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**There Is Nothing Like a DREEM to Create the Future of Medical Education:
International and Hungarian Medical and Dentistry Students' Perceptions on their
Learning Environment in Hungary**

Doctoral (Ph.D.) thesis booklet

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Introduction

The world has seen tremendous changes since the mid-twentieth century. After the Second World War and the collapse of the Soviet Union, the collaboration between countries began to flourish. While globalisation at first mainly affected the economic field, the social effects soon followed suit. As more and more countries opened to international labour force, education inevitably became internationalised.

Historically, there was an existing tradition among universities accepting students from other countries since the first universities were established during the Middle Ages. However, the vast extent of student mobility which began in the last decades of the 20th century is unprecedented. In some countries, international students have since become an important part of university revenues, therefore, influenced institutions in higher education to compete with their local and international peers. Rankings of the best universities were created, and the increasing influx of international students slowly began the transformation of the student population.

Similar tendencies were observed in Hungary after it gained independence from the Soviet Union in 1989. Once Hungary joined the European Union in May 2004, diversity at universities increased tenfold. In Hungary, the cohort of international students became most notable within the four Medical Schools in Budapest, Debrecen, Pécs, and Szeged. These students originate from a multitude of countries, possess diverse cultural backgrounds, varied experiences, and perceptions regarding formal education. This raises the following questions. How well do the Hungarian Medical Schools meet the expectations of the international students? Are the students satisfied with their medical education, compared with their domestic, Hungarian peers?

To the best of my knowledge, there has been no research conducted to address the above issues in reference to the national level. Therefore, my aim was to carry out a holistic investigation regarding students' perceptions on their learning environment, which includes all aspects of their studies, ranging from the actual physical surroundings to teaching methodologies and their own perceived professional knowledge.

I sincerely hope the outcomes of this cross-sectional research study will prove beneficial towards the improvement of the learning environment at the medical schools of Hungary, thus increasing their international appeal to the forthcoming generations of aspiring medical students.

Objectives and hypotheses

The objective of this dissertation is to assess and evaluate international medical and dentistry students' perceptions regarding LE at the four medical schools throughout Hungary, to identify the strengths and potential areas of development of the Hungarian medical education and to reveal any differences in attitude compared with the domestic, Hungarian medical and dentistry student population.

International medical and dentistry students enrolled in either the English or German programmes may have prior experiences with formal education, which differ greatly when compared with Hungarian students. In order to gain insight into the perceptions of students enrolled in Hungarian medical schools, the following five hypotheses were formulated:

H1: The perception of international medical and dentistry students regarding their LE in Hungary is worse than their Hungarian peers'.

H2: Regarding their LE, there is no significant difference between the perceptions of medical and dentistry students studying in the English and German programmes.

H3: International and Hungarian medical and dentistry students with lower academic and social self-perceptions have lower perceptions of learning, teachers, and atmosphere at the medical schools throughout Hungary.

H4: International and Hungarian medical and dentistry students, with lower academic and social self-perceptions, studying in either the English, German, or Hungarian programme, demonstrate no significant difference between their perceptions of learning, teachers, and atmosphere at the medical schools throughout Hungary.

H5: The perception of international and Hungarian medical and dentistry students, studying in the first three academic years, is lower regarding their LE than their peers', studying in the last three years throughout Hungary.

Methods

Due to the complexity of the topic, both qualitative and quantitative investigations were undertaken. A mixed-method cross-sectional research was carried out from April 2022 through November 2022. Analysis of the results began in November 2022. Participation in both the quantitative and the qualitative part of the research was completely voluntary, all participants of the online questionnaire and the interviewees received the necessary information about the purpose of the study, anonymity, confidentiality, and data protection were assured. Ethics approval was granted by the Medical Research Council (reference number: IV/2562- 3 /2022/EKU), and by the Rector's Cabinet, University of Pécs. Throughout the course of the study the principles of the Declaration of Helsinki were followed in strict accordance.

