

FACTORS INFLUENCING THE FIRST YEAR STUDENTS' ADAPTATION TO NATURAL SCIENCE STUDIES IN HIGHER EDUCATION

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Introduction

The study of student retention is one of the most widely studied areas in higher education. Already some 40 years ago, student attrition was typically viewed through the lenses of psychology as the reflection of individual attributes, skills, and motivation (Tinto, 2006). During the last 20 years, there has been significant interest in factors leading to student drop out from the first-year higher education studies (TEQSA, 2017).

The transition from secondary school to university is a challenging phase in a student's life (Sotardi, & Brogt, 2016, p. 3). These changes usually are connected with the study environment, the fulfilment of academic tasks and how students are able to achieve the formulated learning outcomes. The expectations of first-year students are becoming more widely researched and understood. Yet there are fewer studies about how well they feel prepared to the transition from secondary school to the tertiary learning environment (McPhail, 2015) and what is their first-year study experience of improving academic success and engagement (Kift, Nelson, & Clarke, 2010).

By its nature "adaptation is the process and outcome whereby thinking and feeling persons as individuals or in groups use conscious awareness and choice to create human and environmental integration" (Vera, 2014). According to the experience of Malaysian researchers (Abdullah, Elias, Mahyuddin, & Uli, 2009) the first six weeks are a critical period of adapting to the new environment and the solution of conflicts and problems.

Problem of Research

Approximately one third of students in higher education in the OECD countries do not complete their studies (OECD, 2016). There is a lack of systematic knowledge, data and indicators on study success in Europe: only 12 out of 35 European countries regularly report a national indicator of completion (Vossensteyn et al., 2015), and graduation rates still vary widely among European countries (from 10%–60%). Low completion rates point to



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Abstract. *The mass-approach in higher education promotes the broadening of students' number and diversity therefore the question about the young people's readiness to adapt to studies becomes more and more topical. Students who enrol in the natural science faculties of the University of Latvia (UL) are motivated and have high assessment in biology and chemistry as school subjects. However, the studies already during the 1st term prove that students encounter problems to get adjusted to the study process. In order to find out the key factors that determine the adaptation of the first-year students to studies, an e-questionnaire was developed and 79 students from the Faculty of Chemistry and Faculty of Biology were surveyed. Institutional and personal factors that are focused on the application of transferable skills are mainly those that affect the students' adaptation in the first term of studies. At the same time such issues of the academic factor as students' prior knowledge in biology, chemistry, physics and mathematics and their skill to learn independently are intrinsic for students' successful studies.*

Key words: *adaptation to studies, first year natural science students, institutional, personal and academic factors, transferable skills.*

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problems with adaptation to bachelor-level studies, and many students interrupted their studies in the first year. Students' drop-out in many EU countries has attracted the attention of many researchers, policy makers and educators. Although the situation in different countries is different and the reasons for students' early drop-out differ from student to student, there are still observable common trends including learning difficulties, socio-economic problems and the lack of motivation or insufficient support (European Commission/EACEA/ Eurydice, 2015).

According to the data of internal statistics of the University of Latvia (LUIŠ, 2017) – in 2017, the Faculty of Biology enrolled 70 students, after the 2nd term there were 53; the drop-out was 30%. Sixty students started their studies in the Faculty of Chemistry, after the 2nd term there remained 46 students; the drop-out – 25%.

The regular study performed by the Study Department of the UL shows that on the whole students are satisfied with the study environment; however, the students of natural sciences faculties in comparison with students of other faculties consider problematic the high difficulty level of studies, the skills to learn independently, the lack of prior knowledge and the inability to plan their time for studies.

A topical issue is how students actually adapt to university studies. Is this the level of students' prior knowledge or their ability to adapt to university learning, or teaching methods used by the university lecturer? Or are poor study habits, time management, and study skills among the obstacles that stand in the way of learning for many students (Tennen & Hagar, 2011)? Sometimes, graduates "discover that they do not have the skills and competences" for studying (European Commission/EACEA/Eurydice, 2015, p. 3). There is no better way to find out than to ask the students directly if something has helped them to learn and to succeed or has held them back and discouraged them from learning (Bain, 2004).

Research Focus

In order to understand the main reasons that hinder successful studies and lead to great students' drop-out in the first year, it is important to clarify the key factors that influence students to leave the studies. However, there is no complete agreement amongst researchers as to which factors are the most significant, and it is very difficult to create an absolute hierarchy of impact amongst them (Quinn, 2013). She considers that these could be the above mentioned six key (socio-cultural, structural, policy, institutional, personal and learning) factors leading students to drop-out. At the same time, it is not clear whether there is one key factor, or it is the combination of these factors that leads to the drop-out and there is no one essential reason.

