

10.2478/nispa-2024-0013



The Acceptance of Nudges to Encourage HEI Students to Graduate: A Comparative Study

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Abstract:

The study aims to shed light on the acceptance of nudges to encourage HEI students to graduate successfully and to prevent drop-out. The example of two Central European countries with significantly high drop-out rates examines the acceptance of high- and low-touch nudges. The nudges were classified as high-touch or low-touch based on the potential costs of the intervention and whether the intervention involved in-person interaction. The results show that the general acceptance of proposed nudges is similarly high, whereby high-touch nudges are more popular than low-touch ones in both countries. Further, high-touch nudges have a significantly higher level of acceptance. The findings suggest that a communication form (text messaging, email, face-to-face interaction) can influence the acceptance level of the pro-graduation nudge.

Keywords:

behavioral insights; drop-out, nudging HEI students; pro-graduation nudges

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1. Introduction

About 30% of OECD students do not graduate from Higher education institutions (HEIs). Tertiary education is the center of attention of EU and OECD countries, with the goal of 40% of 30-34-year-olds completing tertiary education. The Czech Republic and Slovakia are Central European countries with a well-visible problem of low graduation rates. In 2020, the share of Czech tertiary educated persons aged 25-64 accounted for 25% and 33% among 25-34-year-olds, while almost 50% of students did not complete study. The drop-out rate within five years after HEI enrolment between 2007 and 2015 rose from 43.25% to 49.08% (OECD, 2021a; OECD, 2021b).

The situation in tertiary education in Slovakia is similar to that of Czechia. In Slovakia, 28% of 25-64-year-olds had a tertiary qualification in 2021 compared to 40% on average across OECD countries. The share of younger cohorts (25-34 year-olds) with tertiary qualification is higher (39%). However, it is still below the OECD average (47%) (OECD, 2022a). The tertiary attainment in Slovakia increased quickly, from 11% in 2001 to 39% in 2021 (OECD, 2022b). According to data from the cross-cohort on tertiary attainment, about 62% of students in Slovakia completed the bachelor's program within the standard duration of the program. In comparison, the average in other countries was 77% (OECD, 2021d). Schnepf (2014) analyzed the drop-out rate of adults (25-64 year-olds) in European countries, and he found that approximately 19% of Slovak adults dropped out of tertiary education compared to 27% of Czech adults. One out of five Slovak university students chooses to undertake higher education abroad, a share second only to Luxembourg (OECD, 2021e). Most of them study in the Czech Republic. Moreover, the Slovak higher education system does not sufficiently equip graduates with skills for the future labor market (OECD, 2021e).

This is a social problem that requires an effective solution to increase the success of HEI studies. Nudging is one of the effective tools (Tversky & Kahneman, 1981; Cartwright, 2011). We examine the problem in the case of Slovakia using the methodology of the study conducted in Czechia by Korečková et al. (2023). In this sense, the study focuses on the acceptance of nudging by Slovak and Czech HEI students. It discusses the findings and generalizations of the social research field and public policy. Pro-graduation nudges represent a potentially cost-effective strategy for enhancing student performance, attendance, and engagement. They are also highly scalable (Damgaard & Nielsen, 2018). However, before addressing the ethical implications of nudging and its potential applications in the field, it is essential to understand the level of acceptance of pro-graduation nudges. This is the primary objective and scientific contribution of our study. Although the Czech and Slovak educational systems are similar, their socio-cultural differences may affect the acceptance and effectiveness of nudges. Exploring these differences provides valuable insights into how these factors shape educational interventions, aiding in policy adaptation.

The study is divided into the following parts. In the first part, we discuss a theoretical and conceptual framework for research. Based on assessing contemporary

scientific discourse, we anchor our research on nudge (Thaler & Sunstein, 2008). The second (empirical) part investigates how Slovak and Czech students assess the suitability of using nudge tools. The third and fourth sections are devoted to the results and discussion. At the end of the study, theoretical generalizations and practical recommendations for the educational policy are provided.

2. Theoretical and conceptual framework. Behavioral aspects of HEI students' graduation

Damgaard and Nielsen (2018) highlight that nudging interventions often yield positive educational outcomes, mainly when addressing those behavioral obstacles that significantly impact individuals. Educational nudges can manifest as reminders, goal-setting exercises, peer comparisons, framing of test scores, or feedback. Common behavioral barriers include self-control, limited attention and cognitive ability, default bias, and loss aversion. Additionally, behavioral interventions tend to be more effective when individuals are highly motivated (Damgaard & Nielsen, 2018). This paper explores the acceptability of educational nudges among students in higher education institutions (HEIs).

The analysis of the literature shows that HEI studies and graduation rates success are influenced by several factors (see Fig. 1). There are potential benefits in the choice architecture or design of educational and graduation-supporting nudges (Graham et al., 2017), more personalized, proactive contact with the tutor (Simpson, 2010, Bailes & Hoy, 2014), peer pressure (Borsari & Carey, 2006, Rimal & Real, 2005) and attendance reminders (Graham et al., 2017, Calzolari & Nardotto, 2011). The level of education attained by the parents is a socioeconomic status factor influencing the successful graduation of HEIs (Merritt & Buboltz, 2015). Further, the exploration through economic evaluations and behavioral interventions in the Czech and Slovak environments (e.g., Kovács et al., 2022; Štechová et al., 2024; Jakimiuk et al., 2023; Karolyová et al., 2023; Kovács, 2021; Muthová et al., 2022) demonstrates the value of aligning strategies with behavioral approaches to improve public policy effectiveness.

For this article, we divide behavioral interventions into 'high-touch' or 'low-touch' based on the cost of the intervention and whether the intervention involves in-person interaction (Oreopoulos, 2020). When categorizing nudges into system 1 and system 2 nudges, targeting automatic and deliberate decision-making, respectively, prior research indicates that individuals tend to have a higher acceptance rate of system 2 nudges compared to system 1 nudges (Loibl et al., 2018; Sunstein, 2016). Additionally, there is a higher consistency in accepting less intrusive nudges than more intrusive ones (Loibl et al., 2018). In previous research, the level of intrusiveness was defined by the extent to which individuals might realize they are being nudged or they have autonomy of choice, with subliminal stimuli or default nudges representing the high end of the

scale, and nudges providing information such as social norms representing the low end of the scale (Loibl et al., 2018; Wachner et al., 2020). Low-touch nudges are not necessarily less intrusive; in many cases, quite the contrary. For instance, the automatic offer of psychological assistance is a low-touch nudge but can be perceived as intrusive.