Quantitative questionnaire

In order to collect quantitative data, the DREEM questionnaire was utilised. Written approval was sought and obtained from Dr. Sean McAleer, one of the authors of the DREEM questionnaire, in addition to the Hungarian Medical Research Council, and the Rector's Cabinet, University of Pécs. The DREEM inventory consists of fifty questions, and for each question, a five-point Likert scale was offered, with the range spanning from one to five (one=strongly disagree, two=disagree, three=neutral, four=agree, five=strongly agree). All fifty questions were mandatory to complete. There were nine questions regarding biodata and current studies at the beginning of the questionnaire, and five additional, open-ended questions concluded the survey. Completing the latter group of questions was optional. The objective of these open-ended questions was to gain a more thorough insight into the students' personal experiences, positive/negative stories they were willing to share and to provide students an opportunity to add comments they found relevant regarding the LE or the questionnaire itself. The questionnaire was compiled and made accessible online, in Google Forms.

Qualitative questionnaire

In pursuance of qualitative data, semi-structured interviews were conducted. Purposive sampling technique was applied, the participants of the semi-structured interviews were selected deliberately, based on their field of expertise, competences, and roles in the Medical Schools. In the case of interviews, the criteria meant how closely they worked among international medical and dentistry students (administrators, educators, and clinical doctors who undertook ward instruction) and had an overview and opinion regarding the learning

environment. Individuals best suited to respond to the questions were identified. The list of questions for the interviews were carefully compiled, with the purpose to gain the widest range of thoughts possible about the learning environment at the four Medical Schools, then pre-tested by one educator and one administrator, in June 2022. Interviewees could appraise the learning environment, including the physical aspects, teaching methods, and share their views on how the LE affected the medical students. Responses were transcribed, then coded and prepared for analysis with the aid of Sketch Engine, a corpus-based text analysis software.

Results

Comprehensively, 1164 medical and dentistry students enrolled in either the English, German or the Hungarian programmes of the four medical schools throughout Hungary participated in responding to the questionnaire. Relying on the assistance and support granted by the four Deans of the Medical Schools, participants were reached via the Neptun Unified Education Systems at the four Medical Schools, and through various other channels, including Facebook posts. The highest number of responses were from UPMS, as the research was conducted there.

The majority of respondents were women (62%) while men accounted for 36%. Additionally, 2% identified with, “prefer not to say” option. The ratio of the students studying medicine was 90% and 10% dentistry. Additionally, 47% were enrolled in the English, 10% in the German and 43% in the Hungarian programme. Groups in the English programme showed a great variety in nationality and culture, while the German and Hungarian programme displayed a more homogeneous cultural profile. The majority of the respondents were between the ages of 21-25 (54%), those students 20 years old or below (38%), and only 8% were 26 years old or above. Most of the participants, (68%) were either in their first or second year (35% and 33%, respectively), 18% were in their third and 14% in their fourth, fifth or sixth years. Comprehensively, sixty-two different nationalities were represented in the survey.

Data collected from the DREEM questionnaire was first converted into a Microsoft Excel spreadsheet. On initial analysis, scoring and interpretation guidelines proposed by the creators of the original research instrument were used. Additionally, means and standard deviations were calculated for each sub-category and reliability coefficient (Cronbach’s α) was also calculated.

The overall scores, calculated for each language programme, are displayed in Table 1. The total score was 120 out of the maximum 200, which falls into the “more positive than negative” category, according to the DREEM guidelines. This score summarises the response of students in all language programmes. Cronbach’s α was 0.92, which signifies an excellent internal consistency. The total score for international students (including students in the English and German programmes) was lower than the overall result (118.1). When compared with international students, the result of the Hungarian student population was higher (122.6). This score was also higher than the total result. The lowest overall score was observed in the German programme (110.8). The total DREEM score in the English programme was higher (119.6) than the one observed in the German programme, although still below the total score including each language programme.

