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CAREER ASPIRATIONS OF SLOVENIAN NINTH GRADERS: THE INFLUENCE OF PERSONAL FACTORS AND ATTITUDES TOWARDS ENGINEERING PROFESSIONS

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Abstract/Izvleček

The study examines the career aspirations of Slovenian ninth-grade students and analyses how these are influenced by personal factors and their attitudes towards engineering professions. Regression analyses on a sample of 779 students show that interest in outdoor work is a significant predictor of engineering career aspirations across all educational levels. Physical demands positively influence aspirations for engineering occupations requiring secondary or elementary education, while intellectual demands and employment opportunities encourage interest in engineering occupations at the tertiary level. A positive perception of engineering professions as interesting is a key factor for all levels of education. The results emphasise the importance of fostering interest in technical careers.

Poklicne želje slovenskih devetošolcev: vpliv osebnih dejavnikov in odnosa do tehniških poklicev

V raziskavi smo preučevali poklicne želje slovenskih devetošolcev in analizirali, kako nanje vplivajo osebni dejavniki ter njihov odnos do tehničnih poklicev. Rezultati regresijskih analiz na vzorcu 779 učencev so pokazali, da je zanimanje za delo na prostem pomemben napovednik poklicnih želja v tehničnih poklicih na vseh ravneh izobrazbe. Fizična zahtevnost pozitivno vpliva na izbiro tehničnih poklicev s srednješolsko ali z osnovnošolsko izobrazbo, medtem ko intelektualna zahtevnost in zaposlitvene možnosti spodbujajo zanimanje za tehnične poklice z univerzitetno izobrazbo. Pozitivno dojemanje tehničnih poklicev kot zanimivih je ključni dejavnik za vse ravni izobrazbe. Rezultati poudarjajo pomen spodbujanja zanimanja za tehnične poklice.

Keywords:
ninth grade students, career aspirations, engineering professions, personal factors influencing career choice, attitudes towards engineering professions.

Ključne besede:
učenci devetega razreda, poklicne želje, tehnični poklici, osebni dejavniki vplivanja na poklicne želje, odnos do tehniških poklicev.

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Introduction

According to Sternberg (2004, p. 287), "wisdom is the application of intelligence, creativity and knowledge to the common good by balancing intrapersonal (one's own), interpersonal (others) and extrapersonal (institutional or other larger) interests over the long and short terms, through the mediation of values, so as to adapt to, shape, and select environments". Combining these words with the means of solving environmental problems proposed by Heberlein (Heberlein, 2012), according to which management actions must simultaneously introduce three "solutions" -- cognitive, technological, and structural, one can conclude that solving many global and local problems requires a solid educational background (UNESCO, 2020). However, we observe the trend that the lack of trained professionals in technical fields is one of the fundamental challenges for societal development, and many countries are already struggling with a shortage of qualified personnel in engineering professions (Šorgo and Ploj Virtič, 2020). Professions that are currently in short supply or could soon become so are often referred to as STEM (science, technology, engineering and maths) professions. The shortage of STEM professionals is not just a local problem, but a global challenge that has persisted for years (Ivanova et al, 2019; Kozak, 2019; National Science Board, 2018; OECD, 2022; Ploj Virtič and Šorgo, 2022; Šorgo and Ploj Virtič, 2020). Consequently, attracting and inspiring young people to engineering professions at an early stage of their education should be a priority for any society. However, attractiveness is only a first step that must be followed by measures to maintain interest. Any study that sheds light on the factors that influence certain choices is therefore to be welcomed. Teachers can be recognised as ambassadors who connect the world of school with the extra-curricular sphere. It is widely recognised that teachers and teaching practises play a crucial role in shaping students' career aspirations (Ploj Virtič and Šorgo, 2022). However, research also points to a lack of adequately trained STEM teachers, which could affect their ability to positively influence students' perceptions of engineering professions (Dolenc et al., 2021). Furthermore, the gender gap in STEM fields continues to be an issue. Košak et al. (2024) found that technical and engineering professions are significantly more attractive to boys than to girls. These findings emphasise the need for measures that promote gender equality in career choices.