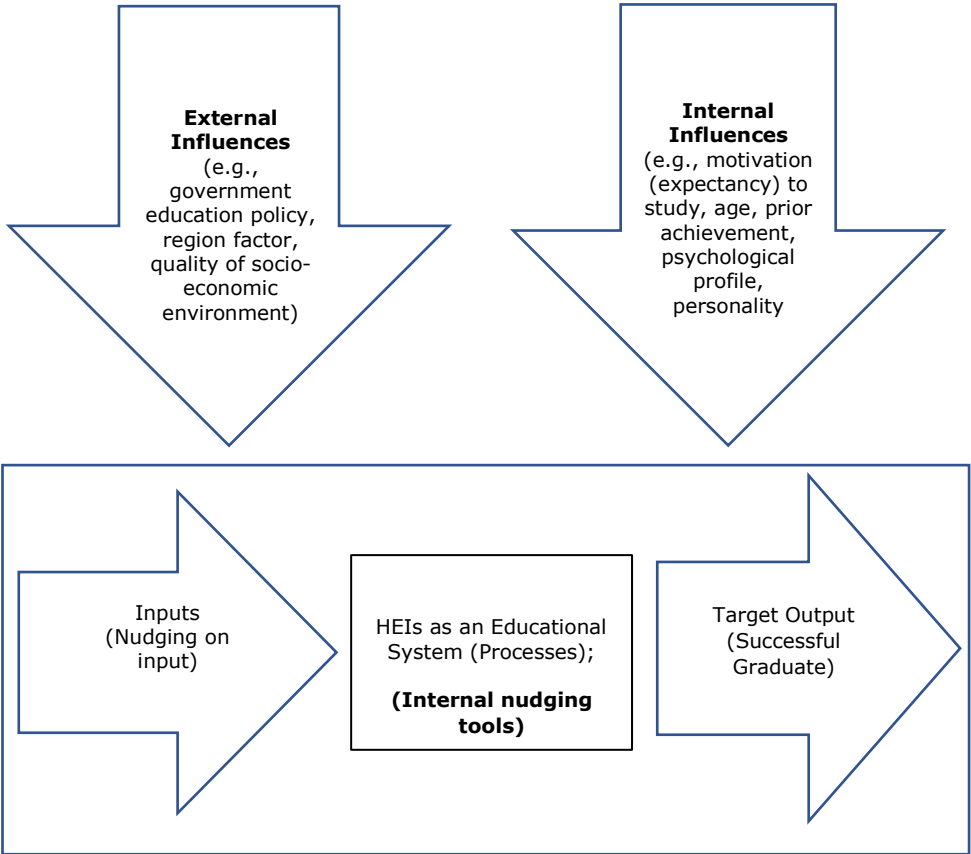
Various socio-demographic factors may influence the level of support for nudges, including social norms in communities, cultural background, age, gender, income, and the like (Loibl et al., 2018; Pe'er et al., 2019). For example, males tend to accept nudges less than females (Loibl et al., 2018; Reisch & Sunstein, 2016), possibly explained by the gender gap in self-confidence (Bleidorn et al., 2016), assuming that males are more confident and thus feel less need for assistance.

In addition, nudge acceptance tends to be lower in industrial and nonmetropolitan areas, presumably among the working class (Loibl et al., 2018). The effect of age is also significant but may vary across different nudges (Loibl et al., 2018). However, a prior study on nudge acceptance among students shows that older students are more likely to accept nudges that aid graduation, possibly due to differences in experience and motivation between age groups (Ochrana et al., 2023). In addition, the level of support can be positively influenced by the perceived effectiveness of nudges and the communicated results of their success rate (Petrescu et al., 2016).

Moreover, the impact of different factors may vary from country to country. For instance, in some countries, there is a positive relationship between household income and nudge acceptance; in others, this relationship is negative or absent (Diepeveen et al., 2013; Loibl et al., 2018).

The following model is a simplified view of the research problem of the success of Czech and Slovak HEI studies from the point of view of input, processes, and output. At this point, it is worth mentioning that the higher education systems of the two countries shared the historical roots of Czechoslovakia until its mutual split in 1993. Despite their mutual history, they have developed distinct cultural identities over the decades. Throughout its history, Czechia was heavily influenced by Western European nations, particularly Germany and Austria, while Slovakia had stronger historical ties with the Eastern European cultural sphere, including Hungary.

Figure 1:
Systematic View of Factors of Successful Graduation of Students



Source: Authors’ own based on Salomon and Globerson, 1987; Pintrich, 1999; Brunsten et al., 2000; Laing and Robinson, 2003; Schofield and Dismore, 2010; Harris et al., 2015; Lerdpornkulrat, 2018; Smith et al., 2023; Summers et al., 2005; Tight, 2020; Helland and Hovdhaugen, 2022.

In the following sections, we will use the typology of nudging interventions in Korečková et al. (2023), according to Damgaard and Nielsen (2018), and empirically investigate how different tools influence the behavior of HEI students if we expose them to nudging. Further, the factors mentioned in the model above, and implications for public policy will be discussed.

3. Empirical part

3.1 Object of research

The object of our research is HEI students, who are heterogeneous in terms of gender, age, and educational attainment of parents. The final number of responding students was 206 in the Czech Republic and 322 in Slovakia. The data cleaning procedure was based on several conditions: bot detection (reCAPTCHA Score > 0.5), fraudulent response (Fraud Score < 0.3), and duplicate response (Duplicate! = 1; Duplicate Score < 75). The last condition was related to the completeness of responses to questions (33 items) about attitudes toward behavioral tools. If a respondent did not answer all 33 questions related to the behavioral tools, we excluded them from the final dataset.

Table 1 shows the structure of respondents according to selected characteristics. From the socio-demographic characteristics, we note that women in both countries dominate the number of respondents (60.9% in Czechia and 78.7% in Slovakia). Over three-quarters of respondents are aged 25 or younger (78.15% and 81.7% in Czechia and Slovakia, respectively). Most of the respondents are students of public higher education institutions (87.4% and 99.7% in Czechia and Slovakia, respectively). Over half of the students are in bachelor programs (57.3% and 58.1% in Czechia and Slovakia, respectively), and over a third in master programs (40.3% and 39.1% of Czech and Slovak respondents, respectively). Most respondents are in a full-time study program (83% and 86% of Czech and Slovak samples). In the Czech sample, there is a more significant share of students in Medicine, Pharmacy, and Medical Social Studies (39,8%) compared to the Slovak sample (14,6%). In contrast, the Slovak sample differs from the Czech sample in that it has a more significant share of students in the Humanities, Arts, and Education (53.4% compared to 19.9%).