DREEM SCORES	TOTAL	I	EP	GP	HP	INTERPRETATION
TOTAL OF SCHOOL	120.0	118.1	119.6	110.8	122.6	more positive than negative
STUDENTS' PERCEPTIONS OF LEARNING	27.6	27.5	28.1	24.7	27.7	a more positive perception
STUDENTS' PERCEPTIONS OF TEACHERS	28.1	27.2	27.4	26.4	29.4	moving in the right direction
STUDENTS' ACADEMIC SELF-PERCEPTIONS	18.8	18.6	19.1	16.6	19.1	feeling more on the positive side
STUDENTS' PERCEPTION OF ATMOSPHERE	29.3	28.8	28.9	27.9	30.0	a more positive atmosphere
STUDENTS' SOCIAL SELF-PERCEPTIONS	16.2	16.0	16.2	15.3	16.4	not too bad

Table 1. Scores and interpretation of the results categorised by language programme (I=International students, EP=English Programme, GP=German Programme, HP=Hungarian Programme)

Open-ended questions

Five open-ended questions formed the last portion of the questionnaire. Responses to these questions were collected, coded, and the most frequent themes were identified. Next, these responses were classified with the help of Sketch Engine, a corpus-based text analysis software. Alongside the twenty most frequent keywords, five major themes were identified, concerning the 1. buildings and physical environment, 2. the language barrier, 3. mental health problems and stress, 4. the timetable, 5. communities and socialisation.

Semi-structured interviews

17 individuals (5 male and 12 female) from the four medical schools were asked to participate in the semi-structured interviews. The participants were employed as clinical doctors, actively involved in ward teaching (N=5), educators (N=7), dentists, who also took part in teaching (N=2), and administrators (N=3) working with both Hungarian and international students. Participating in the research was voluntary, all interviewees were informed regarding the objective of the study and were assured protection, anonymity, and confidentiality of the data collected.

The interviews were digitally recorded, four interviews took place live, person-to-person, and 13 were recorded digitally on Microsoft Teams, Zoom, and Skype, since these participants were only available online. Live interviews were recorded with the aid of a digital voice recorder. The interviews generally took no longer than 20 minutes. Following the last interview, the recordings were transcribed, coded and analysed. Major themes were identified utilising Sketch Engine, a corpus-based text analysis software. All interviews were originally conducted and analysed in Hungarian, and, as the final step, translated into English.

Among the twenty most frequent keywords, the following seven major themes were identified: 1. number of students, 2. number of doctors/dentists/educators, 3. language barrier, 4. stress, 5. devices, 6. buildings and 7. classrooms.

Hypothesis testing

H1: The perception of international medical and dentistry students regarding their LE in Hungary is worse than their Hungarian peers’.

In order to verify the first hypothesis, the first step was to compare DREEM scores. Figure 1. displays the differences between the two student cohorts. While no stark differences can be observed in the figure, it is clear that the perceptions of international students are lower in all subcategories than their Hungarian peers’.

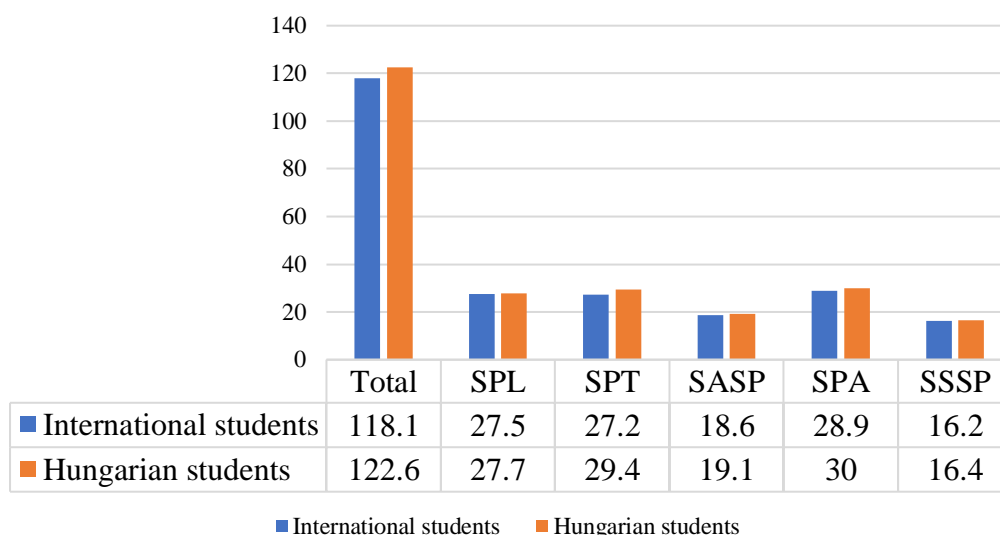


Figure 1. DREEM scores of international and Hungarian students

Mann-Whitney U-tests were carried out for further analysis. Significance level was $p < 0.05$. Significant differences were found between the two student groups regarding perceptions of teachers ($p < 0.001$) and perceptions of atmosphere ($p < 0.004$).

