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Self-discipline as a key indicator to improve learning outcomes in e-learning environment

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Abstract

E-learning environment makes learning process more efficient and attractive. However, the possibility of learning anytime and anywhere in e-learning environment requires additional attention to motivate students to acquire knowledge and prevent drop-outs. The aim of this paper is to prove that a self-discipline in daily routine knowledge acquisition process could be considered as a key parameter to improve learning outcomes. The authors prove this statement by data analysis of learner activity levels within collaborative e-learning environment and achieved appropriate competence levels. Self-discipline and motivation issues are also discussed.

Keywords: Collaborative e-environment; e-learning; learning outcomes; living lab; self-discipline.

1. Introduction

New information systems, their extensions and innovative e-learning tools make learning process more efficient and attractive. However, the possibility of learning anytime and anywhere in virtual environment requires additional attention to motivate students to acquire e-learning objects and prevent drop-outs. Usually e-learning course students do not need any reminders to take part in course activities. Online learning assumes that students access courses on regular basis and find necessary information about course activities on e-learning portal. It is also expected that online

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students become acquainted with all course materials, advisable in predefined learning path, comply with the time limitations and fulfil all required assignments.

However, these are our assumptions and expectations. In reality we are faced with different attitudes to the learning process due to a fact that people differ to each other. Encountering with difficulties, some students overcome them, others – give up.

Two big whales boost the success: self-discipline and motivation. Self-discipline is "the ability to make yourself do things you know you should do even when you do not want to" (Cambridge Dictionaries Online, 2016), "the ability to control one's feelings and overcome one's weaknesses" (Oxford Dictionaries, 2016). It is emphasized that "self-discipline appears in various forms, such as perseverance, restraint, endurance, thinking before acting, finishing what you start doing, and as the ability to carry out one's decisions and plans, in spite of inconvenience, hardships or obstacles. Self-discipline also means a self-control, the ability to avoid unhealthy excess of anything that could lead to negative consequences" (Sasson, 2016).

Low level of individual self-discipline (or self-control as the form of self-discipline) leads to different problems in social and personal life (Duckworth & Seligman, 2005). And vice versa, strong confidence and high level of self-discipline facilitates success, better achievements and reaching the goals (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012) which, in their turn, improve the mood and makes people happier and gladder (Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2013). People with high level of self-discipline much better are able to control their daily and routine activities, and as a result, usually avoid problems, cope with the tasks and overcome possible difficulties. Such people always try to find the most suitable solution to solve a problem, and their resistance desire in unfavorable conditions remains longer than those without self-control (Hofmann, Baumeister, Förster, & Vohs, 2012). It is also found that student achievements in university might be better predicted based on their self-discipline level rather than scores shown in a school diploma (Baumeister, & Tierney, 2011).

Self-discipline very frequently associates with willpower. We expect that individuals, who come to the class, will be conscientious and assiduous students. But not all of them confirms our expectations. Many individuals have lack of self-discipline to deal with acquisition of learning objects. Stress in America survey shows that 27 per cent adults have not enough self-discipline to improve their life and make necessary changes in healthy lifestyle (American Psychological Association, 2011).

Motivation is also very important component to enhance advancements. However, motivation and self-discipline does not mean the same. In the very simplified way we may put some equal sign between:

• Self-discipline and self-control/self-management
• Motivation and inspiration

Motivation is aimed to induce our emotions, to do something which we are interested in. Illusions, which often keep motivation at rather high level, eventually can be crashed. You need improving motivation all the time to reach the goals and fulfil the dream. Even small obstacle may destroy your illusion when your way to success is based on motivation only. And as a result, your goals might not be achieved.

Contrary, self-discipline does not rely on emotions. There is no need to wait for a good mood. Self-discipline is like a learning object – everybody ought to learn it (in particular, how to overcome laziness, uncertainty and fears). Self-discipline is not so popular among people. This is more complicated and difficult way to achieve success than in a case of motivational approach. But this is the most reliable way.