In our study, we are interested in how much the respondents accept the high-touch and low-touch pro-graduation nudges. We know that a high correlation does not necessarily imply confirmation of causality, and a zero correlation does not imply independence (Meloun & Militký, 2006).

Table 1:
Structure of respondents according to selected socio-demographic characteristics

Socio-demographic characteristics		Czech Republic N	Share in %	Slovak Republic N	Share in %
Type of HEI	Public HEI	180	87.4	321	99.7
	Private or international HEI	26	12.6	1	0.3
Degree	Bc	118	57.3	187	58.1
	MA	83	40.3	126	39.1
	PhD	5	2.4	9	2.8
Form	Full-time	171	83	277	86
	Part-time (combined or correspondence)	35	17	45	14
Field of Study	Economics, Law	57	27.7	94	29.2
	Humanities, Arts, Education	41	19.9	172	53.4
	Medical, Health, Social studies	82	39.8	47	14.6
	Sciences, Engineering, ICT	26	12.6	3	0.9
	Other			6	1.9
Gender	Female	126	61.2	261	81.1
	Male	80	38.8	57	17.7
	Other	0	0	4	1.2
Age	Up to 25	161	78.15	263	81.7
	26 and over	42	20.39	58	18
	Missing answer	3	1.46	1	0.3
Highest Education of Parents	Higher	102	49.5	173	53.73
	Upper secondary or lower	101	49	146	45.34
	Irrelevant or missing answers	3	1.5	3	0.93
Total		206	100.0	322	100.0

Note: 'Higher education' means that at least one parent has obtained a higher education degree. 'Upper secondary or lower' means neither parent has a higher education degree.

Source: authors’ own, 2024

3.2 Materials and procedures

A non-experimental questionnaire was conducted without manipulation, a standard

approach in attitudinal research, particularly in education and policy implementation (Brahm & Jenert, 2015; Smith & Jensen, 2016). The questionnaire-based methodology was inspired by and aligned with the methodologies of Korečková et al. (2023) and Oreopoulos (2020) concerning measuring low- and high-touch nudges. The current research, serving as a follow-up to Korečková et al. (2023), provides a comparative analysis of the acceptance of nudges among Czech and Slovak HEI students.

Czech respondents were addressed through an electronic questionnaire created on Click4survey through social media (Facebook) and addressed 42 HEI student associations. The data were collected from 6 June until 26 June 2022. The Slovak questionnaire, a translated Czech questionnaire, was developed in Qualtrics. The questionnaire was distributed through Slovak student groups on Facebook and the Student Council for Higher Education. It was also directly sent to students at Comenius University in Bratislava (the largest university in Slovakia) through group emails. The data for Slovakia were collected between 27 November and 18 December 2022.

The first part of the questionnaire included sociodemographic single-choice questions (e.g., gender, age, and parental educational attainment). The focal part of the questionnaire was specifically targeted at the level of acceptance of proposed behavioral interventions to support the graduation of students from HEIs. The master question consisted of 33 items (nudges) listed in random order.

The suggested ‘pro-graduation’ nudges were classified according to Damgaard and Nielsen (2018) and Oreopoulos (2020). There are, in total, 12 high-touch nudges that require a specific human interaction and 21 low-touch nudges that require little or no human interaction. We have computed a low-touch variable as an arithmetic average of 21 low-touch nudge items. Similarly, a high-touch variable was computed as the arithmetic average of 12 high-touch nudge items. Reliability analysis was performed for both computed variables. Cronbach’s alpha for both low-touch and high-touch items is acceptable (CZ 0.91; 0.82 and SK 0.87; 0.77), indicating sufficient internal consistency and reliability.

In the Czech questionnaire version, we coded the master question as a simple matrix table question. In contrast, in the Slovak version, we also applied a carousel view (dynamic grid) to improve the smartphone respondent experience and then the quality of data.

We used a 4-point (forced choice) Likert scale to avoid an ambiguous meaning of midpoint, such as a neutral or ‘don’t know’ answer (Nadler et al., 2015). The answers were coded with values as follows: acceptable (1), somewhat acceptable (2), somewhat unacceptable (3), and unacceptable (4). The borderline value of acceptance was thus 2.5.

We analyzed the data using t-test (paired) and descriptive statistics. The cut-off value to reject the null hypothesis is 0.01. We used an R program (R Studio) and packages to perform data cleaning (‘dplyr,’ ‘stringr’), statistics (‘psych’), data visualization (‘ggplot2’), and (‘cor’ method= “kendall”). When evaluating the results, we considered 0.01 as a statistically significant level.

3.3 Research Questions

We set the two following research questions (RQs).

RQ 1: What is the attitude of HEI students towards nudging? Do they consider it an appropriate tool to help them succeed in their studies?

RQ 2: To what extent does the level of acceptance vary by gender, age, study program, degree of study, form of study, and the highest level of education attained by the parents?

4. Results

Table 2 shows the mean level of acceptance of low- and high-touch pro-graduation nudges ranked for both Slovak and Czech datasets. The average level of acceptance of low-touch nudges is comparable between the two countries (difference of 0.01 points), with a slightly more significant difference in the level of acceptance of low-touch nudges (difference of 0.14 points). None of the proposed nudges reached the unacceptable value of 3. Information nudges received the highest level of acceptance. High-touch nudges (i.e., including personal contact) are much more acceptable to students than low-touch nudges. None of the high-touch nudges exceeded the borderline value of 2.5 in Slovakia and only 2 (out of 13 high-touch nudges) in Czechia. About 50% of the low-touch nudges in Slovakia and 40% in Czechia appeared acceptable or somewhat acceptable to HEI students.