In addition to education, social influences also impact career aspirations. Studies suggest that family background, socioeconomic status and academic performance have a decisive influence on students' career aspirations (Borrego et al., 2018;

Cleaves, 2005; Davenport et al., 2020; Gero and Abraham, 2016; Jiang et al., 2019; Košak et al., 2022; Košak et al., 2024; Ploj Virtič and Šorgo, 2022; Šorgo and Ploj Virtič, 2020; Wei-Cheng et al., 1998; Woolnough, 1994; Woolnough et al., 1997). A deeper understanding of these factors is essential for developing effective strategies to address the shortage of STEM professionals.

Students' career aspirations develop over the course of their school years (Ginzberg et al., 1951). One of the most important milestones in this process is the end of compulsory elementary school, when young people must choose their future educational path. Recent research in Slovenia (Košak et al., 2024) suggests that students with higher academic performance are more likely to aspire to professions that require a university degree, while students with lower academic performance often opt for vocational education or engineering professions.

Given these findings, it is important to develop evidence-based strategies that guide young people towards sustainable career choices that match both their interests and the demands of the labour market.

Aim and Scope

The main objective of this study was to understand the career aspirations of students after completing nine years of elementary education, in particular their propensity to enrol in secondary education programmes that open up pathways to engineering and technological careers. This includes enrolment in upper secondary vocational education or, later, in higher vocational education and university studies in the field of engineering at technical colleges and universities.

To achieve this goal, the study aimed to investigate whether personal factors and students' attitudes towards engineering professions have a statistically significant influence on the career aspirations of Year 9 students.

The research question of the study:

Can personal factors related to career choice and students' attitudes towards engineering professions statistically significantly predict 9th grade students' career aspirations for technical careers?

Methodology

Sample and Sampling

The study is part of a large doctoral research project conducted between March and May 2022 (Košak, 2024). The study was conducted with a sample of 9th grade

students from elementary schools in Slovenia. A link to the questionnaire, which was created using the open-source online application 1KA, was sent to fifty-nine elementary schools. The questionnaire was anonymous and did not collect any sensitive personal data.

To ensure a systematic and representative sample, schools were selected that included students from all ten statistical regions of Slovenia (Pomurska, Podravska, Savinjska, Koroška, Zasavska, Posavska, Osrednjeslovenska, Jugovzhodna, Goriška and Obalno-kraška). In addition, the sample was distributed proportionally according to the size of the settlement (villages, small towns, and large cities). A total of thirty-five elementary schools took part in the study, and 779 9th grade students answered the questionnaire.

The sample size was large enough to conduct further statistical analyses (Kline, 2015; Wolf et al., 2013).

Statistical Analysis

The collected data was analysed using Jamovi, a free and open-source statistical software (The Jamovi Project, 2023). The following statistical analyses were performed:

- Descriptive statistics were used to examine all variables included in the study.
- Regression analyses (Field, 2013) were conducted to analyse the effects of different factors:
  - Career aspirations in engineering professions,
  - The intention to pursue a technical career, and
  - The choice of an educational pathway.

The predictive models were visualised using graphic representations.

Development of the Instrument

The questionnaire used to assess students' career aspirations and the factors influencing their career choice consisted of several sections (Košak, 2024). In the first section, demographic data was collected. The second and third sections of the data were designed according to the theoretical starting points, as shown in Table 1.

Table 1
Details of the Second and Third Sections of the Instrument

Instrument	Number of statements /scales	Sources
The second section "Personal Factors Influencing Career Choice"	26 statements, measured on a 7-point Likert scale (from *strongly disagree* to *strongly agree*).	Ajzen (1991) Gray and O'Brien (2007) Lent et al. (1994) Liao et al. (2009) Šorgo et al. (2018)
The third section "Attitudes Toward Engineering Professions"	13 statements, measured on a 7-point semantic differential scale (e.g., *engineering professions are very uninteresting – very interesting*).	Ajzen (1991) Lent et al. (1994)

The "Personal Factors Influencing Career Choice" instrument was developed to capture a broad range of potential determinants — both internal and external — that may influence students' career paths to their desired professions. The instrument is based on several theoretical frameworks (Ajzen, 1991; Bandura, 2005; Gray and O'Brien, 2007; Lent et al., 1994; Liao et al., 2009; Ploj Virtič and Šorgo, 2022; Šorgo et al., 2018), all of which have been integrated into the context of career decision-making.