In conclusion, it can be stated that *H1 is partially confirmed, as DREEM scores observed in the international programme are lower than the results in the Hungarian programme*, although significant differences were only found in two DREEM categories (SPT, SPA). This finding is further supported by the negative z-scores of the Mann-Whitney U-test, which indicate higher scores in the second (Hungarian) group.

H2: Regarding their LE, there is no significant difference between the perceptions of medical and dentistry students studying in the English and German programmes.

For the sake of verifying H2, nonparametric Kruskal-Wallis tests were carried out to compare the language programmes. Each DREEM category was thoroughly analysed. Although not an integral part of H2, Hungarian programme was also included in the analysis, as H1 has indicated significant differences between the international (GP and EP) and the Hungarian programmes. In H1, however, GP and EP were analysed jointly, therefore individual differences were not indicated, thus the inclusion of HP in the verification process of H2.

First, students' perception of learning was examined. Interquartile range was lower in the German programme than the English programme. Sample average rank of the GP was lower (460.32) than the EP (602.11). The difference between GP and EP was significant ($p < .001$). Significant difference was found between GP and HP, too ($p < .001$).

Secondly, students' perception of teaching was analysed. Interquartile range was lower again in the German programme than the English programme. Sample average rank of the GP was lower (486.78) than the EP (538.47). The difference between GP and EP was not significant, yet both programmes displayed a significant difference ($p < .001$), when compared with HP.

Next, students' academic self-perception was observed. Interquartile range was lower in this case, too, in the German programme than in the English programme. Sample average rank of the GP was 456.64, lower than the EP (595.54). The difference between GP and EP was significant ($p < .001$). Significant difference was found between GP and HP, too ($p < .001$). Students' perception of atmosphere was analysed next. Interquartile range was lower again in the German programme than in the English programme. Sample average rank of the GP was lower (526.79) than the EP (564.53), although to a lesser extent. The difference between GP and EP was not significant in this case ($p = 0.269$). However, significant difference could be observed between GP and HP ($p = 0.010$), and between EP and HP ($p = 0.015$).

Lastly, students' social self-perception was analysed. Interquartile range was lower in the German programme than in the English programme. The difference between GP and EP was significant ($p=0.017$). In addition, the difference between GP and HP was also significant ($p=0.007$).

As has been demonstrated, *H2 must be rejected, as there are significant differences between the perceptions of students in the English and German programmes concerning three out of the five DREEM subgroups (perception of learning, academic self-perceptions, and social self-perceptions)*. Additionally, when comparing GP and EP to HP, significant difference was found between GP and HP in all DREEM categories, while EP and HP only displayed significant differences in two subgroups (perception of teachers and atmosphere).

H3: International and Hungarian medical and dentistry students with lower academic and social self-perceptions have lower perceptions of learning, teachers, and atmosphere at the medical schools throughout Hungary.

In the interest of testing H3, the lowest scores among students on the English, German and Hungarian programme in the academic and social self-perception categories were identified, collected, and analysed in Microsoft Excel ($N=235$). Lowest scores were set according to the DREEM guidelines, ≤ 16 for academic (SASP), and ≤ 14 for social self-perceptions (SSSP). The overall score for students with low SASP and SSSP was 83.4.

For statistical analysis, a nonparametric test referred to as the Spearman Rank Correlation was conducted to measure the correlation between students' perception of learning, teachers, atmosphere, and academic and social self-perception. In pursuance of greater validity, source data was not limited to students with low academic and social self-perceptions, all participants were included in the analysis ($N=1164$). Positive numbers indicate a positive, while negative values indicate a negative correlation between the different items. A positive, significant correlation was found between all DREEM categories ($p<.001$), therefore, it can be stated that higher academic and social self-perceptions presume higher perceptions of learning, teachers, and atmosphere, whereas students with lower perceptions in the former categories also have lower perceptions in the latter groups.