Table 2:
Acceptance of low- and high-touch nudges

Category (number of nudges)	SK	CZ	Difference (absolute value)
low-touch nudges (21)	2.21 (0.5)	2.20 (0.48)	0.01
high-touch nudges (12)	1.74 (0.4)	1.60 (0.35)	0.14

Note: The items in the table are rank-ordered by the difference (absolute value)

Source: authors’ own, 2024

There are more significant (over 0.3 points) differences in acceptance rates between Slovak and Czech students in six pro-graduation nudges (see Table 4 in

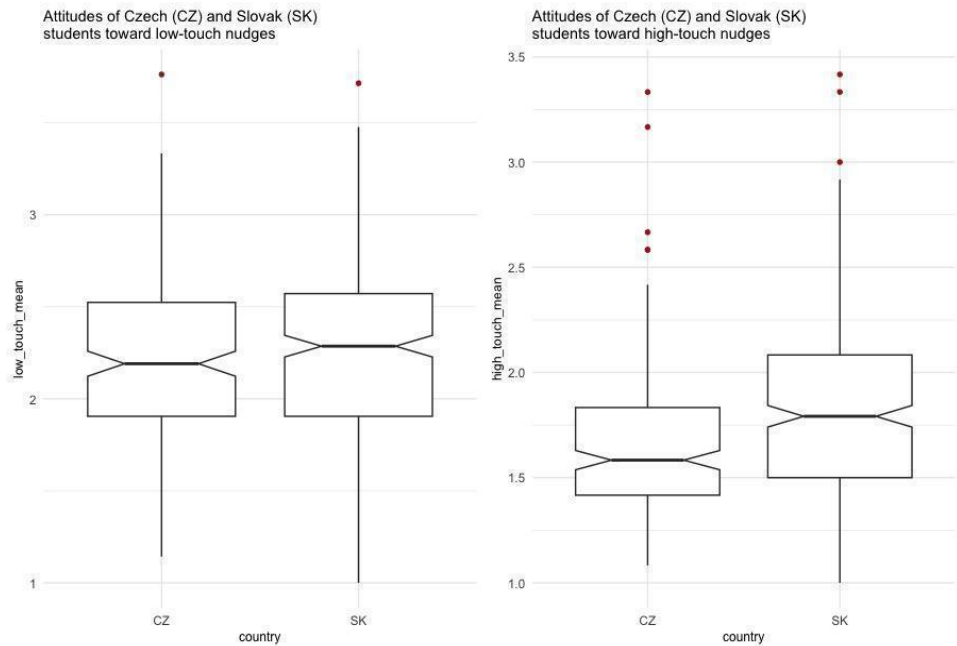
Appendix). The most significant difference (0.69 points) was in '*Continuous and frequent verification of knowledge and skills during the semester*,' which is a less acceptable nudge among Slovak students than Czech students. We observe a similar pattern in the '*Worded (verbal) evaluation of the study results by the guarantor after the end of the academic year*,' but with a lower magnitude (0.4 points). On the other hand, the automatic offer of psychological assistance to students in case of problems in performance is a far more acceptable nudge for Slovak than Czech students (0.55 points, 0.39 points). These intriguing differences could be attributed to differences in the distribution of fields of study in the Slovak (more humanities) and Czech data (more medicine and social studies). Both Czech and Slovak students do not mostly accept reminders and defaults. The acceptance of peer group manipulations fluctuated around the borderline value.

Using the Spearman correlation coefficient to compare the interdependence between the individually proposed nudges, we found a strong or medium correlation with nudges that were identical in content (only having different forms) in both countries.

Interestingly, there was a strong correlation between 'the most irritating' mindset and group manipulation nudges such as messages sent after each exam about study results compared to peers of the given study program, messages such as '*We know you are the kind of student who maximizes your potential*' and '*60% of your peers have already taken Erasmus +*'. In Slovakia, 'pop-up and email notifications after missing lecture attendance twice' were also strongly correlated. Furthermore, the analysis also revealed a moderate correlation between '*Easy access to study information*' and '*Orientation day to use the information system*' in Czechia and '*Learning program for time management*' and '*Coaching program on goal-setting*' in Slovakia. At the same time, a medium correlation was revealed in '*Disclosure of the top three students of a particular study program on the leaderboard*' and '*Trophies and medals awarded in public to the best students*' in Slovakia.

We can compare Slovak and Czech students using the paired t-test. Figure 1 illustrates the differences between Slovak and Czech students in low-touch and high-touch nudges. We do not observe significant differences in low-touch nudges between Slovak and Czech students ($t(450) = 0.4$, $p = .07$). However, Czech students tend to be slightly more in favor of high-touch nudges than Slovak students. The difference in means is 0.15 points, and although it turned out to be a statistically significant difference ($t(480) = 4.49$, $p < .01$.), the difference is relatively small.

Figure 1:
Comparison of low- and high-touch by country



Note: red dots indicate outliers

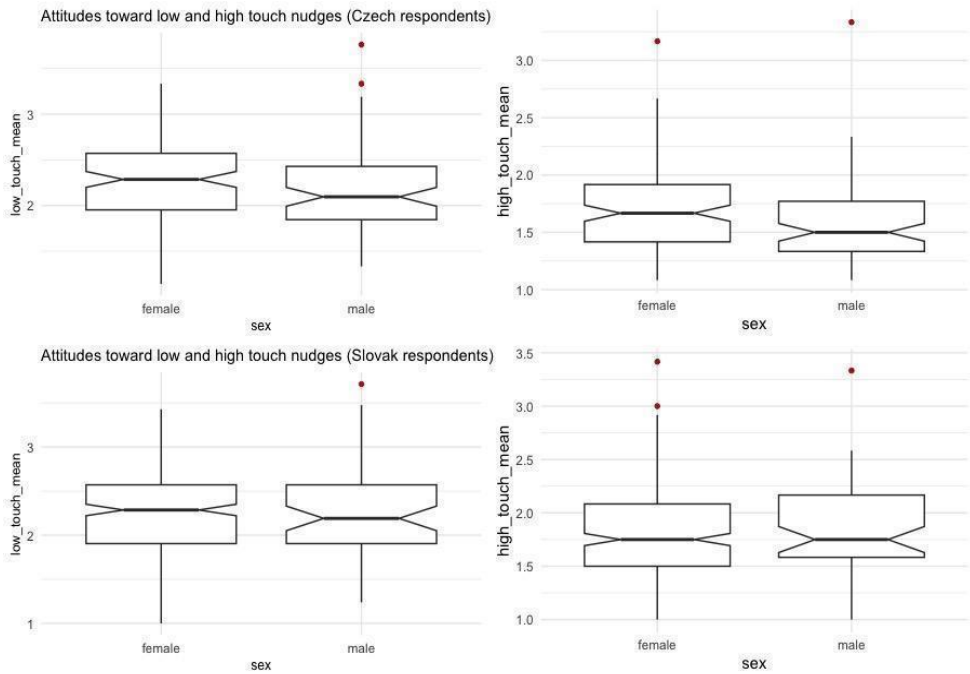
Source: authors' own, 2024

A paired-sample t-test was performed to compare the level of acceptance of low- and high-touch nudges in Slovak and Czech data. Differences in low- and high-touch nudges acceptance rates are statistically significant in both countries but are more prominent in Czechia. The differences are statistically significant in both countries, larger in Czechia. The mean difference in the Slovak data is 0.42 ($t(317)=18.38$, $p < 0.01$), while in the Czech data, it is 0.57 ($t(205)=22.47$, $p < 0.01$) when high-touch nudges are generally more acceptable by students from both countries.

