



ISSN: 2617-6548

URL: www.ijirss.com



Personality traits and motivation of Generation Z students in management study programs in higher education

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Abstract

This article examined Generation Z students' personality traits and motivation as prerequisites for sustainable learning as well as the identification of relevant motivational factors in the educational process. The main goal of the research was to identify and analyze the dominant factors that affect the motivation and performance of Generation Z students in management study programs at a technical university. The identified factors were analyzed in relation to the personality traits and subsequently, the potential impact of the identified factors and personality traits on the learning outcomes of selected subjects was tested. The research sample was represented by Slovak university students while the research sample size was N = 132 respondents. The authors of the article used three standardized questionnaires. The first questionnaire was the Questionnaire NEO (Neuroticism, Extraversion, and Openness) five factor inventory version (with added factors (of agreeableness and conscientiousness), specifically two of the five factors: conscientiousness and neuroticism. The performance motivation questionnaires were also used to assess values, attitudes towards values and motivation. The statistical analysis of the collected data was processed in the statistics program SPSS (Statistical Package for the Social Sciences). The findings proved relationships between motivation to perform and conscientiousness, performance inhibition and neuroticism and differences between students in different years of study.

Keywords: Academic results, Generation Z, Higher education, Motivation, Motivation factors, Performance and personality traits.

DOI: 10.53894/ijirss.v6i1.1102

Funding: This research is supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences (Grant number: 1/0721/20)

History: Received: 14 October 2022/**Revised:** 30 November 2022/**Accepted:** 19 December 2022/**Published:** 22 December 2022

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Authors' Contributions: All authors contributed equally to the conception and design of the study.

Competing Interests: The authors declare that they have no competing interests.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Ethical Statement: This study followed all ethical practices during writing.

Publisher: Innovative Research Publishing

1. Introduction and Theoretical Background

Personality and the complexities of mental life provide the potential and optimal basis for interdisciplinary work [1]. The characteristics of personality and personality itself are complex. The characteristics of personality were identified as central areas of psychological research. The relationship between these characteristics and attitudes or behaviour seems thoroughly reliable, despite the fact that such a relationship has not been adequately captured in either psychological or sociological studies [2]. Personality is mainly made up of character, temperament, qualities and abilities [3]. The individual (from the Latin individual = inseparable, inseparable) is understood as a holistic organism and a unity of all biological, psychological, physiological and socially conditioned psychic properties [4]. It is the structure and composition of the personality that significantly influence the student's performance and academic achievements [5-8]. The term "motivation" originates from the Latin word "movere", i.e., to move and it is a hidden activity of an internal driving force in the human psyche for his or her action. The inner stimulus is the motive which can be expressed as a rational impulse making human behaviour psychologically meaningful. Therefore, it is the cause of human behaviour [9]. Creating motivational programs and a motivational environment is a difficult and usually expensive task for any organization [10]. Nowadays, it is very important to explore and enhance motivation in the working sphere and in the educational sphere [11, 12]. Motivation to learn like motivation to work is highly a complex process that requires constant monitoring [13].

Motivation is a way of bridging the gap between the school's requirements for the student and the prerequisites for managing the student's requirements [14]. The level of motivation affects the performance of students in schools and institutional school facilities [15-18]. Lack of motivation to perform causes students to fail to meet school requirement and inversely, such failing causes a lack of motivation to perform. Motivation can help overcome shortcomings in certain individual prerequisites and abilities of students [19]. Similar themes can cause different behaviours. Each kind of motivation causes different human behaviour which has different consequences. It is possible that various results can be attained with the same assumptions or capabilities due to motivation [20]. That's why it is important to examine the motivation to perform in relation to the achieved academic results. Subsequently, motivation to perform plays a significant role in education and it is also one of the most important challenges in education which can significantly support the effectiveness of learning and the educational process [21]. A significant consideration should be given to motivation to learn in educational facilities especially during the educational process [22]. Naccarato defined the term "motivation to learn" as the tendency for a student to find academic and educational activities meaningful or worthwhile [23]. Student motivation to learn can be conceptualized either as a general trait or as a situation specific state. The trait of motivation to learn is an enduring disposition to strive for content knowledge and skill mastery in learning situations. The state of motivation to learn exists when student engagement in a particular activity is guided by the intention of acquiring the knowledge or mastering the skill that the activity is designed to teach [24].

It has been indicated that there is a positive relationship between performance and motivation [25]. Motivated students achieve higher scores in their examinations in comparison to unmotivated [26]. Motivational orientation is concerned with the underlying attitudes and goals that give rise to action or the why of actions [27]. Interests and goals have been identified as two important motivational variables that impact individuals' academic performances [28]. The choice of characteristic goals is connected with goal motivation and progress towards their achievement [29]. Considering effort and ability, it can be assumed that effort and self-evaluations are functions of expectations. Effort leads to the demonstration of high rather than low ability. The derivation of performance predictions depends on the previous statements of expectations of demonstrating ability as a function of task difficulty [30]. The initial interest is connected with learning outcomes and a significant relationship can also be found between persistence and learning [31].