According to ideas of several authors (Cherif, Movahedzadeh, Adams, & Dunning, 2013; Sotardi & Brogt, 2016; Sotardi & Friesen, 2017; TEQSA, 2017) the body of many factors define the student's readiness to studies. For instance, Sevinc and Gizir (2014) and McCulloch (2014) regard the academic, social, personal-emotional, and institutional adjustment of first-year university students as essential factors that affect negatively the studies. Cherif et al. (2013, p. 7), in their turn, consider that student failure has multiple contributing factors. They group student failure into seven main categories (motivation, study habits and related issues, instruction and related issues, student's academic preparedness, external factors, student's attitudes, and other relevancy issues) and fifteen sub-categories. Also, Krause and Armitage (2014, p. 4) admit that "student engagement, belonging, retention and success as integrated parts of a complex structure rather than a linear process" play an important role. They identify such categories as academic challenge, active learning, student/staff interactions, enriching educational experiences, supportive learning environment, work integrated learning. Aljohani (2016) singles out such categories of influencing factors as family background, student-related factors, social factors, economic factors, students' goals, institutional experience and institutional factors. Students' age, whether students were local or international, time since high school and the learning strategy adopted (Bone & Reid, 2013) are mentioned as other factors. Trujillo and Tanner (2014) maintain that students' prior knowledge and sense of belonging are important. They find interesting the opinion that "science identity is hypothesized to be key in student persistence and retention in the sciences" (p. 12). Learning during the study process to a greater or lesser degree is connected with cognitive stress (Romanenko & Nikitina, 2016); this then could also be one of the factors affecting the first-year students. The ideas of the above-mentioned researches (Figure 1) were used as the theoretical background for researching the factors influencing exploring studies of the first-year students while focusing on exploring institutional, personal and academic factors.



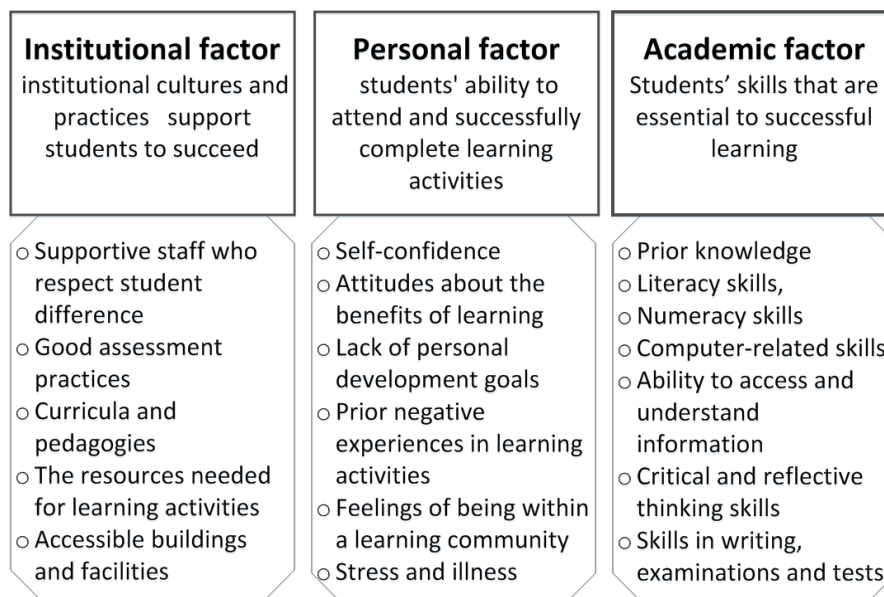


Figure 1. Description of institutional, personal and academic factors influencing the studies.

The research has been performed in the frame of two natural sciences study programs of one university that in principle corresponds to the fact that “the majority of the reported research on the first-year experience is based on single institutions studies, often with small samples of students, not uncommonly from a single programme of study” (Harvey, Drew, & Smith, 2006, p. 1) and “science has been a popular area for evaluations of first-year knowledge” (ibid., p. 28). The aim of the present study is to explore how the first-year students are able to adapt to the university process. The following research question was put forward: which are the main reasons that hinder the first-year students’ adaptation to studies?

Research Methodology

General Background

General education in Latvia in total lasts 12 years consisting of compulsory 9-years basic education and 3-years secondary education. General secondary education programmes are implemented in secondary schools, gymnasiums, evening (shift) and extramural secondary schools (General Education). The research was conducted at the University of Latvia, faculties of Biology and Chemistry in 2016/2017 study year after finishing the first study semester. The research design: a case study. The choice of the case study was defined by the assumption that the current study could give an insight into situations that describe the particular target group. This is one of the ways how to study a concrete problem in order to reach a common understanding of the situation (Kumar, 2014). To specify the views of the first-year students about their adaptation to the university studies, the researchers used open-ended questions for supplementing the students’ views obtained by closed questions, which gave an opportunity to gain insight into the predetermined set of opinions and for the respondents to give replies in their own words (Williams, 2007).