E-learning environment involves students in continuing educational process – all the day and working week students are engaged in wide spectrum of educational activities: lectures, seminars, tests, labs and so on. All things are scheduled, and learners just tide. E-learning offers more freedom for learners, but also requires planning of their own self-development and high self-discipline. It means that self-discipline becomes highly important to ensure learners accomplishments and allow them achieving learning goals.

Taking into account abovementioned considerations, the aim of this paper is to prove that self-discipline in daily routine knowledge acquisition process could be considered as a key indicator to improve learning outcomes.

2. Self-discipline in virtual collaborative environment

Pursuant to initially intended task to enhance learning outcomes and increase student competence levels, researchers of the Distance Education Study Centre, Riga Technical University (RTU) have developed an external

extension to existing learning management system "Moodle" in a form of collaborative e-environment module which complies with ePortfolio system standards. In addition to successful implementation and validation of this system (Gorbunovs, & Kapenieks, 2012) we have got notable positive side-effect. It was found that learner self-discipline, frequent access collaborative e-environment module, and careful implementation of particular group-working tasks, allowed to enable an achievement of better learning outcomes. Learner activities were subjected for measurements by using of Living Lab research method. To evaluate the data, statistical data processing methods were used. System users survey results also demonstrated an importance of self-discipline to achieve better results.

This section gives an overview of abovementioned side-effect. To stimulate student critical thinking skills and reflection abilities, corresponding collaborative e-learning environment in a form of ePortfolio system was created in 2011 and modified – in 2012/2013. In 2011/12 and 2012/13 academic year the system was approbated by using Living Lab research method at the RTU.

2.1. Self-discipline assessment in the first pilot

The formation of an accessibility/convenience representative sample was used in the panel sampling strategy (Mārtinsone, Pipere, Kamerāde, Kristapsone, Mihailovs, Sīle, Sīlis, Lazda, Zakriževska, & Olsena, 2011). The first pilot sample consisted of 145 RTU first year bachelor students who had attended blended learning course "Business Planning for Open Markets (BPOM)".
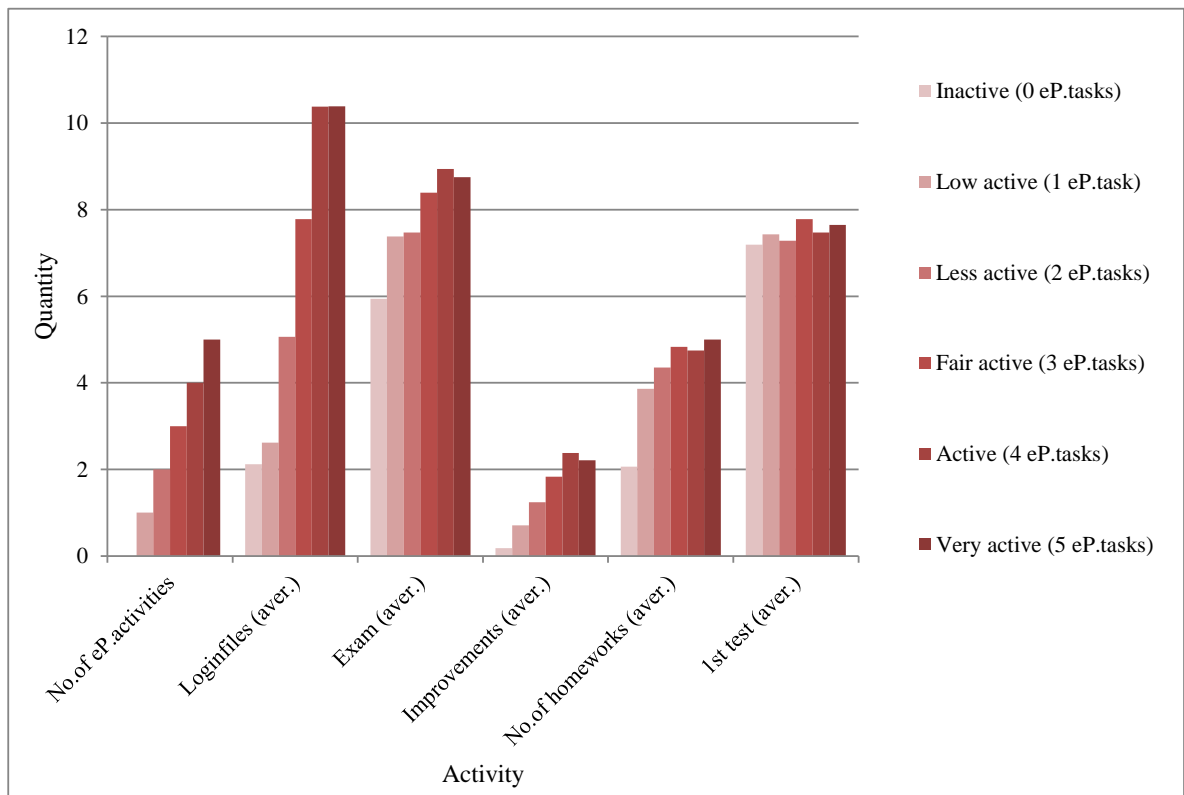