We were also interested in any differences in the level of acceptance across characteristics of HEI students. One of the characteristics is gender. In Czechia, female students were more critical (ten nudges exceeded 2.5) than males (7). In Slovakia, the results were very similar in terms of gender. For Czech and Slovak female students, the automatic offer of psychological assistance and reminders was more acceptable (by about 0.2 in Czechia and Slovakia). However, the overall differences between male and female students' attitudes towards low- and high-touch nudges are not statistically

significant differences.

Figure 2:
Comparison of low- and high-touch by gender and country

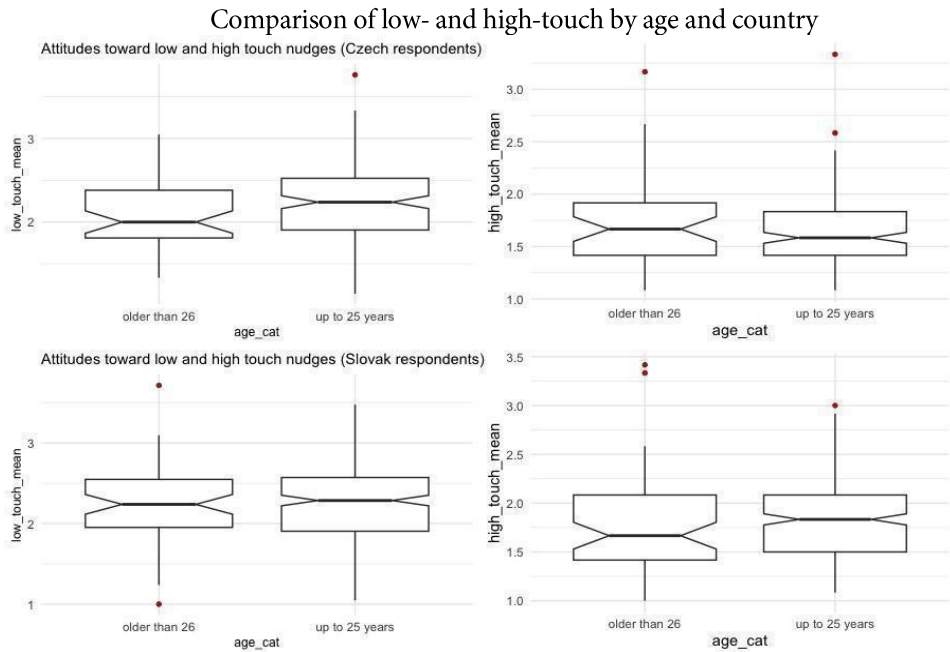


Note: red dots indicate outliers

Source: authors' own, 2024

The other variable was the age of the students. There are slight differences in the level of acceptance of particular nudges. The more considerable differences are in Czechia. However, the means (t-test) differences are not statistically significant within the data for both countries (Figure 2). In addition, ten nudges (30%) were considered somewhat unacceptable for Czech and Slovak HEI 25-year-old or younger students. However, only one of all the nudges exceeded the borderline value of 2.5 (Social comparison in text messages) in Czechia, but up to eight nudges in Slovakia. In Czechia, the guarantor's verbal evaluation of study results at the end of the academic year was more acceptable for younger students (1.7 vs. 1.9). In Slovakia, it was pop-up messages reminding students of important deadlines (1.3 vs. 1.6).

Figure 3:



Source: authors’ own, 2024

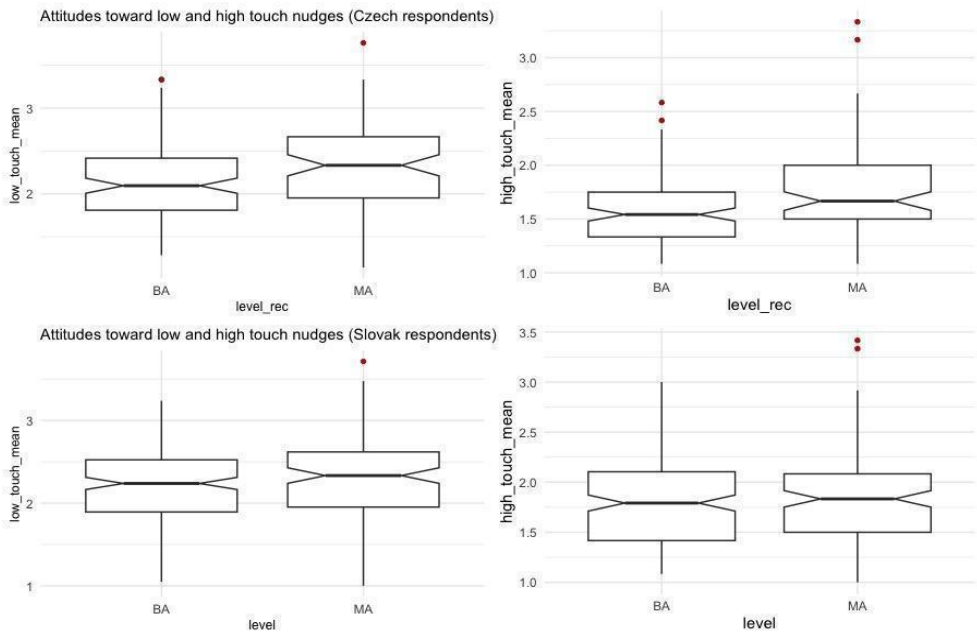
We also examined the differences across study programs. In Slovakia, the difference was not as significant as in Czechia. Czech economics students considered the proposed nudges the most acceptable (1.8 vs. 2.1 in Slovakia), while Czech students of medicine, health, and social studies found them the least acceptable (2.2 vs. 2.1 in Slovakia). In contrast to Slovak students, the Czech economics students accepted nudging significantly more than other Czech students. While the acceptance of Czech students of economics did not exceed the borderline value of 2.5 for any of the proposed nudges, in Slovakia, nine nudges (all the low-touch nudges except for ‘*Trophies and medals awarded*’ and ‘*Email sent after each exam about the study results*’) were considered somewhat unacceptable or unacceptable. Czech and Slovak medical, health, and social studies students evaluated 12 vs 11 nudges as somewhat unacceptable or unacceptable. There were four nudges in Czechia (social belonging, identity activation, and mindset nudges in the form of text and pop-up messages), and none in Slovakia exceeded a value of 3. Medical and social studies students are not more reluctant to use the nudge in Slovakia.