Sample

Eighty percent of the total number (N = 99) of the first-year students in the faculties of Biology and Chemistry participated in the survey. The sample of the research consisted of 79 first year students, of whom there were 56 female (71 %) and 23 male (29 %) students studying at the Faculty of Biology (N = 38; 48%) and the Faculty of Chemistry (N = 41; 52%) of the University of Latvia. Respondents have received their previous education in secondary



schools in different regions of Latvia: 35 (44%) of them have graduated from a gymnasium, 40 (51%) – secondary school, 4 (5%) – another educational institution. The students' average age is 20.2 years ($SD = 2.5$).

Instrument and Procedures

In order to find out the main reasons that affect the studies of the first-year students, they were surveyed at the end of the first term. Students' participation in the survey was voluntary and the respondents' anonymity was guaranteed. The online survey with close-ended 5-point Likert scale and open-ended questions was used as the research instrument on the *QuestionPro* platform (<https://www.questionpro.com/>). The developed questionnaire consisted of two parts: general and conceptual. The whole structure of the questionnaire is presented in Figure 2.

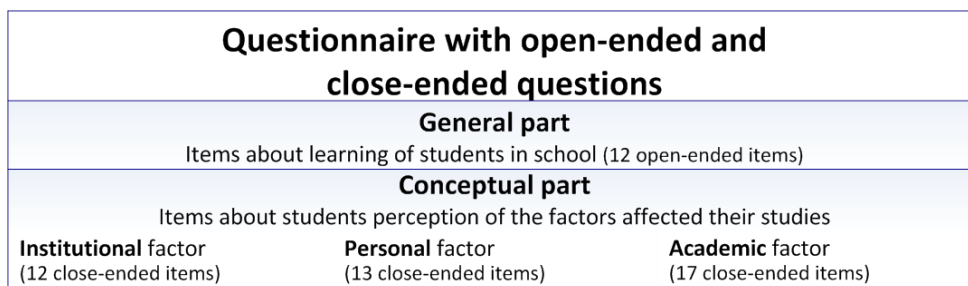


Figure 2. The structure of the developed questionnaire.

The general part of the questionnaire comprised open-ended questions that included questions about students' previous learning experience at school evaluating positive and negative impacts on studying the chosen subject.

The conceptual part of the questionnaire consisted of three sections (Figure 2; Appendix 1). Conceptual part focused on finding out the student's opinion about studies at the university assessing the factors that influence studies on the 5-point Likert scale (1 – strongly disagree, 5 – strongly agree). Items include issues aimed for assessing institutional, personal and academic factors. Institutional factor is related to such issues as an organisation of students' study activities, communication and provision of study resources. Personal factor characterizes issues featured by the student as a personality, including his personal qualities as learning motivation, learning skills and attitudes to study activities, and contact with other course-mates, friends and family. Academic factor is characterized by issues that are related to the student's learning activities. The choice of the issues of these factors was based on the outcomes of the previous studies (Birzina, & Cedere, 2017).

To determine the mutual influence of the issues characterizing the mentioned factors on the student's adaptation, the students were classified into three groups (A, B, and C) according to their performance in the first study year. Group A ("high performing" students) consisted of students with assessment 8–10 in 10-point scale. Group B ("medium performing" students) – 6–7 and Group C ("low performing" students) – 4–5. The breakdown in groups was based on students' scores ranging from 4–10. When reaching a score (4–satisfactory and 5–almost satisfactory), the student demonstrates his competence at a lower level. In the assessment (6–almost good and 7–good) the student reaches the average (medium) level and only (8–very good, 9–excellent, 10–with distinction) has reached the highest level. This ranking system is in the entire university (Grading system).

Subsequently, a comparison was made between these groups in search of common and different issues.

Data Analysis

The descriptive statistics was used in order to analyse the mean of respondents' answer ($1 \leq M \leq 5$), standard deviation, mode and median. Cohen's d was calculated for estimating the effect size for the difference between two means. Comparison of groups with different sample size (Cohen's d , Hedges' g) was used. As the sample size is small, non parametric test was performed, and Spearman's correlation coefficient was used in order to identify the strength between variables and relationships among the institutional, personal and academic factors. Cronbach alfa reliability test which estimates the internal consistency of items in the survey, the relevancy of the consistency among items was found out. The Mann-Whitney test was used to compare two independent groups



and the Kruskal-Wallis Test to compare three independent groups. The obtained qualitative data were processed with the SPSS program.

Qualitative data (Survey General Part) were used to supplement those obtained in the quantitative research, focusing on the unique features of the personality. By means of the qualitative analysis problems of personal, academic and institutional character were clarified.

Data about students' average academic assessment in studies in the first term and at the end of the first year were obtained from the UL authorised internal LUIS electronic study system (LUIS, 2017). Confidentiality of the obtained information was guaranteed.