Many factors might influence students' lack of effort but the absence of academic motivation and lack of interest is also likely to be reflected in students' neglect of their studies [29]. Motivation to learn may be inspired either internally (intrinsically) or externally (extrinsically) [23] and motivation resources and problems determine students' internal, external and negative motivation [32]. There was also an indication of a positive relationship between a student's level of intrinsic intellectual motivation and scholastic achievement [33]. Internal motivation talks about the fact that students learn because they are interested in a topic, issue and other educational activities [34, 35] or because of satisfactory or enjoyable activities [36]. Students actively and independently work and study despite the fact that they have no guaranteed reward or threat of penalty because they can see and understand the goal of education [37]. On the other hand, external motivation means that students learn primarily because of external reward expectations or in order to avoid punishment for failure to perform the task [38, 39]. A combination of internal and external motivation is appropriate to improve learning outcomes [37]. It follows that motivation is a key factor in helping to improve the performance of education. At the same time, we can say that it is the motivation to perform that helps increase the educational process and thereby improve academic performance. Based on the above, it is necessary to analyse and investigate motivational factors as well as interventions that will help better connect work at school with real life [20, 40]. Through academic achievement students can activate and develop their talents and capabilities in line with their educational goals. Academic achievement can support the talent development of students in the context of educational goals. The aforementioned academic goals support the development of the educational process and are considered a predictor of the quality of education [41]. The purpose of education is the development of competencies and their particular components, knowledge, skills and abilities [11, 42]. The sustainability of education means streamlining the education process and focusing on learning and the acquisition of competences that persist and are relevant for the future. The relevance of education is important in learning what is important and what is valuable [43].

Motivation and personal traits are mutually interconnected [44]. In addition to motivation and life goals, personal traits also play a role in choosing a subject of study [45]. Education is a structured goal-oriented activity that must be permanent

and sustainable and at the same time it must reflect the current needs of practice [46]. Motivation can also be influenced by students' participation in educational activities. Academic activities support the development of students' skills and competences which they will use in their studies and subsequently in their professional lives [47]. Learning must be linked to real life. The perception of students about current education is related to what is already known helps them find connections in other contexts. Such a focus represents sustainable learning from which students can subsequently draw as needed throughout their lives [48]. Involvement in academic oriented activities because of their similarities to classroom activities, affects both activity-based and school-based motivation [49].

Motivation to act and make efforts to achieve the goal is important for all generational groups. As generational groups are considered people born in close time period. People belonging to the same generational group have similar historical, cultural, political and economic experiences that have shaped their view of the world and values. These shared or similar formative experiences caused similarities and differences in the attitudes and priorities of individuals within each generational group [50]. The various generations are named differently, because of their typical differences. They are identified as Veterans, the Post-War Generation, Generation X, Generation Y, Generation Z and Generation Alpha [51-53]. Only a very small percentage of Veterans parents' generation is still alive [54].

We focused explicitly on Generation Z in our research. Various research indicate that Generation Z people are specific because they grew up surrounded by advanced ICTs (information and communication technologies) and they suppress personal contact by communication through modern technologies [55]. Digital instruments are often used by the Z Generation, people belonging to the Z Generation are often called "digital people" [56-58]. As Generation Z grew up surrounded by information and communication technologies, it can be said that compared to previous generations, members of Generation Z are the most technically advanced generation to enter school facilities [59]. Generation Z is different from the previous generations and their personality characteristics are a challenge in the creation of the educational process and the structure of academic activities [60, 61]. For Generation Z representatives, reward preference is important for them to be willing to put in the effort. Generation Z members prefer clearly defined rewards directly linked to performance, and rewards should be commensurate with the time they spend in the workplace. They also accept intangible rewards as an opportunity to advance or improve their position at work [62]. For Generation Z, the most valuable incentives are value, career development, education and self-esteem [55, 63]. Generation Z always compares and connects the ratio of time spent to performance. The best way to maintain and manage a good working relationship with Generation Z is to reward their actual performance in a transparent way. Discussions on performance should be accurate and provided regularly [64]. Members of Generation Z require more feedback than previous generations. They should therefore be provided in a meaningful and personal way [56]. The members of Generation Z have several advantages, including technological advancement, the ability to easily establish contacts and relationships that are valuable to them, team orientation, multitasking capability and a moral code [50]. The disadvantages of Generation Z include the fact that they lose interest in human contact, do not know what confidentiality is, and dangerous independence. They often lack knowledge of grammar or the use of literary language [50, 55]. Given that members of Generation Z will create values in the economic systems in the future, the authors of the paper consider it important to examine their motivation to perform and personality characteristics which can be used not only in the educational process but also in organizational human resource management.

2. Materials and Methods

The following part of the article contains the definition of the research problem framework, the pre-research process and the setting of objectives of research. Furthermore, there are determined research questions and described research hypotheses in order to achieve the main aim of the paper. Data collection, data collection tools and evaluation methods are also described.

2.1. Research Problem

Over the last three decades, a complex problem with declining student motivation and associated worsening academic performance has been observed [61, 65, 66]. This problem concerns primary and secondary education, but mainly universities. Several researchers have analysed and the observed declining motivation of students, worsening academic performance and achievements [59, 67-69]. Based on the results of the [National Institute of Certified Educational Measurements - NUCEM](#) [70] which annually carries out international measurements using standardized tests. Slovak students perform worse than students in other participating countries. This is due to several external factors. One of the most important is the declining population curve in the territory of the Slovak Republic but also in Europe [67, 68]. This implies the need to study and characterize Generation Z with a focus on student performance.