Undergraduate and graduate students may have different levels of acceptance of nudges. Undergraduate students may be more willing to accept nudges due to their

lower level of experience. Graduate students are more critical of accepting nudges than undergraduate students in both countries. The mean differences are statistically significant in Czechia but not Slovakia. Czech undergraduates are more positive about both low-touch ($M=2.1$, $t(173)=2.94$, $p < 0.01$) and high-touch ($M=1.6$, $t(152)=3.79$, $p < 0.01$) nudges than their graduate peers (2.3 and 1.8). Slovak undergraduates are also more positive about the low-touch ($M=2.2$, $t(260)=1.79$, $p = 0.07$), although the difference is not statistically significant. There is a negligible difference in the level of acceptance of high-touch nudges ($t(272)=0.47$, $p = 0.64$) between undergraduate and graduate students (1.80 and 1.83). For graduate students, the most acceptable nudge was easy access to information. Undergraduate students also welcomed automatic assistance in Czechia and *‘Pop-up messages reminding students of important deadlines for applying for exams, calls, and international mobilities’* in Slovakia. *‘Reminding text messages to students who missed the last two seminars or internships without an apology’* is more acceptable to undergraduates (2.2 vs. 2.5 in Czechia, 2.2 vs. 2.5 in Slovakia).

Figure 4:

Comparison of low- high-touch by level of study and country



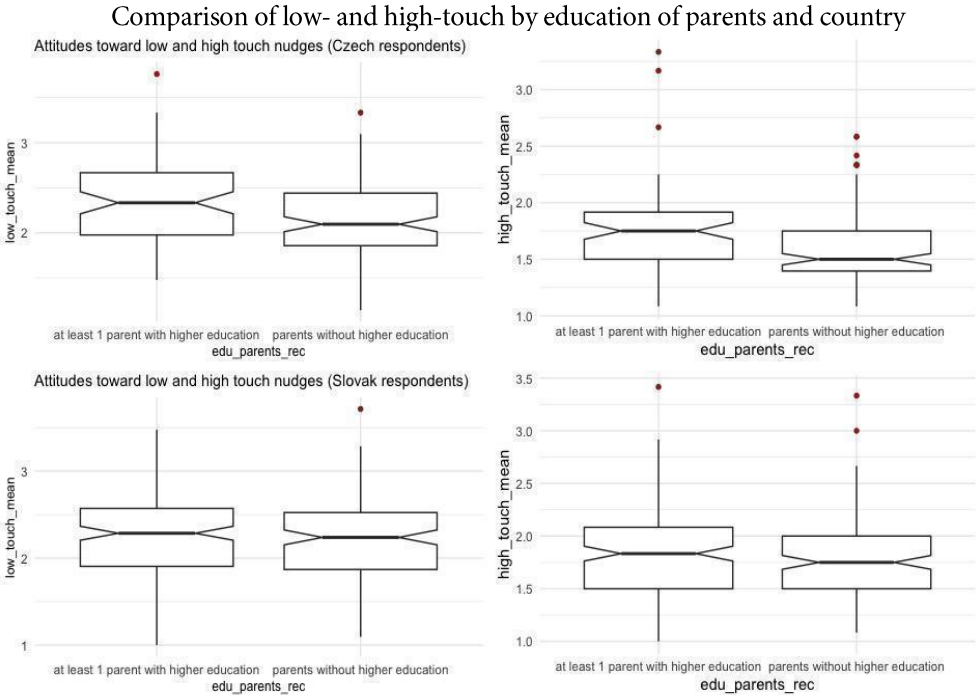
Note: red dots indicate outliers. The small number of values in the sample prevented the analysis of PhD. students as a separate group.

Source: authors' own, 2024

The status of study (full-time, part-time) influenced the level of acceptance of the pro-graduate nudge in favor of part-time students in Czechia (1.9 vs. 2.0) but not in Slovakia (2.10 vs. 2.12). It should be noted that both country samples have a small proportion of responses from part-time students (Czechia 17%, Slovakia 16%). In Czechia, 30% of (particularly low-touch) nudges were somewhat unacceptable for full-time students. Part-time students considered only one nudge (i.e., trophies, medals awarded in public to the best students in each field in a given academic year) somewhat unacceptable. In Slovakia, 11 low-touch nudges were somewhat unacceptable or unacceptable for full-time students and six low-touch nudges for part-time students. This result is not surprising. Part-time students are more likely to expect activities that enable them to study successfully and to maintain better contact with the HEI and teachers.

The data suggest the differences in the acceptance of nudging by parents' level of education. Parents' education was recorded as a dummy variable with two levels - parents without higher education and at least one parent with higher education. Slovak students who have at least one parent with higher education showed no significant difference in the general acceptance of low-touch ($t(305)=0.98$, $p = 0.32$) and high-touch ($t(311)=0.95$, $p = 0.34$) nudges. In contrast, Czech students with at least one parent with higher education showed a systematically lower level of acceptance of both low-touch ($t(173)=2.94$, $p < 0.01$) and high-touch ($t(152)=3.78$, $p < 0.01$) nudges by about 0.2 points than Czech students with parents without higher education. Interestingly, the Czech and Slovak results correspond when extrinsic motivation (trophies, medals awarded in public) and social comparison nudges appeared somewhat unacceptable for students with at least one parent with higher education. In Slovakia, *'Notifications to students who missed the last two seminars or internships without apology'* is more acceptable for Slovak students with at least one parent with higher education (by 0.2 for each form of communication), while in the Czech Republic, this relationship is the opposite (by 0.25 for each form of communication).

Figure 5:



Note: red dots indicate outliers.

Source: authors' own, 2024

To comprehensively analyze how variables such as parents' education, gender, or age affect the acceptance of low- and high-touch nudges, we conducted a multivariate linear regression followed by Type II MANOVA tests. We regressed the acceptance of both low- and high-touch nudges on respondents' gender, age, level of study, country of study, and parents' education. The MANOVA analysis showed significant effects on all predictors except for gender. A closer look at each model (low-touch and high-touch) suggests a significant relationship between the acceptance of nudges and the degree of study. The acceptance of low-touch nudges is 0.14 lower among MA students than BA students, and the acceptance of high-touch nudges is 0.08 lower. In addition, the acceptance of high-touch nudges is 0.13 lower among respondents with at least one parent with higher education than those without higher education.