Fig. 1. Achievements depending on self-discipline in the first pilot.

Valuation of created ePortfolio system included: (a) its validation, i.e., the process at the final stage of system development to be satisfied that achieved results answer the purpose (Dosbergs, 2013), realized by prototype examination, including users activities in Living Lab, their survey results regarding system usability and efficacy,

experts opinions, among them – at the international scientific conferences and reviews of publications; (b) verification, i.e., the analysis by use of statistical data processing methods, including Excel 2010 and SPSS-21 software, and setting the system non-user group data against user group data.

Approbation results in Living Lab show effectiveness of the system which stimulates system user reflection and improves particular competence levels which associates with the course. Besides, it was also found that the self-discipline plays significant role in learner abilities to achieve learning goals and better results.

The self-discipline was measured by student activity level parameters during the course, first of all, the number of fulfilled assignments and the number of log-files. Totally, students had to participate in five consequent group-working activities in the groups of four students each. Each time they were asked to submit essays and financial calculations and assess own group members submitted files within collaborative e-learning environment (ePortfolio system). It was defined that student group compositions remains unchanged during whole course.

By implementing student self-discipline data analysis, i.e. after completion of Kolmogorov-Smirnov, Mann-Whitney and T-tests, where test values did not exceed critical values, with 95 per cent level of confidence, as well after determination of possible correlations with at least 95 to 99 per cent level of confidence, we have got approval that the self-discipline plays crucial role in achieving of learning objectives. For example, see Fig. 1.

It is found that there is a moderate positive correlation between self-discipline (the number of fulfilled assignments – routine activities within ePortfolio system) and: achieved competence levels at the end of the course (correlation coefficient r= 0.475, correlation is significant at the 0.01 level (α= 0.01)), fulfilled external tasks (r= 0.613, α= 0.01), the number of improved fulfilled assignments (r= 0.492, α= 0.01). Besides, there is also a positive correlation between the number of login files (the second self-discipline parameter) and the number of improved fulfilled assignments / submitted files (r= 0.356, α= 0.01), as well achieved competence levels at the end of the course (r= 0.269, α= 0.01). These data justify positive impact of the self-discipline on learning outcomes.