The personal factors included in this instrument are as follows (Košak et al., 2022; Košak, 2024):

- Self-efficacy — an internal factor representing a person's belief in their own ability to perform a particular occupation (Lent et al., 1994; Bandura, 2005).
- Attitudes towards professions — a person's general perception of various occupational characteristics (Liao et al., 2009).
- Subjective norms — the perception of how others, especially those influential to the individual, view their career choice (Ajzen, 1991).
- Aspiration for success — the extent to which a person sets achievement-oriented goals in a particular occupation (Gray and O'Brien, 2007).
- Perceived ease of work — the ease with which a person perceives a particular occupation (Liao et al., 2009).
- Educational pathway to an occupation — the willingness to invest time and effort to complete the necessary education for a chosen career (Gray and O'Brien, 2007; Ploj Virtič and Šorgo, 2022; Šorgo et al., 2018).
- Additional external factors that are independently included in the instrument are financial incentives (e.g., high salary), employment opportunities, travel

opportunities, work environment (e.g., clean workplace, outdoor work) and the possibility of employment in the hometown.

The "Attitudes Toward Engineering Professions" instrument provides a comprehensive insight into individuals' perceptions of engineering professions and integrates both internal and external factors that influence these attitudes. The development of this instrument is based on theoretical foundations (Ajzen, 1991; Lent et al., 1994) that are directly linked to career-related attitudes (Košak, 2024).

Attitudes towards engineering professions are captured by experiential attitudes that reflect how a person perceives engineering professions (e.g., as enjoyable, demanding, etc.), stereotypical attitudes that assess whether technical careers are perceived as gender-specific (e.g., technical careers are only for men), or external factors that assess whether financial rewards or labour market opportunities influence attitudes towards technical careers (e.g., excellent salary) (Košak, 2024). All items of the instrument "Attitudes Toward Engineering Professions" can be found in Table 2.

The fourth section of the questionnaire, titled "Career Aspirations" (Košak et al., 2024), consists of seventeen statements. Respondents indicate their interest in a particular career on a 7-point scale ranging from 1 (not at all interested) to 7 (very interested), with an additional option: "I do not know this career".

The professions in this section are divided into three groups according to the level of education required:

- Professions requiring a university degree — 10 occupational categories.
- Professions requiring a secondary school degree — 5 occupational categories.
- Professions requiring an elementary school degree — 2 occupational categories.

Each category is further subdivided into occupational fields, such as military and police professions or engineering and technology professions (e.g., mechanical engineering, civil engineering, electrical engineering, computer science). All items in the "Career Aspirations" instrument can be found in Table 3.

Research Hypotheses

Before conducting the study, we formulated the following hypotheses:

- H1: The career aspirations of 9th grade elementary school students towards engineering professions are influenced by personal factors.

- H2: The career aspirations of 9th grade elementary school students towards engineering professions are influenced by their attitudes towards technical careers.

Results

The results of the descriptive statistics for the instrument "Personal Factors Influencing Career Choice" have already been presented in a previous publication (Košak et al., 2022). Since this study is part of a broader research project from which both publications emerged, the results for the instrument "Personal Factors Influencing Career Choice" (N = 769, Cronbach's alpha = 0.86) remain consistent and are not repeated in this article but summarised here. Students rated their level of agreement with twenty-six statements on a 7-point Likert scale (from 1 - strongly disagree to 7 - strongly agree). The descriptive results show that the most important personal factors influencing 9th grade students' career choices (median ≥ 6) are as follows: "… where I find the work interesting", "… in which I will enjoy working", "… that will fulfil my life ambitions", and "… that provides challenges." Conversely, the least important factors (median = 3) are "… that has been recommended to me by others" and "… that will make me famous."

The results of the descriptive statistics for the "Attitude Towards Engineering Professions" instrument are shown in Table 2. Students expressed their attitudes towards engineering professions using a 7-point scale between two opposing statements (e.g., engineering professions are very uninteresting – very interesting) and rated 13 statements.