Research Results

The university entrance score of these students is very high within the range of 8–10 in 10-point system) which indicates a high level of prior knowledge (Table 1). Using LUIS (2017) data were obtained about students' total mean assessment, the mark in biology/chemistry in the secondary school certificate and assessment in the first term. As it is seen in Table 1, there are differences between students' marks in biology and chemistry as school subjects and in University. Students predominantly enter the university with high academic achievements – the average mark in the secondary school certificate is almost 8 points and in the particular school subjects it is even higher – above 8 points. Cohen's $d < .2$ show that there is no statistically significant difference in average marks between Biology and Chemistry students. It means that in subsequent measurements students of both faculties can be seen as one group.

Table 1. Students' performance before studies and during studies in university.

	Item	Study program	N	M	SD	Cohen's d
School	Average mark in the certificate	Biology	38	7.83	0.88	0.05
		Chemistry	41	7.88	1.07	
	Mark in the speciality subject	Biology	38	8.41	1.52	0.02
		Chemistry	41	8.44	1.25	
University	Average mark after finishing the first term (LUIS data)	Biology	53	6.40	1.14	0.10
		Chemistry	46	6.56	1.90	

Analysis of the Factors Influencing Student Adaptation

High mean values (mainly $M = 3-4.45$), median (from $Mdn = 4-5$) and mode (predominantly 5) dominated in the students' answers on the 5-point Likert scale (Appendix 1). This proves that students on the whole assess positively their adaptation to studies in the first year. However, a more detailed analysis of the data showed that there were differences in the understanding of different issues. Identifying the internal consistency among the items included in the survey, it was concluded that Cronbach alpha in all factors is in the limits of the mean reliability ($\alpha = .67; .69; .81$ – respectively Personal (PF), Institutional (IF) and Academic (AF) factors) which indicates that the obtained data correspond to the consistency criteria and are applicable for describing these factors.

In order to analyse students' answers in more detail, the mutual relations of the obtained quantitative data were identified among the factors and within the boundaries of one factor defining the Spearman's rank correlation coefficient. Corresponding to the number of respondents the correlation between personal factor and institutional for students was weak, $r(78) = .24, p < .05$. None of these factors correlate with the academic factor. It means that during the first term students connect themselves more with settling in the social environment than the acquisition of the organizational procedures. They assess their studies from the aspect of personal well-feeling participating in the study process and think much less about the academic aspect of studies.



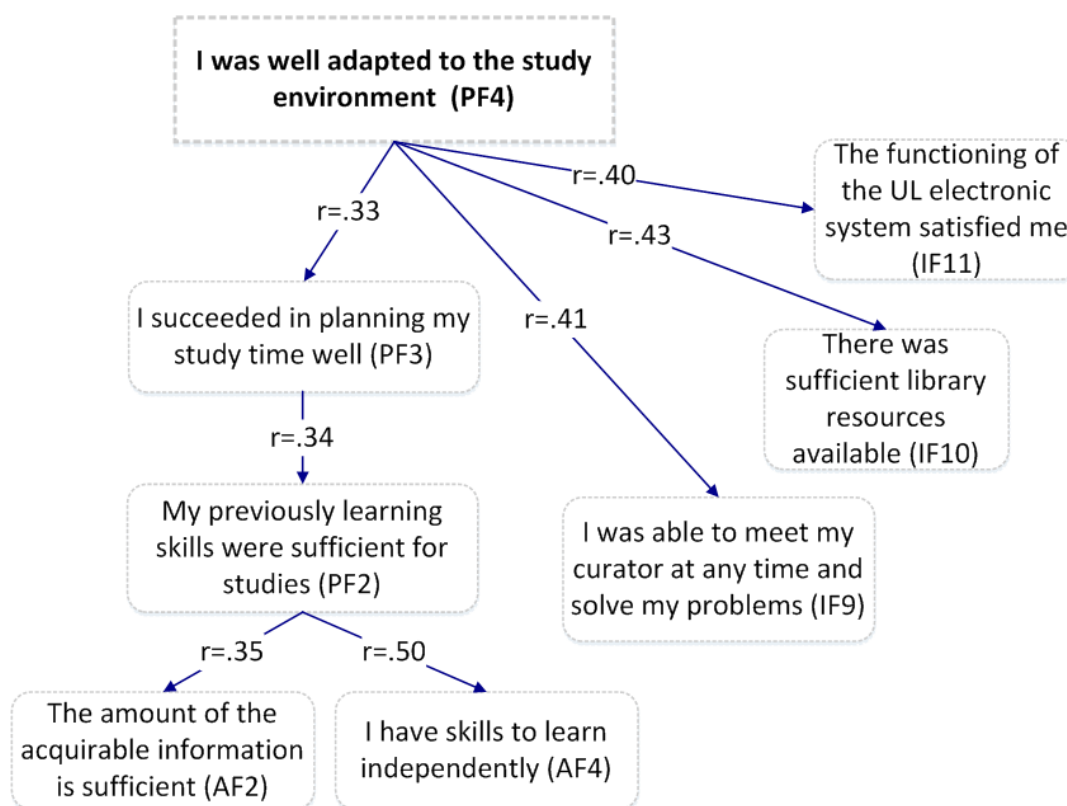


Figure 3. Characteristic features influencing students' adaptation to study environment.

