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EFFECTIVE UNIVERSITY CHOICE MARKETING FOR HIGHER EDUCATIONAL INSTITUTIONS: DILEMMAS AND INNOVATIVE SOLUTIONS

THESES OF PH.D. DISSERTATION

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Effective University Choice Marketing for higher educational institutions: dilemmas and innovative solutions

Theses of Ph.D dissertation

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Content

1. Topicality of the theme

"The higher educational system of a country is the significant part of the social and economic system of the given country." (Barakonyi, 2010, old: 9) The importance of the universities and colleges is indisputable, their importance appears in many areas of social and economic life. Higher education and intellectual training is a major role for higher educational institutions (Kuráth és tsai, 2018), which do not only create and give knowledge, but also contribute to establishment of the quality labour and human capital. (Schultz T. , 1961; Abel és Deitz, 2011). Furthermore, former students of these institutions will hold important government posts and key posts. (Barakonyi, 2010)

Universities have been continuously exposed to challenges since their inception, but despite this they are ready to renew, while their mission is unchanged: *"giving and generating knowledge"* (Barakonyi, 2010, old.: 9).

Demographic trends forecast the decrease of students besides, they must face the continuous suction power of capital universities regarding the number of students.

Economic crisis had negative effect on most universities and colleges, which is reflected in the reduction of the state subsidies. (Berács et al., 2015) and the budget of higher education. (KSH, 2018) The critical situation of the Hungarian economics and new education policy notions have been influencing the development direction of the Hungarian higher education. (Polónyi, 2011; Polónyi, 2016) The change of the maintainer will bring a significant transformation, that means most of the state universities will be private ones, which force institutions more for the application of entrepreneurial view: profit-oriented operation. However, the commercialized approach cannot be maintained long term. Key of survival and successful operation can be solved by the transformation into four a generation university. The essence of 4GE model is that universities have to take part in the development of their region, which is the interest for both the region and the university. Higher educational institutions have to create *"the harmony of business and social interest with the integration of global and national local processes."* (Piskóti, 2020 old: 12) With the market sales of research results, the cooperation industrial and research sector, technological transfer as one of the *"key component of innovation processes"* (Freész, 2013, old.: 103) is indispensable for development.

Megatrend of "Industrial Revolution 4.0" as well as in every sector, also brought big changes in higher education. (Hussin, 2018), and also transformed the classical business model of the universities with its important element: marketing.

"University 4.0. can be described by the infrastructural platform of several activities (research, project and development of new practices) (Lapteva and Efimov, 2016) Fast development of information technology resulted significant changes, for this reason digital technologies were continuously integrated into the practice of marketing bringig new generations of marketing approaches with itself the so-called Marketing 4.0 (Jara et al tsai, 2012; Başyazıcıoğlu and Karamustafa, 2018) Digitalization provided the possibility of effective communication on much lower costs. (Jimenez-Zarco és tsai, 2017) This era is based on a cybernetic marketing system where business transactions and customer activities can be tracked real time. (Başyazıcıoğlu és Karamustafa, 2018)

"University 5.0. includes the concept of University 4.0 developing it. University personalizes its service provided to the students much more. It permits the students to negotiate on the content of education and the way of access to it. They do not insist on choosing the academic years and sites and contribute to participating the micro-credit based courses, supporting the students' own learning path. In this notion the students furthermore can choose which course to attend and the professor to it as well. (Universiti Teknologi MARA, 2019)

Digitalization of the universities means that a paper-based university has to be transformed into one based on digital tools, which does not only mean the change of tools but also all the management processes and the global rethinking of the management model. (Rolf et al, 2020) One significant change brought by the digital revolution is the cease of most professions in some decades. According to the estimations, 49% of the present professions will be replaced by machine technology, but at least 60% of these professions will live on in an automatized form to least 30% extent. 80% of the professions now being taught will be outdated, thanks to robots and the exploitation of artificial intelligence (Marwala és tsai, 2006). For this reason the demand on quick retraining and with the life long learning has had an increasing role as well as the importance of system of alumni and tracking graduates' career not only during the education but after it as well. Preparation for these changes also goes hand in hand with mapping the unique customer needs because without them we can hardly be attractive than our competitors. These changes must be considered by the universities. They must map the communication habits of the potential students. University communication goes toward marketing 4.0, it still contains traditional elements that can be used successfully, but large part of them is outdated.