The results from Table 2 show that the students' attitude towards engineering professions is above 4 (neutral) for all statements. The statements "Engineering professions are very important" and "Engineering professions offer many challenges" stand out with a mean value of over 5. At the bottom of the table is the statement "Engineering professions raise reputations."

Table 2
Attitudes of Elementary School Students in Year 9 Towards Engineering Professions, Sorted by Median Value (N = 769, Cronbach's alpha = 0.89)

Engineering professions…	**Mean**	**Med**	**Mod**	**SD**
... are very important.	5.4	6	7	1.8
... they offer many challenges.	5.0	5	7	1.7
... they are physically demanding.	5.0	5	6	1.7
... offer great job opportunities.	4.9	5	5	1.7
The people I value have a good opinion of engineering professions	4.8	5	4	1.7
... they are mentally demanding.	4.7	5	5	1.6
... require a lot of continuous training.	4.7	5	4	1.5
Education for an engineering profession is demanding.	4.6	5	4	1.6
... are respected.	4.5	4	4	1.7
... are well paid.	4.5	4	4	1.6
... are interesting.	4.4	4	4	1.9
... raise reputations.	4.3	4	4	1.6
... are for women only.	3.7	4	4	1.4

The results of the descriptive statistics for the "Career Aspirations" instrument are shown in Table 3. The students rated their career aspirations on a scale from 1 (I would not like to do this profession at all) to 7 (I would definitely like to do this profession).

The results from Table 3 show that the most popular professions among 9th grade students are those that require a university degree. Preferred fields include sports and culture (e.g., musician, actor, writer, sports coach, etc.), healthcare (e.g., doctor, dentist, etc.), engineering and technology professions (e.g., mechanical engineer, civil engineer, electrical engineer, computer scientist, etc.), social sciences and humanities (e.g., archaeologist, historian, geographer, translator, psychologist, etc.), and law (e.g., lawyer, jurist, judge, etc.).

Table 3
Career Aspirations of 9th Grade Elementary School Students, Sorted by Popularity of Occupational Groups (N = 769)

Career Aspirations (required education qualification)	*n*	missing	Mean	Med	Mod	SD
Professions in Sport and Culture (UNI)	736	33	3.7	4	1	2.1
Health Professions (UNI)	729	40	3.5	3	1	2.0
Engineering and Technological Professions (UNI)	**738**	**31**	**3.3**	**3**	**1**	**2.1**
Professions in Law (UNI)	734	35	3.3	3	1	1.9
Social sciences and humanities professions (UNI)	726	43	3.3	3	1	1.8
Clerical, managerial, economist (UNI)	722	47	3.2	3	1	1.8
Health professions (SEC)	736	33	3.2	3	1	2.0
Mathematical and natural science professions (UNI)	725	44	3.1	3	1	1.8
Education professions (UNI)	719	50	3.0	3	1	1.9
Military or police occupations (UNI)	739	30	3.0	3	1	1.9
Occupations in the hospitality, tourism, and commerce sectors (SEC)	734	35	2.9	3	1	1.7
Office occupations (SEC)	733	36	2.8	3	1	1.6
Engineering and technological occupations (SEC)	**728**	**41**	**2.8**	**2**	**1**	**1.9**
Occupations in agriculture (UNI)	702	67	2.7	2	1	1.9
Agricultural occupations (SEC)	717	52	2.4	2	1	1.7
Engineering and technological occupations (Elementary)	**717**	**52**	**2.4**	**2**	**1**	**1.8**
Elementary occupations (Elementary)	707	62	1.9	1	1	1.4

Note: UNI – university qualification, SEC – secondary school qualification, Elementary – elementary school qualification

Among the professions that require a secondary school qualification, the most popular are healthcare professions (e.g., nurse, medical technician, etc.).

To examine whether personal factors influencing career choice and attitudes towards engineering professions significantly predict students' career aspirations in engineering professions, we conducted an ordinal logistic regression analysis. The results are shown in Tables 5 and 6.

The results from Table 4 show that the predictors of career aspirations in engineering professions vary according to the level of education required. Only one personal factor significantly ($p < .05$) and positively predicts career aspirations in all engineering professions: "*I will choose an occupation that is performed outdoors*".