Furthermore, the acceptance of high-touch nudges is 0.11 lower among Slovak students compared to students who studied in Czechia. These results are consistent with the results of the t-tests. In addition, the model showed that individuals who did not identify as female or male were less willing to accept low-touch nudges. However, this group is tiny (4 respondents in the Slovak sample), and the nested model without the

gender, age, and country of study variables fits the data as well as the original model ($F(4, 517) = 1.543, p = 0.188$). For high-touch nudges, the nested model without the gender and age variables also fits the data and the model with all variables ($F(3, 517) = 1.961, p = 0.119$).

Table 3:
Linear Regression - Acceptance of Proposed Pro-Graduation Nudges

	Acceptance of low-touch nudges				Acceptance of high-touch nudges			
	Est.	CI (95%)	t val.	P	Est.	CI (95%)	t val.	p
(Intercept)	2.103	1.977 - 2.230	32.646	0.000	1.655	1.552 - 1.758	31.535	0.000
gender (male)	-0.042	-0.141 - 0.057	-0.835	0.404	-0.010	-0.090 - 0.071	-0.233	0.816
gender (other)	0.520	0.036 - 1.004	2.109	0.035	0.317	-0.077 - 0.712	1.580	0.115
age (26 and over)	0.049	-0.085 - 0.183	0.717	0.474	-0.102	-0.211 - 0.007	-1.842	0.066
level of study (MA)	0.138	0.050 - 0.225	3.073	0.002	0.078	0.007 - 0.150	2.146	0.032
level of study (PhD)	0.043	-0.234 - 0.321	0.308	0.758	-0.216	-0.442 - 0.009	-1.882	0.060
education (at least 1 parent with HE)	0.088	-0.033 - 0.209	1.427	0.154	0.131	0.032 - 0.229	2.598	0.010
country (SK)	-0.032	-0.134 - 0.069	-0.624	0.533	0.105	0.022 - 0.187	2.477	0.014
Observations	525							
R ² /Adj. R ²	0.039 / 0.026				0.074 / 0.061			

Source: authors' own, 2024

5. Discussion

The article explored the acceptance of pro-graduation nudges in Slovakia and Czechia using the study methodology conducted by Korečková et al. (2023). We conclude that in both CEE countries, the acceptance fluctuated among types of nudges.

High-touch nudges received the most support in both countries, and low-touch nudges were generally less acceptable. Interestingly, there were relatively higher differences in variables (the type of study program, the form of study, and gender) in Czechia. Overall, the higher acceptance rate of high-touch nudges may be explained by individuals perceiving them as more complex, personalized, and potentially more effective. Previous studies have highlighted that the perceived effectiveness of nudges is positively related to their acceptance (Petrescu et al., 2016).

Information nudges received the highest level of acceptance in both countries. These findings align with prior research indicating that low-level intrusive nudges, predominantly represented by information nudges, are associated with a higher acceptance level than more intrusive nudges (Loibl et al., 2018; Wachner et al., 2020). Individuals may perceive that these nudges do not threaten their autonomy of choice, thus making them more tolerable. Acceptance was slightly stronger among Czech male, part-time, and economics students. They seem to be more nudgeable. Gender, age, and study program did not show statistically significant differences in Slovakia. We do not observe that males accept nudges less than females, as Loibl et al. (2018) suggested. In addition, older students are not more likely to accept nudges that aid in graduation.

Czech students with at least one higher-education parent showed slightly less acceptance of nudges. In other words, the results suggest that students who do not have parents with higher education may favor nudging in education. Extrinsic motivation and social comparison nudges were less acceptable by students with at least one parent with higher education both in Czechia and Slovakia, except for one case (*'Notifications to students who missed the last two seminars or internships without apology'*). Additionally, the form of communication can influence the level of acceptability of pro-graduation nudges. The results suggest that identical content (e.g., '60% of your peers have already taken the Erasmus+') is more acceptable when received via email than pop-up messages or text messaging.

Opportunities to apply nudges are available to all students, regardless of their characteristics. Our findings align with previous studies by Pugatch and Wilson (2017), Oreopoulos (2020), Graham et al. (2017), Lawrence et al. (2019), Plak et al. (2022), or Castleman & Meyer (2020), supporting the broad applicability of nudges in educational settings. Moreover, the results correspond to the motivation, self-regulation, satisfaction, and expectancy studies (Vettori et al., 2021; Brouwer et al., 2016; Kitsantas et al., 2008; Merritt & Buboltz, 2015). In addition, non-monetary incentives (trophies, medals) showed less consistency and less acceptance for older students, as in the studies of Fryer (2016) and Wagner and Riener (2015). For instance, social comparison nudges, which involve benchmarking an individual's performance against peers, can generate positive and negative social pressures, influencing conformity to norms. These findings suggest that the effectiveness of nudges can depend significantly on the context and the age of the students involved. The study thus underscores the need for context-specific adjustments in behavioral interventions, enhancing the broader relevance and applicability and considering the ethical aspects of what and how is acceptable in both

countries, potentially leading to cost-effective solutions.

There are several limitations of the study. It employed non-probability and convenience sampling via student networks both in Slovakia and the Czechia, leading to cost-effective but non-representative samples that overrepresent specific demographics (e.g., women, students in economics or social sciences) and under-represent others (e.g., PhD students, technical science students). The lack of data from private university students, international students, and those in police and military studies further limits the study's generalizability. Grouping study programs into broad categories was necessary to manage sample sizes but may introduce additional biases. In addition, this study did not analyze the year of study and the cultural and historical factors that might influence students' perceptions. Another limitation of this research is the relatively narrow age range of respondents and the unbalanced distribution of sample sizes among respondents over 26 in both national cohorts. To improve students' learning skills and strategies as they progress through their academic maturation, the year of study might be a relevant variable. The possibility that specific subgroups of students, potentially interconnected by personal relationships, may have participated in the survey cannot be excluded. Although using student networks for recruitment may have caused bias, this approach facilitated access to convenience samples across multiple institutions, which would have been challenging through traditional methods. Future research with more diverse and extensive samples is recommended to mitigate selection biases.

6. Conclusion

The results of this study serve as a challenge to policymakers and practitioners in the field of education. New approaches to innovation in teaching and learning in higher education point to the possibilities of applying nudging in education to improve graduation rates. The academic discourse frequently concentrates on the effectiveness of behavioral interventions – nudges. However, to address the ethical aspects of nudging, it is equally relevant to study the acceptability of such interventions among the individuals they are designed to influence (Clavien, 2018). Therefore, practitioners must consider the acceptability of nudging and ethical concerns before implementing them.