Performing a more detailed exploration of the relations of different issues, the most characteristic features of each factor were studied among which there is a medium correlation (Figure 3; Appendix 1, 2). The moderate Spearman correlation coefficient value of .41–.43 confirm positive correlation among PF4 and IF9, IF10 and IF11. This correlation coefficient is significant at the 0.01 level of significance. Students have no problems with the availability of resources in the university library (IF10, $M = 3.71$) and the possibilities to use the electronic system (IF11, $M = 3.95$), although polarity was observed also in these answers ($SD = 1.26$ – 1.32 , respectively).

One of the issues, which serves as evidence for student's adaptation to the study environment (PF4) is the ability to plan the time of studying (PF3, $M = 3.25$; $SD = 1.36$). An important role to the solution of the study-related problems is given to the curator (IF9, $M = 4.20$; $SD = 0.99$), whom the student can meet any time needed to receive more detailed information about uncertainties in the study process. It means, social skills are important for the students, i.e., they are well adapted to the new environment because they could communicate freely with the course curator. Work of curators (a selected person of the academic staff) was one of student support measures to promote adaptation of students in academic environment and study process. The curators assisted students in grasping the opportunities for applying the skills and knowledge offered by study courses (Latvijas Universitātes 2017. gada pārskats, 2018).

There was a weak positive correlation between PF4 and PF3. It shows that they did not experience any problems with planning the study time (PF3). That students' experience in turn, has a weak correlation with his personal learning abilities (PF2). Within the academic factor (AF) there is a relatively low correlation between the student's learning skills and the sufficiency of the amount of information to be acquired (AF2, $M = 3.20$; $SD = 1.23$) and moderate correlation with independent learning ability ($M = 3.08$), which is simultaneously characterized by SD value 1.43, which indicates the difference between these skills among the students.

Since the values of these issues are dominated by relatively high SD values, it is essential to find out how these differences appear in the A, B and C groups related to the level of students' academic preparedness.

The Impact of Academic Performance on Student Adaptation

In order to clarify whether the adaptation to studies is related to students' academic achievements at the university, it was important to find out the proportion of students with high, medium and low assessment. Sixty-five students responded to this question in the survey. The Kruskal-Wallis test (Table 2; Appendix 1) helped to explore a statistically significant difference issues among A group, B group and C group students revealing the most significant issues in personal and academic factors that affect student adaptation.

Table 2. Issues affecting the studies of A, B and C group students in Test Statistics^{a,b}.

Issues	Total (N=65)		Group A (N=18)		Group B (N=37)		Group C (N=10)		Chi-Square	df	p
	M	SD	M	SD	M	SD	M	SD			
PF6	4.26	1.15	4.50	0.92	4.46	0.99	3.10	1.45	11.10	2	.004
PF7	4.12	1.22	4.22	1.00	4.38	1.06	3.00	1.56	8.73	2	.013
PF2	3.40	1.38	4.33	0.97	3.20	1.41	3.00	1.14	12.16	2	.002
PF3	3.25	1.40	3.83	1.20	3.11	1.39	2.70	1.57	5.05	2	.080
PF11	2.97	1.46	3.28	1.18	3.11	1.60	1.90	0.88	6.48	2	.039
AF12	3.65	1.32	4.22	1.17	3.49	1.39	3.20	1.03	6.03	2	.049
AF14	3.55	1.40	4.22	1.11	3.38	1.38	3.00	1.63	7.11	2	.029
AF15	3.55	1.42	4.39	0.98	3.27	1.47	3.10	1.37	10.13	2	.006
AF13	3.45	1.52	4.56	0.98	3.14	1.51	2.60	1.35	16.23	2	<.001
AF4	3.03	1.46	3.89	1.28	2.89	1.43	2.00	1.05	11.53	2	.003

a. Kruskal Wallis H Test

b. Grouping Variable: Group

Results of the independent sample indicated that there is a statistically significant difference between Group A, Group B and Group C students. The obtained data (Table 2) allow concluding that the difficulties between the "high performing", "medium performing" and "low performing" students in the transition from learning at school to studying at the university are connected with personal and academic factors. Besides, the specific weight of the academic factor is the decisive. This is proved by the statistically significant difference in such issues: the skill to learn independently (AF4), the prior knowledge in biology (AF12), chemistry (AF13), physics (AF14), and mathematics (AF15). The mentioned issues of the academic factor show that there has been a consistent decline in the average value among high, medium and low performing students.