In conclusion, it can be claimed that *H3 is confirmed, as international and Hungarian medical and dentistry students with lower scores in academic and social self-perceptions also have lower perceptions of learning, teachers, and atmosphere.*

H4: International and Hungarian medical and dentistry students, with lower academic and social self-perceptions, studying in either the English, German or Hungarian programme, demonstrate no significant difference between their perceptions of learning, teachers, and atmosphere at the medical schools throughout Hungary.

In pursuance of the verification of H4, DREEM scores of students in the English, German and Hungarian programmes with lower points in academic and social self-perceptions ($SASP \leq 16$ and $SSSP \leq 14$) were collected and analysed in Microsoft Excel (N=235). Scores of the five DREEM categories for each language programmes are displayed in Figure 2.

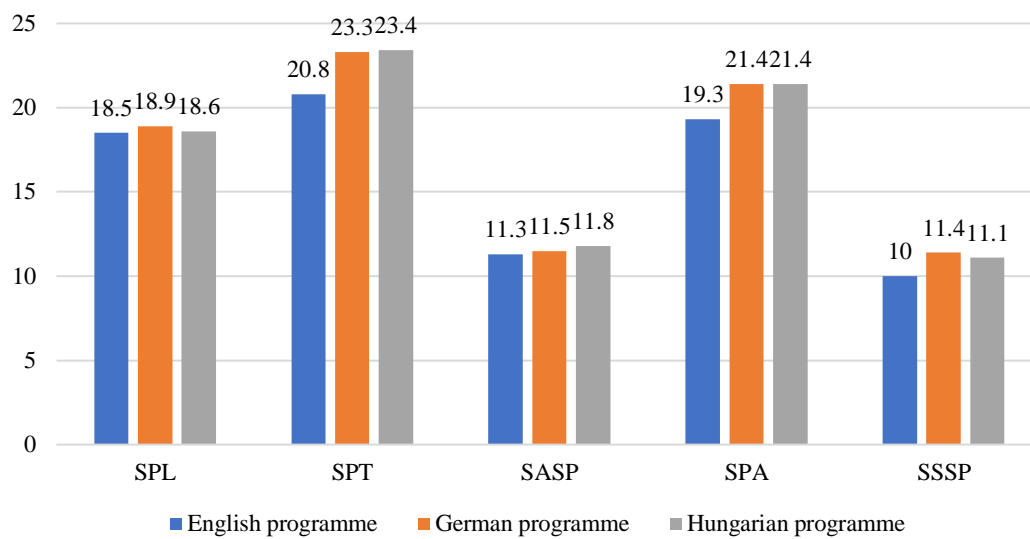


Figure 2. DREEM subgroup results, EP (N=108), GP (N=37) and HP (N=90), $SASP \leq 16$ and $SSSP \leq 14$

The nonparametric Spearman’s rho test was utilised again to measure the association between the language groups and DREEM categories. In pursuance of greater validity, all participants were included in the analysis (N=1164). Positive, significant correlation was found between students’ perception of teachers ($p < 0.001$), perception of atmosphere ($p = 0.017$) and the three language programmes.

As has been demonstrated, *H4 must be rejected, as there are differences between the perceptions of international and Hungarian medical and dentistry students with lower academic and social self-perceptions, studying in either the English, German or Hungarian language programme, concerning perceptions of learning, teachers and atmosphere, the perceptions of the English student cohort being noticeably lower in two DREEM subgroups (perception of teachers, perception of atmosphere) than the German and Hungarian groups.*

H5: The perception of international and Hungarian medical and dentistry students, studying in the first three academic years, is lower regarding their LE than their peers', studying in the last three years throughout Hungary.