2.2. Pre-Research of Motivational Factors Affecting Generation Z

Before the beginning of our research, we carried out pre-research, to provide an overview of what factors affect the motivation of students in the educational process at university. The aim of the pre-research was to identify factors that influence students' motivation before and during the exam. The identified factors were further used as the basis for the formulation of scientific hypotheses. Second-year students (first stage of study), study programs Industrial Management and Personnel Policy in Industrial Plant comprised the research sample in pre-research. As a data collection tool, we designed questionnaire of motivation factors. The questionnaire consisted of factors that could affect student performance before or during the exam. Questionnaires were distributed directly to the students in paper form. Participation in the research was fully anonymous and voluntary. The only identifier was the gender of the respondents. By completing the

research questionnaire, respondents confirmed their agreement to participate in the pre-research and to the use of research data. Altogether, 40 questionnaires were distributed of which 39 were returned correctly and fully completed. Overall, we can confirm a 97.50% return of the distributed questionnaires.

The filled-out questionnaires were processed and analysed based on the frequency of the students' answers. The authors of the paper tested the questionnaire's reliability, which reached a Cronbach coefficient $\alpha = 0.732$ sufficient for scientific purposes [71, 72]. We summarized the factors that may influence the motivation of students and their achievements in examinations. Based on the works considering needs influencing motivation in the educational process [73] as well as the knowledge and experience of the authors of the paper, we summarized 17 factors that students were supposed to score on the five-degree Likert scale. The student must score the following factors: 1. The number of exam terms. 2. The number of points from continuous evaluation. 3. Previous experience with the examiner. 4. There are a lot of students taking the examination. 5. There are few students taking the examination. 6. The location of the examination., 7. Exam time (morning/afternoon). 8. The number of credits for subject, 9. Subject evaluation in the previous period's academic information system. 10. Form of exam. 11. The way seminars were taught during the semester, 12. The way of conducting exercises during the semester. 13. The approach of the teacher during the exercises, 14. Atmosphere at the exam, 15. The number of supervisors at exam. 16. Feedback on exam results from the examiner. 17. The clarity and accessibility of study materials.

Further, factors were divided into two homogenous groups: the factors that most affect students before the exam and the factors that least affect students during the exam. The factors that had the least impact on students during the exam were 8, 16, 6, 1, 5 and 3, and they were mostly affected by factors 10, 14 and 15 and 7. Based on the analysis of all collected data, we identified the most influential factors given in Table 1. These factors were: factor no. 2. The number of points from continuous evaluation, factor no. 7. Exam time (morning/afternoon). Factor no. 10. Form of exam, factor no. 11. The way seminars were taught during the semester, factor no. 12. The way of conducting the exercises during the semester, factor no. 14. Atmosphere at the exam and factor no. 17. The clarity and accessibility of study materials.

Table 1.
Mostly positively scored factors (own elaboration).

The numbers of factors with most frequent answers - I rather agree and totally agree							
Factor number	2	10	12	7	17	11	14
Absolute frequency of answers	35	35	33	29	29	27	24

Table 1 summarises the positive responses: the possibility of totally agreeing and rather agreeing as well as the numbers of the seven factors we identified based on respondents' responses as those that have affected them mostly before and after exam. The pre-research brought a finalized and selected set of factors - motivators that motivated respondents to better exam results. The scores of selected factors were used from the formulation of research hypotheses as composite scores based on factors that may affect student performance.

2.3. Research on the Performance Motivation and Personality of Generation Z and their Academic Achievements

The aim of the research was to identify the dominant factors influencing the motivation of students from Generation Z in the educational process and to analyse the relationship between chosen personality characteristics, identified factors and academic results from selected subjects. Mathematics I and operational analysis were selected as comparably content - oriented subjects for different years of study. Before defining the research problem, it was necessary to analyse literature and previous studies focused on motivation in education carry out pre-research and determine the personality characteristics that influence the motivation of Z generation. In order to define the research framework, we have formulated research questions and research hypotheses.

Research Question 1 (RQ1): What scores have been achieved by respondents from the performance motivation questionnaire and are there differences between first year and fourth-year students?

Research Question 2 (RQ2): What score have students achieved on the NEO Five Factor questionnaire inventory and are there differences between first year and fourth-year students?

Research Question 3 (RQ3): What scores have respondents achieved from the questionnaire for assessing values, attitudes toward values and motivation?

Research Hypothesis 1 (RH1): There is a statistically significant relationship between the measured score of achieved points from continuous evaluation and the success in the examination of the selected subject.

Research Hypothesis 2 (RH2): There is a statistically significant relationship between the high scores for motivation to perform and the composite scores of factors that may affect the performance of students.

Research Hypothesis 3 (RH3): There is a statistically significant relationship between values measured for motivation to perform and the conscientiousness values measured by the questionnaire NEO Five Factor Inventory.

Research Hypothesis 4 (RH4): There is a statistically significant relationship between the values for anxiety inhibiting performance measured by the performance motivation questionnaire and the values for neuroticism measured by the questionnaire NEO Five Factor Inventory.