At the same time, we found weak correlation between activities within ePortfolio system and initial test results (r= 0.169, α= 0.05). As a result, it could be concluded that student achievements at the end of the course do not depend on their initial competence levels. Contrariwise, the self-discipline is the key factor which influences learners and allows them achieving objectives.
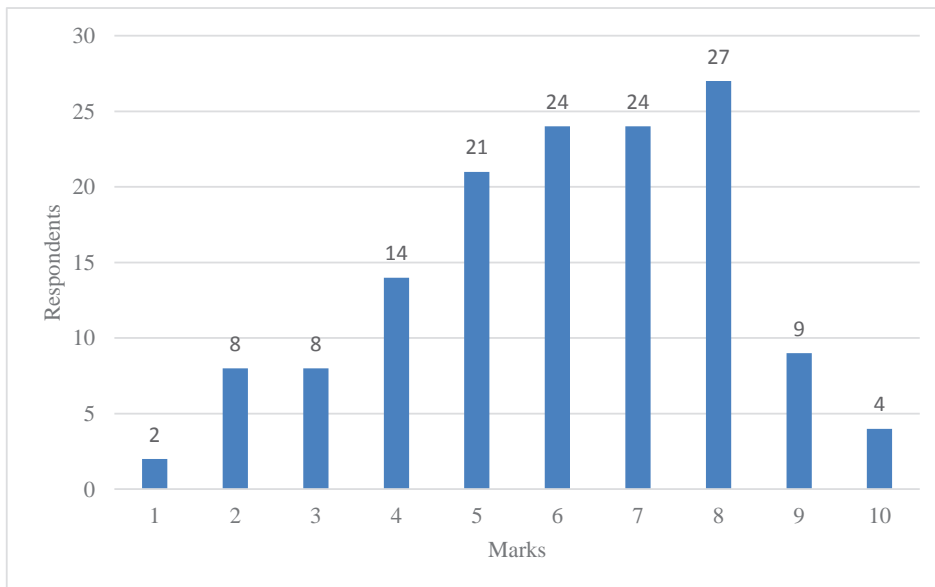

Fig. 2. Learners' thoughts about their group members' self-discipline.

At the end of the course, students were asked to complete questionnaire regarding their thoughts about self-discipline of other group members within their corresponding groups, where the worst group member self-discipline

had to be marked as "1", and the best self-discipline – "10". 141 respondents took part in the survey. It shows (see Fig. 2) that majority of respondents (88 students or more than 62 per cent) had a positive confidence about self-discipline level of their colleagues. However, 18 respondents (or almost 13 per cent) indicated that their group members had lack of self-discipline, but 40 respondents (or 28 per cent) pointed out very high their group member self-discipline level. Students high self-discipline may further other group member activity levels and their self-discipline in the positive direction; and, conversely, the lack of self-discipline of one or more students in a group can smash other group participants all positive intents and motivation which may lead to different failures, despite their rather high self-discipline.