In contemplation of testing H5, DREEM scores were sorted according to the students' years, including all three language programmes (N=1164). First to third year students were grouped together in one category, while the remainder of students further along in their studies were collected in the other category. Results were calculated according to the DREEM guideline, scores of the DREEM subgroups are displayed in Figure 3. Total score of students in Year 1-3 was 121.6, in Year 4-6 the overall result was lower (110.0). Scores in all DREEM subgroups were higher in Year 1-3. The two year groups exhibited the biggest differences in SPL (28.3±8.2 in Year 1-3 and 23.0±9.0 in Year 4-6), SPT (28.5±6.9 in Year 1-3 and 25.8±6.7 in Year 4-6) and SPA (29.7±8.3 in Year 1-3 and 26.7±7.8 in Year 4-6).

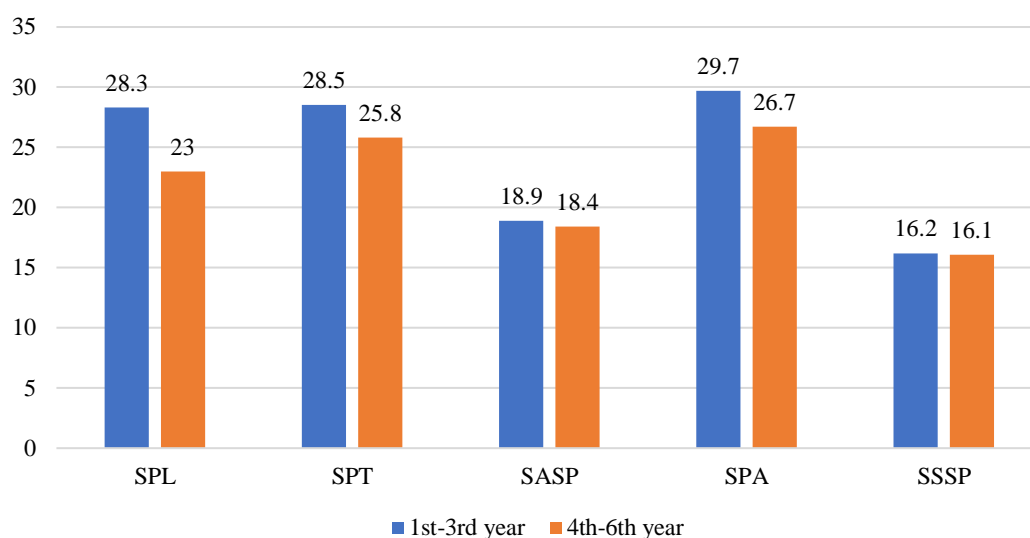


Figure 3. Scores of DREEM subgroups, by students' years

In consideration of further analysis, Spearman's rho, a nonparametric test was chosen to measure the association among the language groups. Negative, significant correlation was found between the years and SPL ($p < 0.001$), SPT ($p < 0.001$) and SPA ($p < 0.001$).

As has been demonstrated, *H5 must be rejected, since the perception of international and Hungarian medical and dentistry students regarding their LE decreases as they progress with their studies, perceptions of students in their first three academic years are higher than their peers' in the last three years throughout Hungary.*

Discussion and conclusions

The objective of this dissertation is to assess and evaluate international and Hungarian medical and dentistry students' perceptions regarding LE at the four medical schools throughout Hungary, to identify the strengths and potential areas of development of the Hungarian medical education and to reveal any differences in attitude compared with the domestic, Hungarian medical and dentistry student population. In the pursuit of this objective, this research was aimed to collect the perceptions of international and Hungarian medical and dentistry students on the LE at the four Hungarian medical schools, therefore, the results can be viewed as a compilation of the overall satisfaction of international and Hungarian students of the medical education throughout Hungary. The intent was to carry out a holistic investigation on students' opinion regarding their education environment, which includes all aspects of their studies, from the actual physical surroundings to the teaching methods including their own perceived professional knowledge.

As it was hypothesised, international students are less content with the LE than their Hungarian peers. This phenomenon can be explained by the fact that Hungarian students familiarise themselves with the workings and conditions of the educational system in Hungary during their primary and secondary education. Tertiary education, therefore, poses no or little surprise for them, contrary to the international students, whose educational systems oftentimes differ from the Hungarian one. It was interesting, however, to note how students studying in the German programme had significantly lower perceptions on their LE than their peers in the English programme.