A questionnaire designed by the authors of the paper was constructed as a research data collection tool. Standardized questionnaires focus on diagnostics of motivation and personality characteristics were used in its development. Respondents were informed that participation in the research was anonymous and voluntary. By filling out the

questionnaires, the respondents confirmed their agreement to participate in the research. The designed questionnaire is composed of the following four sections:

1. Demographic parameters. The questionnaire in this section focuses on the characteristics of the respondents (students). The respondents evaluated the identified motivational factors identified in the preliminary research. The students also had to state what grade they got in exams for the selected subjects (Mathematics I and operational analysis). The questionnaire did not contain a question that would identify the gender of the respondents in the research. This arrangement was adjusted in order for students to have a feeling of complete anonymity and at the same time be willing to provide true answers.

2. Questionnaire NEO Five Factor Inventory. The items in this questionnaire examine a person's personality traits (Neuroticism, Extraversion, Openness, conscientiousness and agreeableness). We focused on two personality traits, Neuroticism and Conscientiousness. Neuroticism manifests itself as a tendency towards negative feelings such as fear, threat, anxiety, sadness, anger, etc. Neurotics have trouble controlling their impulses and are less able to handle stress. Neuroticism has a negative impact on performance. Conscientiousness manifests itself in a person's self-regulation and self-control. Self-control involves responsible planning, active organization and performance of tasks. A conscientious person has a strong will, is focussed and also is reliable. Conscientiousness is considered a preposition for achieving higher general performance [74].

3. Performance Motivation Questionnaire. The questionnaire contains three scales, scale performance motivation, anxiety-inhibiting performance and anxiety enhancing performance. The first item of the questionnaire is instructional and is not to be evaluated. The questionnaire also contains 52 statements, which are scored on a 6-degree Likert scale [75].

4. Questionnaire for assessing values, attitudes toward values and motivation. It is a questionnaire designed to identify value orientations, attitudes toward values and motivation. We used the questionnaire focused on motivation from the total set of three questionnaires. This section includes 10 items from the file of incentives related to interests, subjective experience of achieved results, material rewards, advancement requirements, and interpersonal relationships in the horizontal and vertical plane and the social benefit of the work performed. To complete the questionnaire, it is necessary to sort the individual incentives with the maximum weight of 10 points and the lowest weight of 1 point. There are three levels of situations in the motivation questionnaire and the achieved score ranges from 30 to 3 [76].

There were various statistical methods used for processing and analysing the collected data: descriptive and inferential statistics, quantitative statistical methods, graphical interpretations and additional analysis in tabular form. Furthermore, we used parametric and non-parametric tests: Pearson correlation test (r), Spearman test (r_s), students t-test, Kolmogorov-Smirnov test, p-value, Cronbach α and Cohen d . All statistical tests were performed in MS Excel and in SPSS 23 version (Statistical Package for the Social Sciences). SPSS is a statistical software that enables to provide an advanced statistical procedures and data analysis.

2.4. Description of the Research Sample

The research sample consisted of students studying programs in industrial management and personnel policy in industrial plants. All respondents were full-time students (attending university from Monday to Friday according to a predetermined schedule). Students involved in the questionnaire research attended lectures of selected subjects together and exercises were attended by them according to the planned schedule. The research sample consisted of first-year bachelor students aged 19 to 20 and also consisted of first-year engineering students (fourth year) aged 22 to 23. Both groups of respondents could be classified on the basis of age (year of birth) as Generation Z. The sample consisted of 50 first-year students and 50 fourth-year students. A total of 100 questionnaires were distributed during the research and 93 were completed. The number indicates a 93% success rate for the questionnaire data collection method. In the research sample of 93 students up to 52% (48 respondents) were in the first year of study and 48% (45 respondents) were in the 4th year of study. In Table 2 we see the history of the number of students in selected years of study over a seven-year period.

Table 2.
Number of respondents in study programs industrial management and personnel policy in industrial plant (own processing).

Academic year	1st Year of study	4th Year of study	Summary
2013/2014	118	68	186
2014/2015	36	56	92
2015/2016	86	79	165
2016/2017	81	73	154
2017/2018	53	59	112
2018/2019	53	43	96
2019/2020	74	32	106

A comparison of the number of students shown in Table 2 with the number of students involved in the research shows that the distribution of 100 questionnaires (50 for first-year students and 50 for fourth-year students) is sufficient given the number of full-time students. The choice of first-year students was influenced by the fact that students had completed Mathematics I in the winter semester which is considered to be one of the most difficult subjects of bachelor's study. Fourth-year students completed the course Operational Analysis in the winter semester, which is considered one of the

most difficult subjects of engineering study. Both subjects focus on the development of cognitive skills and analytical thinking which are important for managers.

The contents of Mathematics I. include matrices, determinants, sets of linear equations, vectors and vector applications, sequences and limits, functions and limits, rules and applications of differentiation, maxima and minima, integrals and applications.

The content of the subject operational analysis includes breakdown of operational analysis, implementation model, linear programming, distribution problems, graph and network theory, methods of network analysis, sequential models and models of queuing.

Table 3 shows the percentage success of students in the examination of the analysed subjects. 9950 students have completed the subject Mathematics I and 6536 students have completed the subject operational analysis so far.

Table 3.
Total success of students at the subject's mathematics I. and operational analysis (own processing).