Concerning the personal factor, as the main issues are mentioned learning skills (PF2); studies planning skills (PF3); support from family (PF6) and friends (PF7), as well as stress (PF11). A consistent average decline is observed in student responses for learning skills (PF2) and study planning skills (PF3).

Effect size was calculated to compare groups in pairs: A-B, A-C, B-C. For this purpose, the comparison of groups with different sample size (Cohen's *d*, Hedges' *g*) was used. As shown in Table 3, there is a small difference between learning skills (PF2) for groups B and C, but they are much larger for group A. Whereas support for friends (PF7) and family (PF6) has received similar and stronger over A and B students Group C students.

Interestingly, there is finding on the stress level (PF11), which shows that "high performing" students are more concerned about their studies as a "low performing" students. It can be concluded that successful students take more responsibility for the success of the study process.

Table 3. Effect sizes (*d*) among students' groups A, B and C.

	PF6	PF7	PF2	PF3	PF11	AF12	AF14	AF15	AF13	AF4
d_{A-B}	-0.04	0.15	-0.88	-0.54	-0.12	-0.55	-0.65	-0.84	-0.88	-0.72
d_{A-C}	-1.24	-1.00	-1.29	-0.88	-1.27	-0.91	-0.93	-1.14	-1.29	-1.57
d_{B-C}	-1.24	-1.17	-0.15	-0.29	-0.82	-0.22	-0.26	-0.12	-0.15	-0.65



The analysis of students' answers to open-ended questions, too, (Table 4) show that there are differences in students' opinions how learning at school has influenced them for the study process at the University. Their academic performance at the university to some extent is also related to their learning experience in secondary school. Students assess their learning at school very differently starting from the acquisition of the knowledge in the given subject to the skill of learning and master new information as well as plan their time and the importance of personal qualities.

Table 4. Comparison of students' learning experience acquired at school.

Issue	Positive ideas (quotes from students' answers)	Negative ideas (quotes from students' answers)
Prior knowledge	<i>Basic knowledge in almost all fields. maybe not so good prior knowledge in molecular biology and microbiology.</i>	<i>Insufficient knowledge from the secondary school.</i>
Time management	<i>To plan one's work and to analyse the outcomes.</i>	<i>Out-of-university activities (sports, theatre) and new friends from Riga. Chemistry "moved to the second place".</i>
Amount of information	<i>I can systematize information, work with vast amount of information</i>	<i>The unusual amount of information and the skill to work with it made studying difficult.</i>
Skills to learn independently	<i>I can work independently and continuously. Understand systematics, learn how to understand biology better, to make my own system of learning. To think logically and to analyse.</i>	<i>My short span of concentration and my attention can be easily distracted, I cannot "force" myself to learn.</i>
Personal qualities	<i>My persistence and conscientiousness. The willingness to study and explore things. Self-invested work and determination.</i>	<i>My laziness and not so high motivation to try. The lack of self-initiative.</i>

Discussion

The given research emphasizes the interaction of the institutional, personal and academic factors in the student's adaptation to the University. The obtained results (Figure 3) showed that students in the first study year paid greater attention to the personal and institutional factor than the academic. This means that they are more oriented to the use of their "soft" study skills – a set of individual transferable skills that are typically considered as not specifically related to academic discipline or area of knowledge but required for learning and assessment at university and that can be used in a wide variety of situations (Cattanach & Watkins, 2017; UNESCO, 2013). The student feels good if there is social communication with the study support staff. Also, the curator plays a significant role in the establishment of a positive study environment (Figure 3). This is proved also by the ideas expressed by Sotardi and Friesen (2017) that students' perceptions of the learning environment as clear and organised, interesting and personally relevant, and supportive of building a peer-based learning network were linked to positive changes in their learning and study practices. Formal and informal interaction with the faculty contributes to students' university adjustment, therefore it is good if an effective advisory system and mentoring programs for new students are developed at the university. This means that the student's belonging to his/her faculty is perceived as a prominent factor affecting students' adjustment. If the student develops negative relations with the academic staff and he/she is unable to form friendly relations with the course-mates then the teaching quality suffers as a result of the social adjustment (Sevinc & Gizir, 2014).

The personal factor is the one that largely determines the formation of student's feeling of comfort. The majority of students are enrolled in the chosen study program with a high motivation to acquire this branch of science (Birzina, & Cedere, 2017; Cēdere, Jurgena, & Targamadze, 2018) however, their personal qualities can affect their studies. The research outcomes (Table 2, 3, 4) show that students often lack skills to plan their time and they are unable to define their priorities in the course of the studies as well as laziness is one of the reasons that hinders successful studying. Cherif and his co-authors (2013), too, as well as researches by Goldfinch and Hughes (2007) confirm that the rate of academic failure among students affects the connection between poor study habits: poor study skills, poor time management, and an inability to identify and establish priorities, as well as their laziness. They prove that students with poorly developed skills in organizing self-directed learning



have more chances to become dropouts. It means that the interaction of social and academic factors is especially important because "poor first-year academic performance alone will not result in withdrawal" (Harvey, Drew, & Smith, 2006, p. 16). The student's well-feeling is also decisive in the continuation of the studies.