International and Hungarian students with low academic and social self-perceptions also had low perceptions in areas of learning, teachers and atmosphere, a good support system, therefore, could prove most effective in helping such students in need. Although the results in the English programme were noticeably lower regarding perceptions of teachers and atmosphere, students in all three programmes could benefit from such aid. It is important to mention, however, that each medical school offers psychological consultations for students in need, and the Hungarian and the international student councils work tirelessly to ensure the welfare of medical and dentistry students.

Participants in their first three academic years exhibited higher perceptions than their peers in the last three years, which suggests a need for continuous surveillance of student well-being throughout their entire training at the medical schools.

However, there are still areas in need of improvement, which should be remedied to further enhance the learning environment, thus decreasing attrition, and making the four medical schools in Hungary increasingly attractive for international students. These include large spaces for studying, longer library hours and effective and continuously available support system for students. Further language training opportunities could also prove beneficial for both students and staff.

Summary of novel findings

1. To the best of my knowledge, no study has been specifically conducted regarding the international medical students' perceptions on their LE at a national level, in the scope of the four medical schools throughout Hungary. Therefore, my aim was to carry out a holistic investigation regarding students' perceptions on their learning environment, which includes all aspects of their studies, ranging from the actual physical surroundings to teaching methodologies and their own perceived professional knowledge.

2. Perceptions of international students on their LE are lower than their Hungarian peers. One likely supporting reason why scores were higher for domestic Hungarian students implies they were more used to the workings and conditions of the Hungarian educational system than their international peers.

3. Interestingly, the perceptions among the German student cohort were significantly lower than their peers' in the English programme, while scores in the English and in the Hungarian programme did not differ considerably in three DREEM categories (perception of learning, academic and social self-perceptions).

4. Higher DREEM scores were exhibited in the first three years than in the remaining years, students' perceptions regarding their LE deteriorated as their years progressed at the university.

5. The increasing difference between the student and staff proportions was highlighted during the semi-structured interviews. Participants mentioned that, while the number of international students was steadily rising, it was not compensated by the increase in the number of educators.

List of publications

Articles related to the thesis

Dávidovics, A., Németh, T. (2021). International Students and Languages for Specific Purposed: The results of a study on international students' perceptions of teaching and learning LSP. *Journal of Languages for Specific Purposes*, 8, 25-34.

Dávidovics, A. (2020). Teaching and Learning Medical Hungarian vs. Medical English: similarities and differences. *Teaching Methodology in Higher Education*, 9(34), 53-60.

Dávidovics, A., Németh, T. (2020). Az orvosi szaknyelv tanulásával és tanításával kapcsolatos percepciók és attitűdök: így látják a külföldi hallgatók. *Porta Lingua*, 1, 249-259.

Additional articles

Dávidovics, A. (2023). Online oktatás és vizsgák a világjárvány alatt a pécsi orvostanhallgatók szemszögéből. *Porta Lingua* (preprint)

Dávidovics, A. (2021). Szaknyelvroktatás és gamifikáció. *Porta Lingua*, 1, 21-33.

Dávidovics, A. (2021). Is Gamification an Option to Reach the New Generation of Learners? A Comparative Survey between International and Hungarian Medical Students Studying Languages for Medical Purposes. In: Mateja, D., Polona, V. (eds.). *Inter Alia. Proceedings of the 2nd International Conference Languages for Specific Purposes: Opportunities and Challenges of Teaching and Research: Developing ESP Competencies: Between Tasks, Experience, Skills, and Method*. The Slovene Association of LSP Teachers. 27-38.

Dávidovics, K., Dávidovics, S., Farkas, A., Benedek, N., Tornóczky, T., Kardos, D., Dávidovics, A., Vajda, P. (2020). Urothelial Papilloma of the Urinary Bladder in Children: Report of Two Cases. *European Journal of Pediatric Reports*, 8(1) e23-e26.

Kardos, D., Kereskai, L., Tornóczky, T., Farkas, K., Dávidovics, A., Farkas, A., Vástyán, A., Pintér, A., Vajda, P. (2019). Re-evaluation of histological findings after colocystoplasty and gastrocystoplasty. *Journal of Pediatric Urology*, 15(6), 651.e1-651.e8.