Subject	Mathematics I.					
Classification	A	B	C	D	E	FX
Success rate [%]	2.8	4.7	11.5	19.5	45.3	16.2
Subject	Operational analysis					
Classification	A	B	C	D	E	FX
Success rate [%]	3.0	4.9	10.5	17.5	53.2	10.9

As figured out in Table 3, the most common classification from both subjects is rating E which represents the worst rating (expressed in numerical equivalent 3.0) and the least numerous grades is rating A, which represents the best rating (expressed in numerical equivalent 1.0).

3. Results

The following chapter is divided into two parts, the evaluation of the determined research questions and the evaluation of the formulated research hypotheses. The evaluation of research questions and research hypotheses was processed in tabular form and in graphs, which allow easier interpretation of the obtained results.

Research Question 1: What scores were achieved by respondents from the performance motivation questionnaire and are there differences between first year and fourth year students? (Figure 1).

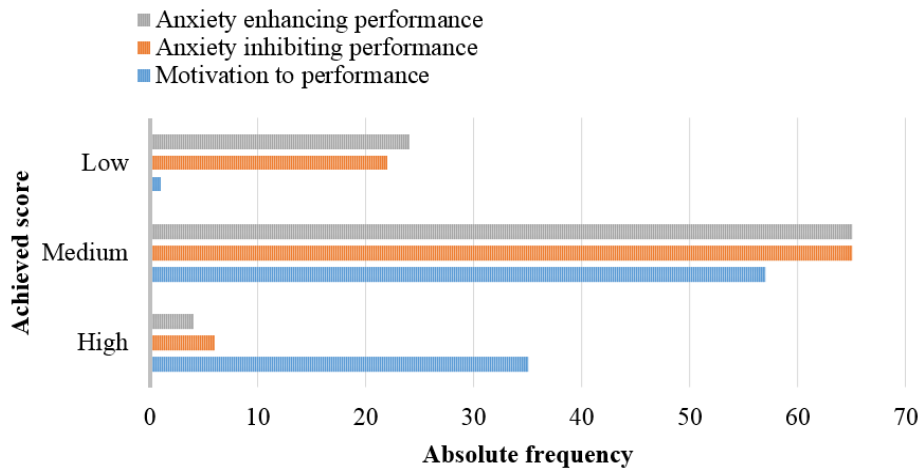


Figure 1. Performance motivation questionnaire: Achieved scores (own elaboration).

The first research question consisted of two parts. The first part of the research question is focused on the composition of the number of respondents who were classified into three levels according to the achieved score (high, medium and low) in the items of the performance motivation questionnaire. The results of the analysis can be seen in Figure 1 which shows the answers of the respondents (first-year and fourth-year students) to the questions of the performance motivation questionnaire. The result of the motivation to perform scale revealed that 38% of respondents achieved high scores, 61% received a medium score and only 1% received low score. In a supplementary analysis, where the sample was divided into first year students and fourth year students, we identified that the first-year students showed much higher values on the performance motivation scale than in the fourth year of study. According to the findings, only a small number of students demonstrated low performance motivation scores. On the contrary, almost 40% of students with high performance motivation values were found. On the anxiety-inhibiting performance scale, the results showed that high scores were achieved by 6% of respondents, medium scores were achieved by 70% of respondents and low scores were achieved by 24% of respondents. Such findings are considered positive because students revealed very low values in high-risk scores.

The last scale was the anxiety-enhancing performance scale. On this scale the results showed that a high score was achieved by 4% of respondents, a medium score by 70% of respondents and a low score by 26% of respondents. We can conclude that students have very similar scores in the anxiety-enhancing and anxiety-inhibiting performance scales where they achieved almost identical values.

The second part of the research question focused on whether there are significant statistical differences in the achieved scores on the performance motivation questionnaire scales between the first year and fourth-year students. All parameters have a normal data distribution in the research sample given in Table 4 which shows the Kolmogorov-Smirnov normality test results for the performance motivation questionnaire scale.

Table 4.
Kolmogorov-Smirnov test for performance motivation questionnaire scales (own elaboration).

Performance motivation questionnaire scales	Year of study	Kolmogor-Smirn test		
		Statistic	df	Sig.
Motivation to performance scale	First	0.122	48	0.072
	Fourth	0.068	45	0.200*
Anxiety-inhibiting performance scale	First	0.097	48	0.200*
	Fourth	0.117	45	0.146
Anxiety-enhancing performance scale	First	0.079	48	0.200*
	Fourth	0.129	45	0.056

Note: * indicates statistical significance at the 10% level.

All scales indicated a normal distribution of data in the research sample (see Table 4) so we could approach the parametric student's t-test for two independent selections Table 5.

Table 5.
Student's t-test of differences between first- and fourth-year students (own elaboration).