Table 4

Results of the Logistic Ordinal Regression to Explain Career Aspirations in Engineering Professions Based on the Personal Factors that Influence Career Choice

Forecast	**Career preferences of 9th-grade elementary school students for engineering occupations requiring ...**					
	university qualification		**secondary school qualification**		**elementary school qualification**	
Personal factors for career choice I will choose a profession ...	**Regression estimation**	*p*	**Regression estimation**	*p*	**Regression estimation**	*p*
... for which I will easily be able to complete the required training.	.08	.137	.05	.373	.08	.145
... where I will be interested in the work.	.01	.937	.11	.289	- .02	.875
... which I will enjoy.	- .03	.755	- .07	.547	- .11	.346
... which offers challenges.	.10	.169	- .01	.903	- .03	.717
... which requires teamwork.	- .06	.310	.04	.460	.04	.514
... which helps me to help others.	**- .20**	**< .001**	- .02	.695	- .12	.064
... which will fulfil my ambitions in life.	- .13	.074	**- .17**	**.014**	- .07	.328
... which others have advised me to do.	.02	.740	.02	.706	**.10**	**.041**
... which pays well.	.06	.345	.01	.867	- .07	.293
... providing sufficient quality job opportunities.	**.18**	**.010**	.09	.234	.07	.380
... allowing plenty of travel.	- .03	.529	- .05	.358	- .06	.285
... which takes place in a clean environment.	**- .16**	**.004**	**- .16**	**.007**	- .11	.072
... which takes place outdoors.	**.10**	**.041**	**.13**	**.010**	**.11**	**.046**
... which provides employment in the hometown.	.08	.093	.06	.191	**.11**	**.046**
... which is physically strenuous.	.03	.526	**.18**	**< .001**	**.25**	**< .001**
... mentally demanding.	**.20**	**.002**	.05	.386	.00	.970
... requiring special talents.	- .05	.399	.02	.696	- .07	.287
... which is well thought of by people I respect.	- .09	.133	- .06	.272	- .06	.362
... which will enhance my reputation.	.08	.190	.05	.409	.02	.805

...which will make me famous.	- .09	.087	.00	.949	.01	.852
... for which I am willing to study hard.	- .09	.091	**- .17**	**.003**	- .09	.122
... which I will get to as quickly as possible.	.09	.058	**.11**	**.027**	**.16**	**.003**
... in which I will have to continually improve myself.	- .06	.333	- .07	.273	**- .14**	**.030**
...in which I will lead other employees.	**.15**	**.021**	.05	.415	.02	.754
... in which I will teach other employees.	.07	.272	.02	.761	.08	.243
...where I will put extra energy into promotion.	.02	.719	- .06	.399	$-4.78e^{-4}$	.995
Variance explained (R^2)	.04		.04		.06	

Note: Results in bold are statistically significant predictors of career aspirations for engineering occupations
($p < .05$).

Among the strongest positive predictors ($p < .001$) for career aspirations in engineering professions that require a secondary or elementary school degree, the following personal factor stands out: "*I will choose an occupation that is physically demanding.*"

There are two statistically significant ($p < .05$) positive predictors for career aspirations in engineering occupations that require a university degree: "*I will choose an occupation that offers sufficiently high-quality employment opportunities*" and "*I will choose an occupation that is intellectually demanding*".

Table 5
Results of the Logistic Ordinal Regression to Explain Career Aspirations in the Engineering Professions on the Basis of Attitudes Towards the Engineering Professions

Forecast	**Career preferences of 9th-grade elementary school students for engineering occupations requiring ...**					
	university qualification		**secondary school qualification**		**elementary school qualification**	
Attitudes towards engineering professions Engineering professions ...	**Regression estimation**	***p***	**Regression estimation**	***p***	**Regression estimation**	***p***
... are very interesting.	**.73**	**< .001**	**.57**	**< .001**	**.40**	**< .001**
... they offer many challenges.	- .04	.520	- .05	.331	.04	.441
... they are very respected.	.08	.115	.01	.899	.04	.413
... they are very important.	- .03	.588	- .09	.098	**- .12**	**.038**