Student knowledge is a crucial, complex resource when regarding university-level assessment (Rohaeti, & Prodjosantoso, 2018; Sotardi & Brogt, 2016, p. 7). The research findings show (Table 1; 2; 3) that academic factors are also those that influence significantly successful studies. Although students consider that their school knowledge in the subjects of their specialization is high, there are still observable differences not only in the assessment of the school and university performance (Table 1) but also between the Group A, Group B un Group C students (Table 2; 3). Students of both faculties admit that there should be good prior knowledge not only in the chosen science in the branch (biology or chemistry) but also in the field of other natural sciences – in physics and mathematics. It means that insufficient level of prior knowledge could be one of the main and this is proved by the contradictions in the answers given by "high performing" and "low performing" students to the open-ended questions (Table 2; 3). Harvey, Drew, and Smith (2006) consider that student's prior knowledge could be one of the predictive factors, which determine the student's successful studying. Also, other researchers (McCulloch, 2014) maintain that students with higher prior knowledge are less subjected to the dropout risk. Students responses show that there are differences between "high performing" "medium performing" and "low performing" students, especially in the assessment of prior knowledge in chemistry and mathematics.

However, not always regardless the depth of knowledge in the subject, students are able to fulfil the requirements defined at the University, they are unable to fulfil the expected requirements of the task and fail to receive full marks. This means that "they consistently lack discipline-specific skills that are needed for achievement on 100-level course tasks" (Sotardi & Brogt, 2016, p. 15). It is possible to explain it that although the majority of students enrolling at the university expect that studies will differ from learning at school (Crisp et al., 2009), they still are not fully ready to face the reality and that significantly influences their ability to function well in the unfamiliar university environment (Bone & Reid, 2013).

Students have diverse educational experiences, life experiences and personal circumstances. This diversity has significant implications for students' expectations, motivations, and the academic and personal resources that they bring to their university experience (James, Krause, & Jennings, 2010). This is one of the factors that has to be taken into account and the present research also shows the differences between the "high performing", "medium performing" and "low performing" students in such aspects as their time planning, the learning skills and prior knowledge (Table 2; 3). It is possible that these differences are mainly connected with the student's learning skill and his/her prior knowledge because "learning in a particular area of knowledge such as life sciences can be viewed as a continuum from novice to expert status" (Wood, 2009, p. 5) and if there is no prior knowledge then "new information unrelated to prior knowledge is difficult to learn and remember" (ibid. p. 4). Thus, it is important to take into consideration "what students can do with knowledge, rather than what units of knowledge they have" (Silva, 2009, p. 631). Most likely "low performing" students lack higher-order thinking skills and they are more oriented to mechanic memorizing of unrelated facts and are unable to form meaningful acquisition of mutually related information therefore the amount of information that needs to be memorized seems too big. Marouchou (2012) considers that students with a higher level of thinking concentrate more on meaningful understanding of the acquirable topics and are more responsible for their learning and personal development. This means that if the students lack skills to learn independently, then the amount of information to be acquired seems too large (Table 2). Thus, if the students are unable to comprehend to their mind the large amount of information, then it is possible that they are more oriented to the surface learning – the memorization and recalling of facts based on "cramming" not on the deep learning – the learning with understanding and the formation of interconnections.

Implications for Future

As the present research is a small-scale study with the sample of 79 participants, then the generalization of the obtained results is limited; however, as a case study research it marks the tendencies in students' adaptation to the natural sciences studies that should be taken into consideration to reduce the student dropout. The authors' previous studies (Birzina & Cedere, 2017), too, showed a similar situation with the students' readiness to become a successful student. The research continues with broadening the target audience and exploring the opinion and experience of the academic staff, how to reduce the student dropout at the university. It would be



interesting to continue that research in an international environment, and to prepare an international comparative study, clarify if the same factors appear to be important in cultural context of the other universities.

Conclusions

Students' adaptation to studies in the first year is a complex process which is affected by institutional, personal and academic factors. Students' subjective opinion testifies about good readiness for the studies; they do not encounter problems that would hinder successful studies.

Initially, students associate the adaptation to studies in the first term more with the "soft" transferable skills: personal well-feeling and integration in the university study environment. Thus, students consider the personal and institutional factors the key factors that affect their studies in the first term.