Performance motivation questionnaire scales		Levene's test		Student's t-test		
		F	Sig.	t	df	Sig. 2
Motivation to perform	The same deviations are assumed	0.103	0.748	-0.356	91	0.723
	The same deviations are not assumed	-	-	-0.356	90.892	0.723
Anxiety inhibiting performance	The same deviations are assumed	1.639	0.204	2.057	91	0.043
	The same deviations are not assumed	-	-	2.076	86.785	0.041
Anxiety enhancing performance	The same deviations are assumed	0.119	0.731	-0.009	91	0.993
	The same deviations are not assumed	-	-	-0.009	90.848	0.993

Student's t-test results for two independent selections (Table 5) showed a statistically significant differences in the performance motivation questionnaire, subscale Anxiety inhibiting performance ($t = 2.057$, $sig = 0.043$) between first year and four-year students. The value of significance estimated by the Cohen d parameter is $d = 0.431$, which can be considered a low level of effect [77]. There were no significant differences between students in the first-year and fourth-year study groups for the results from the performance motivation questionnaire subscale motivation to performance ($t = -0.356$, $sig = 0.723$) and the performance motivation questionnaire subscale anxiety enhancing performance ($t = -0.009$, $sig = 0.993$).

Research Question 2: What score students achieved from the questionnaire NEO five factor inventory and are there differences between first year and fourth year students?

The second research question consists of two parts. The first part of the question focuses on the composition of the sample number of respondents who were divided to three levels based on the achieved score (high, medium and low) in selected personality characteristics of the questionnaire NEO five actor inventory (neuroticism and conscientiousness). The Figure 2 shows a graphical visualization of the results from the questionnaire the NEO Five factor inventory.

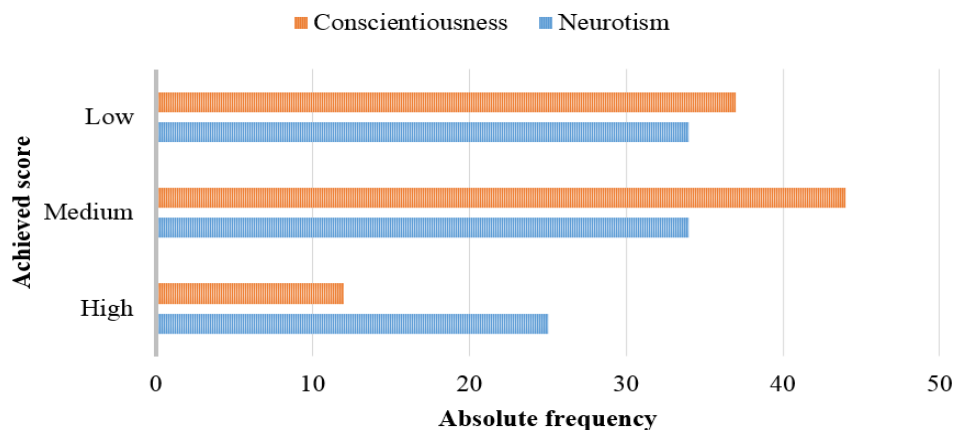


Figure 2.
Questionnaire NEO five factor inventory – selected personality traits (own elaboration).

In Figure 2, the absolute frequencies of responses representing the achieved scores of respondents in selected personality traits (conscientiousness and neuroticism) from the questionnaire NEO five factor inventories are shown. The absolute frequencies shown in Figure 2 were converted to relative frequencies. The high score of neuroticisms manifested in 27% of respondents, a high score manifested in 37% of respondents and the low score manifested in 36% of respondents. This implies that approximately equal number of respondents reached medium and low scores on personality trait neuroticism. According to the research results for the personality trait conscientiousness, students achieved 13% low scores, 47% medium scores, and 40% high scores. Here we can conclude that the respondents have manifested a big disparity between high and low scores in the personality characteristics.

The second part of the second research question focuses on whether there are statistically significant differences in the measured values of selected personality characteristics of the questionnaire NEO five factor inventory between first year and fourth year students. All parameters had a normal data distribution in the research sample given in Table 6, where the results of the Kolmogorov-Smirnov test are listed.

Table 6.
Kolmogorov-Smirnov test for questionnaire NEO five factor inventory items (own elaboration).

Selected personality traits		Kolmogor-Smirnov test		
		Statistic	df	Sig.
Questionnaire NEO five factor inventory item – neuroticism	First year	0.113	48	0.162
	Fourth year	0.087	45	0.200*
Questionnaire NEO five factor inventory item – conscientiousness	First year	0.101	48	0.200*
	Fourth year	0.082	45	0.200*

Note: * indicates statistical significance at the 10% level.

All variables indicated a normal distribution of data in the research sample (Table 6), so we could approach the parametric student's t-test for two independent selections (Table 7).

Table 7.
Student's t-test of differences between first- and fourth-year students (own elaboration).

Selected personality traits		Levene's test		Student t-test		
		F	Sig.	t	df	Sig. 2
Neuroticism	Expects the same deviations	4.081	0.046	2.687	91	0.009
	Does not expects the same deviations	-	-	2.708	88.248	0.008
Conscientiousness	Expects the same deviations	0.001	0.977	-0.795	91	0.429
	Does not expects the same deviations	-	-	-0.796	90.896	0.428

The t-test result showed a statistically significant difference between the first year and fourth year students in the subscale of neuroticism ($t = 2.708$, $sig. = 0.008$). The value of the significance measured by the Cohen d parameter is $d = 0.578$ which can be considered a medium effect [77]. For the subscale of conscientiousness, no significant difference between groups was identified ($t = -0.795$; $sig. = 0.429$). Based on a supplementary analysis in Excel, we know that the first year of study showed a much higher score for neuroticism compared to the fourth-year students. Table 7 shows that there are significant differences between respondents in their first and fourth year of study.