... they are for women only.	.04	.525	**.16**	**.007**	.08	.171
... they are very well paid.	.12	.053	.04	.576	.04	.541
... offer very good job opportunities.	.03	.621	.05	.466	.05	.473
... require a great deal of continuous training.	**- .15**	**.028**	- .10	.147	**- .19**	**.007**
... are physically very demanding.	**- .11**	**.042**	- .03	.634	.04	.450
... are very demanding mentally.	.06	.391	- .04	.503	- .02	.770
Education for an engineering profession is very demanding.	- .12	.070	.04	.525	- .07	.299
The people I respect have a good opinion of engineering professions.	.05	.352	.02	.706	.01	.909
... raises their reputation.	.01	.883	.00	.978	.08	.205
Variance explained (R^2)	.13		.08		.05	

Note: Results in bold are statistically significant predictors of career aspirations for engineering occupations
($p < .05$).

The results from Table 5 show that the predictors for career aspirations in engineering professions differ depending on the level of education required. Only one predictor significantly ($p < .05$) and positively predicts career aspirations for all engineering professions. This is the attitude towards engineering professions: "Engineering professions are very interesting".
The prediction model to explain the career aspirations of students in engineering professions is shown in Figures 1 and 2.

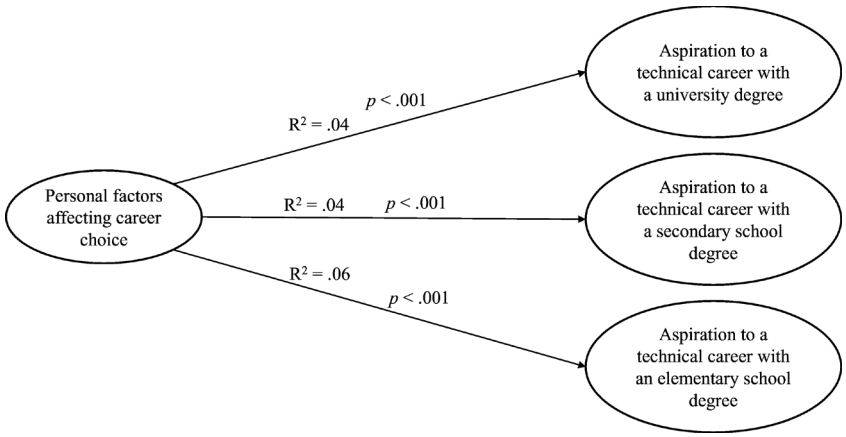

Figure 1
Prediction Model for Career Aspirations in Engineering Occupations Based on Personal Factors Influencing Career Choice

The results from Figure 1 show that personal factors influencing career choice have a significant influence ($p < .001$) on career aspirations in engineering professions. However, they account for only around 5% of the variance in career aspirations at the individual educational levels.

The prediction model confirms H1 (*We hypothesise that personal factors significantly influence the career aspirations of 9th grade students in engineering professions*), but only for certain personal factors (see Table 4).

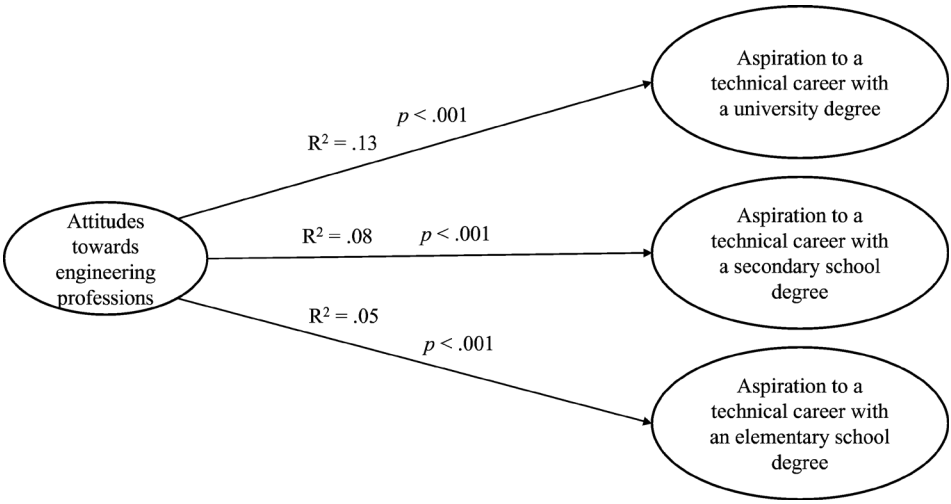

Figure 2
Predictive Model for Career Aspirations in Engineering Professions Based on Attitudes Toward Engineering Professions