The article shows that Czech and Slovak students predominantly accept pro-graduation nudges. High-touch nudges tend to be perceived as more acceptable than low-touch nudges. However, high-touch nudges can be more challenging as they require a specific human interaction, and therefore, they can be more time-consuming for both lecturers and students and in certain situations (e.g., COVID-19 pandemic), their application may not be realistic. For this reason, a study of teachers' level of acceptance of nudges would be needed to investigate teachers' perspectives on the potential difficulties of implementing nudges in practice and their perceptions of their

potential effectiveness.

The effectiveness of the pro-graduation nudges remains an open question. Therefore, this article encourages further research in this area on acceptance rates and the effectiveness of nudges in education. The results show relatively small differences in the acceptance rates of pro-graduation nudges. The above may be because both countries had a mutual history and long-term institutional trajectory. Nevertheless, the explanations for the differences need to be further analyzed. In addition, a relevant avenue for further research is the effect of the form of communication (text message vs. face-to-face interaction) on the acceptance of nudges in education.

The use of nudging in education can raise ethical concerns. Researchers and practitioners should avoid misleading or sharing false information (James et al., 2017). In addressing the ethical concerns associated with nudging within educational settings, the following objections identified by Schmidt and Engelen (2020) should be considered: violation of personal autonomy and human dignity, manipulation involving environments that influence behavior, potentially without the explicit consent or awareness of those being nudged. These objections require implementing nudging strategies with ethical rigor, emphasizing transparency, consent, and autonomy.

Acknowledgment

The present paper was supported by the long-term institutional scientific research funding scheme in the Faculty of Finance and Accounting, Prague University of Economics and Business (IP 100040)

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Appendix – Table

Table 4: Acceptance of Proposed Pro-Graduation Nudges

Type of nudge	Category	SK	CZ	Difference (absolute value)
Continuous and frequent verification of knowledge and skills during the semester	high-touch	2.2 (0.94)	1.51 (0.56)	0.69
Automatic offer of psychological assistance to students in noticing problems in their studies or deterioration in achievement, sent by the information system in the form of a text message	low-touch	1.72 (0.92)	2.27 (0.86)	0.55
Worded (verbal) evaluation of study results by the guarantor after the end of the academic year	high-touch	2.11 (0.93)	1.71 (0.69)	0.4
Automatic offer of psychological assistance to students in noticing problems in their studies or deterioration in achievement, sent by the information system in the form of a "pop-up" message	low-touch	1.75 (0.88)	2.14 (0.85)	0.39
Chatbot actively draws attention to unused parts of the information system	low-touch	2.25 (0.9)	1.9 (0.76)	0.35
Regular mentoring meetings with the aim of improving study habits	high-touch	1.84 (0.8)	1.55 (0.63)	0.29
Reminding "pop-up" messages to students who missed the last two seminars or internships without apology	low-touch	1.94 (0.95)	2.17 (0.88)	0.23
Setting goals with your guarantor once a year before the beginning of the academic year	high-touch	1.92 (0.81)	1.7 (0.67)	0.22
"Pop-up" messages reminding students of important deadlines for applying for exams, calls, and international mobilities	low-touch	1.34 (0.62)	1.56 (0.67)	0.22
A pop-up message in the information system about the study results in comparison with the peers of the given study program	low-touch	2.7 (1.07)	2.51 (0.89)	0.19
An email sent after each exam about the study results in comparison with the peers of the given study program	low-touch	2.56 (1.09)	2.37 (0.87)	0.19
E-mails such as "We know you are the kind of student who maximizes your potential ..."	low-touch	2.72 (1.03)	2.57 (0.86)	0.15

Text messages such as "We know you are the kind of student who maximizes your potential ..."	low-touch	2.84 (1.02)	2.69 (0.85)	0.15
Automatic offer of psychological assistance to students to notice problems in their studies or deterioration in achievement, sent by the information system in the form of email	low-touch	1.59 (0.83)	1.73 (0.71)	0.14
Pro-graduation email messages creating an atmosphere supporting the success and completion of studies (reminders of graduates' successes and their examples, sharing stories of overcoming difficulties)	low-touch	1.98 (0.88)	1.84 (0.81)	0.14
A learning program that, among other things, would teach students how to organize their time and study material, set goals, and stay motivated	high-touch	1.57 (0.73)	1.44 (0.6)	0.13
Disclosure of top 3 students of a particular study program on leader board	low-touch	2.73 (1.07)	2.6 (0.85)	0.13
E-mails such as "60% of your peers have already taken the Erasmus+"	low-touch	2.73 (1.02)	2.6 (0.81)	0.13
A text message sent after each exam about the study results in comparison with the peers of the given study program	low-touch	2.76 (1.12)	2.64 (0.88)	0.12
Organizing meetings and sharing information about study problems with older students	high-touch	1.67 (0.71)	1.56 (0.57)	0.11
Pop-up messages such as "We know you are the kind of student who maximizes your potential ..."	low-touch	2.78 (1.05)	2.67 (0.85)	0.11
Trophies, medals awarded in public to the best students in each field in a given academic year	high-touch	2.5 (1.03)	2.6 (0.82)	0.1
Pop-up messages such as "60% of your peers have already taken the Erasmus+"	low-touch	2.74 (0.99)	2.65 (0.87)	0.09
Easy access to information about study duties, scholarships, and exchange programs	low-touch	1.21 (0.49)	1.12 (0.36)	0.09
Text messages such as "60% of your peers have already taken the Erasmus+"	low-touch	2.84 (1.02)	2.76 (0.87)	0.08
Reminding emails to students who missed the last two seminars or internships without apology	low-touch	1.83 (0.93)	1.9 (0.8)	0.07
Organizing meetings with graduates	high-touch	1.77 (0.74)	1.71 (0.63)	0.06
Semester coaching program on goal setting, better time management, and enhanced study skills	high-touch	1.69 (0.8)	1.64 (0.68)	0.05

Organizing meetings and sharing information on study issues with academics and researchers	high-touch	1.67 (0.75)	1.72 (0.66)	0.05
Pre-set regular emailing informing about study obligations, international mobility programs, and scholarships, with the possibility to unsubscribe	low-touch	1.58 (0.67)	1.62 (0.6)	0.04
Orientation day to use the information system	high-touch	1.43 (0.59)	1.40 (0.6)	0.03
Assistance to new students who must complete a number of tasks, such as registering and finding housing, before they can begin their studies	high-touch	1.31 (0.54)	1.29 (0.46)	0.02
Reminding text messages to students who missed the last two seminars or internships without an apology	low-touch	2.32 (1.07)	2.34 (0.92)	0.02

Source: authors’ own, 2024