Research Question 3: What score have respondents achieved from the questionnaire for assessing values, attitudes toward values and motivation?

The third research question focused on identifying the number of respondents who were divided into three groups according to the achieved score (high, medium and low) in motivation items from the questionnaire for assessing values, attitudes toward values and motivation. The results of the analysis can be seen in Table 8.

Table 8.
Questionnaire for assessing values, attitudes to values and motivation: Absolute frequencies (own elaboration).

Motivation factor	Score		
	High	Medium	Low
Interesting tasks	37	39	17
The amount of pay	25	40	28
Enjoyment from work results	15	60	18
Recognition from the supervisor	8	51	34
Competitiveness in team	5	20	68
Flexible work schedule	3	37	53
Exciting situations	3	34	56
The opportunity to advise	2	46	45
Contribution to society	2	40	51
Recognition from colleagues	2	28	63

The analysis showed that the strongest motivation of students of Generation Z manifested itself in interesting tasks, rewards and enjoyment from work results (Table 8). These results indicate the importance of both internal and external motivation in relation to performance. We can conclude that it is important to adapt tasks to the level of student competencies and abilities and choose the appropriate form of remuneration according to the efforts and results achieved. Such findings we consider as very interesting challenge how to integrate these factors to make the study more attractive to Generation Z students. To test the research hypotheses, we used the parametric Pearson correlation test (r) and the non-parametric correlation test, the Spearman (r_s) test as appropriate methods.

Research Hypothesis 1: There is a statistically significant relationship between the measured score of achieved points from continuous evaluation and the success in the examination of the selected subject. The result of Spearman's correlation test proved that there is a statistically significant relationship between the measured score for the "student's continuous evaluation" factor and the successful completion of the selected exams in Mathematics I and operational analysis. The tested variable correlates with the Spearman correlation coefficient $r_s = 0.356$ at the level of $\text{sig} = 0.05$. The significance value reached the required level ($\text{sig} < 0.05$), therefore we do not refute this hypothesis and we can confirm that there is a weak correlation between the tested variables.

Research Hypothesis 2: There is a statistically significant relationship between the high scores measured for motivation to perform and the composite scores from factors that may affect student performance. The result of Pearson's correlation test proved that there is a statistically significant relationship between the measured high scores in motivation to perform and the composite scores in all factors. This variable correlates at the level of $\text{sig} = 0.05$ with the Pearson correlation coefficient tested $r = 0.496$. The significance value reached the required level ($\text{sig} < 0.05$), therefore we do not refute this hypothesis and can confirm that there is a moderate relationship between the tested variables. Research Hypothesis 3: There is a statistically significant relationship between values measured for motivation to perform and the conscientiousness values measured by the questionnaire NEO five factor inventory. We used Pearson's correlation test to test the hypothesis. The results prove that there is a statistically significant relationship between item conscientiousness and motivation to perform. The correlation between these variables was established after the effect of anxiety inhibiting performance was removed because it was a partial correlation at $\text{sig} = 0.001$ with a Pearson correlation coefficient of $r = 0.594$. Based on the results, we do not refute the hypothesis and we can conclude that a medium dependence between the tested variables was proved. Research Hypothesis 4: There is a statistically significant relationship between the values for anxiety-inhibiting performance measured by performance motivation questionnaire and the values for neuroticism measured by the questionnaire NEO five factor inventory. The results of the Pearson correlation test confirmed a statistically significant relationship between the neuroticism scale and the anxiety inhibiting performance scale. Pearson's correlation coefficient was $r = 0.644$ at $\text{sig} = 0.001$. We do not refute the hypothesis and we can confirm that there is a medium correlation between the measured values of the anxiety inhibiting performance scale and neuroticism.

4. Discussion

The research was carried out within the framework of a determined research problem reflecting declining student motivation and worsening performance. The selection of Generation Z was conditioned by the fact that negative changes in demography in Slovakia, but also abroad [78] which should have a negative impact on the labour market and the potential for employment of graduates [79]. With various and diverse changes in our society, the role of the university and the way of interaction with students must continue to change. If students expect a good result based on a good continuous evaluation, they are more willing to make efforts, attend class when it affects their academic performance [80]. Academics and researchers working as teachers in the higher education sector are professional so students may benefit from increased motivation caused by the matching approach of teachers [26]. The factors mentioned above are considered by the students to be most important in the examination itself but it is also important to note that the identified factors can be influenced relatively easily by educational institutions. Factors selected in pre-research were used for formulating and defining research hypotheses. An interesting result showed results based on the determined research questions. Statistical analysis has shown that up to 64% (27% high score and 37% medium score) of the total number of respondents tend to be neurotic. Neuroticism figures as a naming dimension of emotional instability-stability in Eysenck's analytical factor theory of personality [81]. Stress resistance has an extensive impact on people's creative abilities [82]. A tendency to neuroticism indicates a decrease in performance, activity and alertness in situations of increased stress and negatively affecting results in the educational process [83]. These facts suggest that the analysed group of respondents cannot regulate their desires and resist impulses from their surroundings. Conscientiousness was another monitored item within the NEO five factor inventory questionnaires. Based on the results of the above -mentioned item, the authors conclude that only 13% of respondents from Generation Z achieved a high score while up to 8% of respondents achieved a medium and low score. The low proportion (13%) of the high conscientiousness score high affects academic and professional performance. Furthermore, the research showed a significant difference between the first and fourth grade groups, based on the results we can conclude that neuroticism differs by age among students confirmed also by other authors [84]. On the other hand, the conscientiousness item did not show a statistically significant difference. Other studies have found that the monitored personality characteristics are important in human resource management, whether in the educational or work processes [47]. The second standardized tool used in the analysis of Generation Z was the performance motivation questionnaire which followed three basic scales (motivation to perform, anxiety enhancing performance and anxiety inhibiting performance). According to the results on the scale motivation to perform, Generation Z manifested high values in the motivation to perform scale (38%), which we consider most important in achieving goals in the work or educational process. We evaluated the results on the Anxiety inhibiting performance scale because the generation group Z has very low