2.2. Self-discipline assessment in the second pilot

To ensure learners more active participation in collaborative system activities and enhance their motivation, initial ePortfolio system model was modified. It provided another group formation principle. In contradistinction to the first version of developed ePortfolio system, where group composition remained unchanged from initial ePortfolio activity till the end of the course, its modified version provides group formation anew for each activity module. Besides, partial automation of the ePortfolio system was made. It allowed a teacher to download all submitted files with fulfilled assignments onto one specific directory of a file system where the system divided these files into groups – registered submitted files and group numbers in ePortfolio system data base. By doing this, we avoided possibility that any of student groups might remain blank.
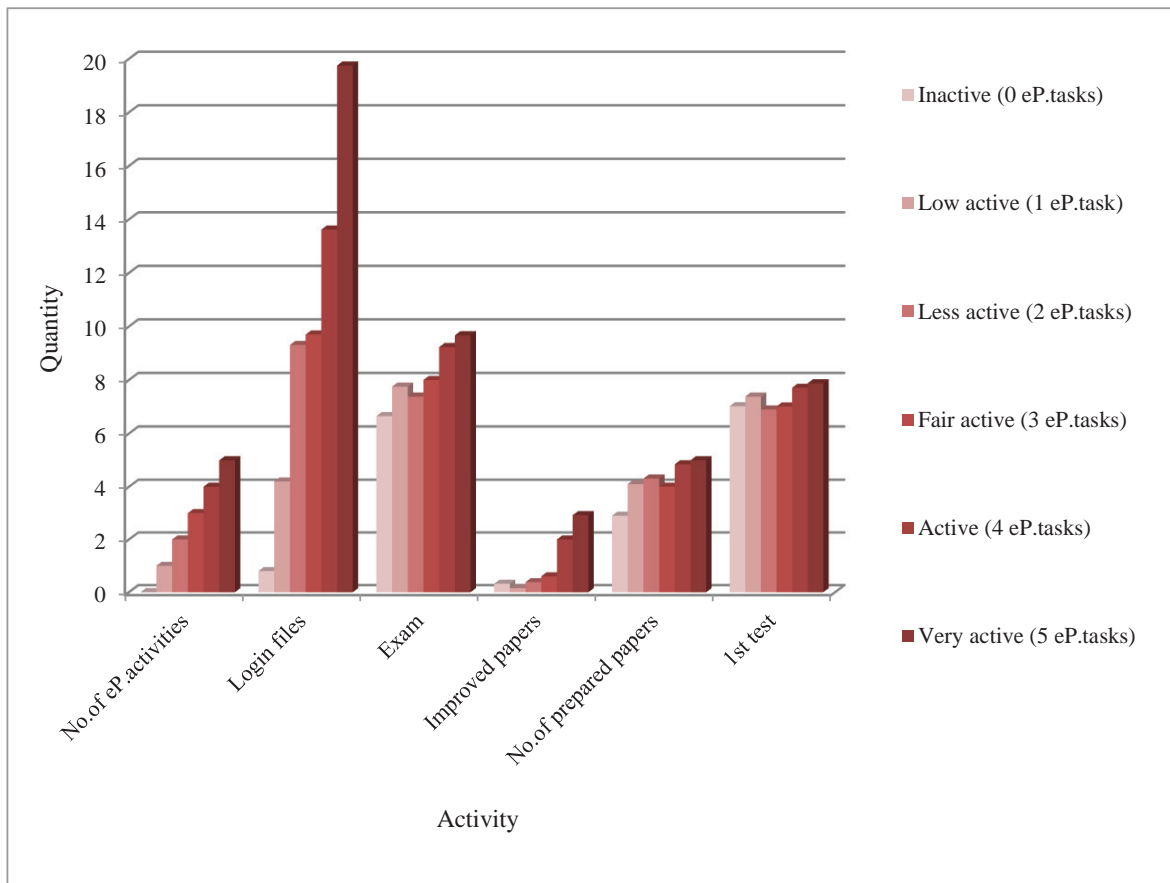

Fig. 3. Achievements depending on self-discipline in the second pilot.

To find relationship between input and output parameters of modified ePortfolio system, a representative sample of 99 students was ranked discrete into two groups: non-users group (18 students) and experimental group – ePortfolio system users with at least one login or fulfilled assignment who made one, two, three, four or five file submissions (91 students).

After completion of Kolmogorov-Smirnov, Mann-Whitney and T-tests, where test values did not exceed critical values, with 95 per cent level of confidence, as well after determination of possible correlations with at least 95 to 99 per cent level of confidence, it was established that test results are similar to previous ones made for the first prototype in 2011/12 academic year.

Again it was proved that the self-discipline plays significant role in learner abilities to achieve learning goals and improve their competences. For example, see Fig. 3. Moreover, data analysis displayed correlations which were very similar to the first pilot results.

It is found that there is a moderate positive correlation between self-discipline (the number of fulfilled assignments – routine activities within ePortfolio system) and: achieved competence levels at the end of the course (r= 0.565, α= 0.01), fulfilled external tasks (r= 0.493, α= 0.01), number of improved fulfilled assignments – the main parameter of reflection (r= 0.446, α= 0.01). There is also positive correlation between the number of login files (another one self-discipline parameter) and the number of improved fulfilled assignments (r= 0.304, α= 0.01), as well achieved competence levels at the end of the course (r= 0.393, α= 0.01).