The results from Figure 2 show that attitudes towards engineering professions have a significant influence ($p < .001$) on career aspirations in engineering professions. More specifically, attitude explains:

- 13% of the variance in career aspirations for engineering professions that require a university degree,
- 8% of the variance in career aspirations for engineering professions that require a secondary school qualification,
- 5% of the variance in career aspirations for engineering professions that require an elementary school qualification.

The prediction model confirms H2 (*We hypothesise that 9th grade students' attitudes towards engineering professions significantly influence their career aspirations in engineering professions*), but only for certain attitudinal statements (see Table 5).

Discussion

The results show that two predictors have a significant and positive influence on career aspirations in engineering and technology professions across all required educational levels: (1) the personal factor "*I will choose a profession that is performed outdoors*" and (2) the attitude towards engineering professions "*Engineering professions are very interesting*". The latter predictor is consistent with previous research (Chan et al., 2019; Chen et al., 2024; Smit et al., 2021).

A statistically significant and positive predictor of career aspirations in engineering and technology professions that require a secondary or elementary school degree is the personal factor "*I will choose an occupation that is physically demanding*". For career aspirations in engineering professions that require a university degree, there are two significant personal factors: "*I will choose an occupation that provides sufficient high-quality employment opportunities*" and "*I will choose an occupation that is intellectually demanding*". These predictors were expected based on stereotypical assumptions. Low-skilled engineering and technology professions and occupations requiring a secondary school degree tend to be more physically demanding, which attracts or discourages individuals for whom this factor is relevant. Similarly, engineering and technology professions that require a university degree are more intellectually demanding and therefore appeal to people who value this aspect.

The results can primarily be explained by external motivational factors, since elementary school students have no influence on the characteristics of the professions. Another possible explanation arises from the self-determination perspective, where students select a range of professions in which they believe they could be successful.

Career aspirations cannot be explained by a single theory (e.g., Lent et al., 1994) as too many factors are involved, from personal factors in the psychological sciences (e.g., Deci and Ryan, 2012) to numerous social and economic factors in the social sciences (e.g., Lent et al., 1994), to the objective realities of living conditions and the environment. If bridging the gap between career aspirations and actual career choices in STEM careers is a genuine goal of society and its subsystems, it is insufficient to delegate this problem to schools alone.

Conclusion

The main objective of this study was to investigate whether personal factors and attitudes towards engineering professions predict the career aspirations of Slovenian 9th grade students for technical careers in a statistically significant way. The research sought to answer the question: What personal factors and attitudes influence students' interest in engineering professions across different educational pathways? The results show that career aspirations in engineering professions are influenced by different factors depending on the level of education. Across all levels, interest in working outdoors proved to be a consistently positive predictor. Physical demands were identified as an important motivator for professions requiring a secondary or elementary school degree, while intellectual demands and employment opportunities were the most important factors for careers requiring a university degree. Furthermore, the perception of engineering professions as "very interesting" was a universal predictor for all levels of education.

These findings underscore the importance of fostering positive attitudes towards engineering professions and aligning educational strategies with students' personal interests and perceptions of career characteristics. By addressing these factors, educational institutions and policy makers can better support students in making informed decisions about their future careers in engineering fields.

Limitations of the study

The study has several limitations on different levels. One of its limitations, but also a strength, is its novelty both in the Slovenian and international context. Therefore, the results of the study cannot be directly compared with previous research or identical foreign studies. Given the broad scope of the research problem, numerous constructs derived from established theories were not considered, which could serve as a direction for future research. Further limitations arise from the voluntary nature of participation in the survey, which may affect the representativeness of the sample and therefore the generalisability of the results to the wider population or international context. Further limitations arise from the online nature of the survey with all its known advantages and limitations. Although the interpretation of the results was conducted with the utmost care and scientific rigour, some interpretations suggest the need for further research.

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