values in the high-risk score (6%). As a negative finding, we consider that the range of anxiety enhancing performance shows too high values at a low score (26%), this fact affects a person in a rather negative way. Analysis of the performance motivation questionnaire showed that the strongest motivation factors for students - respondents of Generation Z are: interesting work, joy in the outcome of work and the amount of salary. Motivational factors are proven by studies to dominance not only for students but also for employed people [10].

The authors of the paper have defined research hypotheses which were all not refuted and their testing confirmed the existence of significant relationships. The result of Spearman's correlation test when verifying the first research hypothesis proved the existence of a statistically significant relationship between the success of the continuous evaluation of the monitored subjects (Mathematics I and operational analysis) and the final study results from the selected subjects. The value of the Spearman correlation coefficient becomes $r_s = 0.356$. It follows that the chosen motivation factor has a really positive impact on academic results achieved by the students. The result of the Pearson correlation test ($r = 0.496$) demonstrated that there is a statistically significant relationship between the measured high scores on motivation and the composite scores in all factors. Therefore, it can be argued that motivational factors have a significant impact on the homogeneous performance motivation scaling which is important in positive performance regulation. Statistical testing showed that there is a significant relationship between the extent of motivation to perform as motivation from the performance motivation questionnaire and the NEO five factor inventory. The last finding was the quantification of the relationship between the anxiety inhibiting performance scale from the performance motivation questionnaire and the neuroticism item from the NEO five factor inventory. The results showed a significant relationship and therefore we can conclude that Generation Z is negatively affected by the personality characteristic of neuroticism and related anxiety which hinders performance. All these findings contributed to the main research aim achievement. Based on the findings, it is necessary to address not only motivational factors and motivation of personality as confirmed also by other studies [85] but also personality characteristics that can positively influence the achieved academic results. As mentioned above, the declining academic performance of students causes problems in education and consequently in the working sphere.

One part of the research goal was to identify personality characteristics in relation to the motivation of Generation Z students in the educational process. This partial goal has also been met and we consider its findings important and useful in further research. Both, students and employees represent diversified potential not only for educational institutions but also for businesses [86]. Given that Generation Z is a very important generation for the future, therefore research focused on Generation Z are important to better understand its students. A contribution to understanding Generation Z can be seen as a contribution to understanding most of today's students and the future of modern society [87, 88].

The effectiveness of education and learning processes in the business environment is much more complex than that of institutional education at secondary schools, high schools or universities. Therefore, we consider it important to further explore and characterize the Generation Z, which in a few years will become an important part of the labour market.

5. Conclusions

The main goal of the research was to identify and analyse the dominant factors that affect the motivation to perform in the educational process of Generation Z students in management study programs at a technical university. The identified factors were analysed in relation to the personality traits and subsequently was tested the potential impact of the identified factors and personality traits on the learning outcomes of selected subjects as a precondition for sustainable learning.

In order to properly set the research framework and enhance the contribution of research we carried out pre-research focused on motivational factors affecting students before and during the exams. Based on the pre-research results, we identified the most important factors that affect students before and during the examinations. Based on our research results, scholars, teachers, and higher education specialists can find useful information to personalize the lessons for Generation Z students. Educational institutions, especially universities, through sustainable learning increase the success (performance) of students in the educational process, considering these factors. Research results have shown that internal motivation is important for Generation Z students, since the research results proved that students need incentive and inspirational work. On the other hand, the research showed that beside the enjoyment from realized activities is important the reward. Based on the analysed research results, the authors of the paper consider that the importance of internal and external motivation of Generation Z students must be balanced.

Another finding was that the surveyed respondents did not achieve a high conscientiousness score, resulting in reduced performance and poorer academic performance. After statistical testing the research hypotheses, the authors of the paper found that there is a significant relationship between the selected variables. All formulated hypotheses were not refuted, and we can conclude moderate and strong dependencies between variables, concrete values can be seen in the results and discussion sections. Overall, we can conclude that there is motivation among the students in accordance in their academic achievement in selected subjects of their studies. Despite that, all professionals need to show interest in factors and research results that can positively influence students' behaviour while improving academic performance. Implementation of the proposed recommendations has the potential to increase the effectiveness of the educational process and simultaneously improve the academic performance of students in higher education. The given research results can help streamline the sustainable learning and education process in higher education. Finally, we can state that the findings regarding the personality structure of Generation Z members are useful for sustainable human resource management in organizations.

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