On the other hand, we have not found any correlation between initial competence levels, which are displayed in initial test results, and the number of improved essays and re-submitted files (r= 0.023), as well exam results (r= 0.070).

Thus, achievements do not depend on initial competence levels. Moreover, similar results in both pilots may allow us to conclude that a choice of information system, tools, technology, methods and methodology also does not impact learner achievements so much as they depend on learner self-discipline. It could be underlined once again that self-discipline is the key factor which influences learners and allows them achieving the goals.

3. Conclusion and future work

Self-discipline has positive impact on learning outcomes. Achievements at the end of the learning course do not depend on student initial competence levels. Contrariwise, self-discipline is the key factor which influences learners and allows them achieving main goals. Accordingly, self-discipline in daily routine knowledge acquisition process is the key indicator to improve learning outcomes.

On the one hand, teaching staff ought to care about student motivation and make steps to strengthen this spirit during whole educational process. On the other hand, we have to keep in mind that the motivation needs to be replenished in order to maintain it at least at the previous level. To achieve the goals, crucial importance ought to be dedicated to the self-discipline; and advisably, in conjunction with motivation instruments.

Further research could involve findings on the teacher readiness to ensure efficacious continuous learning support which would depend also on teacher self-discipline, as well teacher ability to require discipline from students, in a democratic form, of course.

Further research direction might cover also studies on the impact of self-discipline levels of the one or more group participants on other group member motivation and self-discipline. Group size and learning environment in such study may differ.

References

American Psychological Association. (2012). Stress in America: Our health at risk. Retrieved 12 March, 2016 from http://www.apa.org/news/press/releases/stress/2011/final-2011.pdf

Baumeister, R., & Tierney, J. (2011). *Willpower: Rediscovering the greatest human strength*. New York: Penguin Press.

Cambridge Dictionaries Online. (2016). *Meaning of "self-discipline" in the English Dictionary*. Cambridge: Cambridge University Press. Retrieved 8 March, 2016 from http://dictionary.cambridge.org/dictionary/english/self-discipline

de Ridder, D., Lensvelt-Mulders, G., Finkenauer, C. F., Stok, M., & Baumeister, R. F. (2012). Taking stock of self-control: A metaanalysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review, 16,* 76–99.

Dosbergs, D. (2013). Verifikācija un validācija. Retrieved 15 March, 2016 from http://estudijas.lu.lv/mod/resource/view.php?id=131454.

Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16,* 939–944.

Gorbunovs, A., Kapenieks, A. (2012). Competences Development Process Recording for Multi-Competence e-Course. *Proceedings of the International Scientific Conference "Society, Integration, Education"* (vol. 1), (pp. 261–272). School Pedagogy, Higher Educational Institutions Pedagogy, Lifelong Learning. Rezekne, May 25th–26th.

Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Everyday temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology, 102*, 1318–1335.

Hofmann, W., Luhmann, M., Fisher, R.R., Vohs, K.D., & Baumeister, R.F. (2013). Yes, but are they happy? Effects of trait self-control on affective well-being and life satisfaction. *Journal of Personality, 82 (4),* 265–277. DOI: 10.1111/jopy.12050.

Mārtinsone, K., Pipere, A., Kamerāde, D., Kristapsone, S., Mihailovs, I. J., Sīle, V., Sīlis, V., Lazda, R., Zakriževska, M., & Olsena, S. (2011). *Ievads pētniecībā: Stratēģijas, dizaini, metodes*. Riga: RaKa.

Oxford Dictionaries. (2016). *Definition of "self-discipline" in English*. Oxford: Oxford University Press. Retrieved 10 March, 2016 from http://www.oxforddictionaries.com/definition/english/self-discipline.

Sasson, R. (2016). *What is self-discipline? Definitions*. Retrieved 1 March, 2016 from http://www.successconsciousness.com/blog/inner-strength/what-is-self-discipline-definitions/