in academic results in four distinct testing phases

Group	(I)	(J)	Mean Difference (I-J)	Sig.	F	df	Sig	Eta Squared
Control	*High school*	*First semester*	3.04*	.000	154,11	3, 192	.000	.85
		Second semester pretest	3.22*	.000				
		Second semester posttest	2.93*	.000				
	First semester	*Second semester pretest*	.17	.486				
		Second semester posttest	-.11	1.000				
	Second semester pretest	*Second semester posttest*	-.28	.096				
Experimental	*High school*	*First semester*	3.19*	.000	545,4	3, 192	.000	.90
		Second semester pretest	3.23*	.000				
		Second semester posttest	.31*	.011				
	First semester	*Second semester pretest*	.04	1.000				
		Second semester posttest	-2.87*	.000				
	Second semester pretest	*Second semester posttest*	-2.91*	.000				

The t test for paired samples revealed significant differences between pretest and posttest. Participants in the experimental group significantly improved their academic results, effect size being strong. Participants in the control group improve their academic results in the second semester, but these improvements are less significant and the effect size is weak. The improvement of academic results can be explained through increased adaptation to academic requirements, while for those in the experimental program the explanation of increased performances lies in the experimental program which they attended (Table 5).

Table 5. Mean differences between the two testing moments (pretest and posttest)

Group		Mean	N	Std. Deviation	t	df	p	d Cohen
control	Mean pretest second semester	5.64	65	.50	-2.476	64	.016	0,31

experimental	Mean posttest second semester	5.93	65	.72	-24.640	64	.000	3,09
	Mean pretest second semester	5.76	65	.64				
	Mean posttest second semester	8.68	65	.61				

5. Conclusions

The hypothesis of the study was confirmed, time management has a positive impact on academic performance. Academic success has, on another perspective, a positive impact on motivation (generating motives) and on work time (which will be shorter if the task aims rapidity, and longer if the task is complex and requires continuous effort).

The results of the experiment suggest that individual learning programs should be developed in order to form a personal ability, to organize learning activity during semesters, to organize learning activity during exams periods, to teach students to organize their program, to structure their weekly learning activities.

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