The academic factor is not considered as essential although the research findings reveal that exactly this factor is the one that shows most differences between the adaptation of "high performing", "medium performing" and "low performing" students to the studies. The main differences lie in such issues as their skill to learn independently at the university and the prior knowledge acquired at secondary school. Thus, the above-mentioned aspects are significant for the students' successful studies. If the students cannot learn independently, then they encounter problems to acquire the new information well enough and the amount of this information seems too large because obviously it is more connected with the surface learning – the memorization and recalling of facts not with the deep learning – the understanding of interconnections. Students' prior knowledge also determines learning. Although students are certain that their prior knowledge is sufficient for studies, the research data prove that in order to study successfully, the student needs to have equally good prior knowledge not only in some (the chosen) school subjects but in the field of all natural sciences: biology, chemistry, physics and mathematics.

The studies of "low performing" students at the university are affected also by such personal factors as the skill to learn acquired at school and the skill to plan one's time, taking the responsibility for one's studies that are insufficient for these students. The lack of these skills also promotes the student dropout.

In general, it is possible to regard the mutual connection of the above-mentioned issues as the reason of the big dropout numbers of the first-year students.

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Appendix 1

Descriptive Statistics ($N = 79$) of issues arranged in descending order by means in every factor (codes of the analysed issues marked in bold)

Code	Issues	Mean	Median	Mode	SD
IF7	Communication with the administrative staff and study secretaries.	4.47	5.00	5	.78
IF1	Timetable of lectures.	4.28	4.00	5	.85
IF9	Communication with the curator (tutor).	4.20	5.00	5	.99
IF8	Communication with the academic staff and laboratory assistants.	4.16	4.00	5	.85
IF11	UL electronic systems (e-studies and LUISS).	3.95	4.00	5	1.26
IF12	Internet access.	3.91	4.00	5	1.30
IF6	Information about the requirements.	3.73	4.00	5	1.13
IF10	Provisions of the library resources.	3.71	4.00	5	1.32
IF2	Proportion of lectures to the practical classes.	3.68	4.00	5	1.15
IF3	Too long laboratory tasks.	3.37	4.00	5	1.40
IF4	Too few seminars.	3.10	3.00	3	1.38
PF9	Participation in seminars.	4.43	5.00	5	1.08
PF6	Family support.	4.32	5.00	5	1.09
PF12	Painful stress situation	4.25	5.00	5	1.28
PF7	Friends' support.	4.13	5.00	5	1.21
PF8	Attendance of lectures.	4.03	5.00	5	1.35
PF4	Settling into the study environment.	3.95	4.00	4	1.06
PF13	Frequency of illness	3.81	5.00	5	1.57
PF1	Learning motivation.	3.47	4.00	5	1.38
PF2	Learning skill.	3.47	4.00	5	1.34
PF3	Planning the time for learning.	3.25	4.00	4	1.36
PF11	Stress about the organization of the studies.	2.94	3.00	1	1.45
PF10	Stress about the organization of the everyday life.	2.75	2.00	2	1.38
PF5	Work along the studies.	2.27	1.00	1	1.68
AF10	The use of free access e-materials.	4.32	5.00	5	1.02
AF11	Cooperation with course-mates.	4.18	5.00	5	1.15
AF1	The choice of the study program.	4.15	5.00	5	1.15
AF3	Support from the academic staff.	3.82	4.00	5	1.16
AF9	Useful tutorials.	3.81	4.00	5	.92
AF12	Prior knowledge in biology.	3.67	4.00	5	1.27
AF15	Prior knowledge in mathematics.	3.56	4.00	5	1.40
AF8	Time used preparing for the laboratory tasks.	3.53	4.00	5	1.26
AF14	Prior knowledge in physics.	3.52	4.00	4	1.39
AF13	Prior knowledge in chemistry.	3.46	4.00	5	1.48
AF7	Time used preparing for the seminars.	3.39	3.00	3	1.23
AF6	Boring and hard to understand lectures.	3.22	3.00	3	1.15
AF2	The amount of the acquirable information.	3.20	3.00	2	1.23
AF4	Skills to learn independently.	3.08	3.00	2	1.43
AF5	Adaptation to the lecturing style of the university teacher.	3.05	3.00	2	1.34

Note. IF- Institutional Factor. PF – Personal Factor. AF – Academic Factor



Appendix 2

Spearman's rho Correlation matrix of issues influencing students' adaptation to study environment (Figure 3).

Matrix 1

Code	IF7	IF9	IF10	IF11	IF12	IF15
IF7	1					
IF9	.43**					
IF10	.30**	.15				
IF11	.21	.25*	.51**			
IF12	.31**	.29*	.40**	.46**		
IF15	.35**	.15	.21	.23*	.37**	
PF4	.27	.41**	.43*	.41**	.27	.33**

Matrix 2

Code	PF2	PF3	PF4	AF1	AF2	AF3
PF2	1					
PF3	.35**					
PF4	.14	.33**				
AF1	-.02	.16	.21			
AF2	.35**	.32**	.19	.29**		
AF3	.09	.30**	.40**	.23*	.42**	
AF4	.51**	.45**	.14	.13	.38**	.38**

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

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