2. Aim of research

At the beginning of my dissertation, I made a summary on professional literature in connection with my research theme that covers both international and Hungarian marketing, and university choice, student recruitment in it. Details of the professional literature is described by the following table.

Higher educational marketing, university choice marketing	Analysing factors influencing university choice	Examining communicational habits of potential students	Measuring the further learning consciousness of high school students
Situation of higher education Situation and significance of higher educational marketing University marketing 4.0 University choice marketing Marketing mixes for universities	Collecting factors influencing university choice	Integrated marketing communication Y and Z generation Media consumption of potential students The range of Media planning and analysis software Backpack problem Dynamic programming	Definitions of consciousness Measurement methods of further learning consciousness (indices)

1. Table: professional literature of doctoral dissertation
Source: compiled by the author

Central issue of the present research: how university choice marketing can be made more effective for higher educational institutions? In order to answer this question a made investigations in the following subfields: analysis of factors influencing university choice, examining the communicational habits of potential students, measuring further learning consciousness:
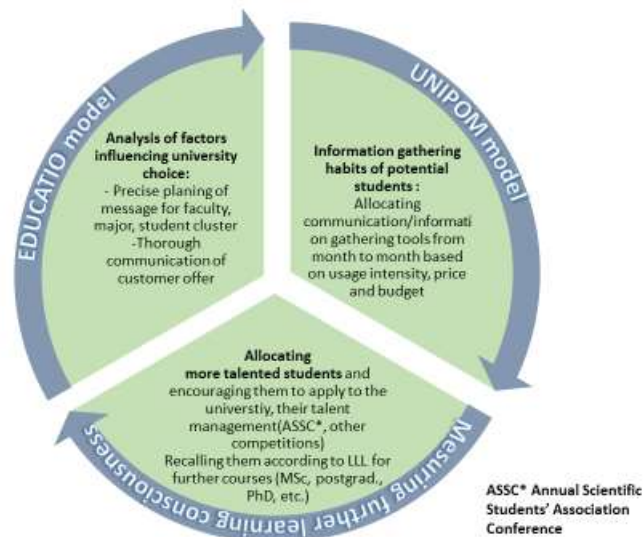
1. Figure: Making university choice marketing more effective through sub-goals
Source: Compiled by the author

In connection with **variables influencing university choice,** I investigate the aspects students choose a higher educational institution. Furthermore, I am interested in factors these variables can form. I also check if the students can be grouped according to the factors set up and which variables influence these student groups in university choice. Research also focuses on the identifying variables that influence the potential students of the different faculties. EDUCATIO model and the connecting research does not only provide a chance for the continuous development of the university customer offer but also can help in the precise planning of university choice marketing campaign.

K1:   *Which are the most influential university choice factors and how these could be grouped?*

K2:   *How can potential students be grouped according to the importance of university choice factors?*

Regarding the information gathering habits I am looking for answers for such key questions that are indispensable for setting up the most optimal marketing communication campaign. These are the followings: In which months do the potential students search information? Which marketing communication tools are the most effective to reach them? What sources do they you on a monthly basis?

K3:   *What are the most intensive periods for the information gathering related to further learning and what is the distribution of the intensity of the information gathering?*

K4:   *Can a combination of marketing communication mix elements be created that allows the highest total usage intensity in reaching potential students at a given budget and considering the intensity of marketing communication tools usage and their price?*

K5:   *Which is more effective: the intuitive human decision or the optimization algorithm used for this purpose when choosing communication tools?*

We often mention that a particular student is consciously preparing for admission, but what that awareness covers exactly is not stated in the literature. There is no concept or measurement index is available for **further learning consciousness**, so their creation can fill a gap. In addition, measuring further learning consciousness can serve as a new segmentation method

during university choice, as we can target students, who would not only like to go to universities but also take important steps to succeed. In addition, students can also come into our perspective, who are really interested in studying and therefore we can give them the opportunity to nurture their talent, make them take part in competitions and later recall them for further studies in the spirit of lifelong learning.

K6: *How do further learning intentions affect further learning activities?*

K7: *Is there a difference between the level of further learning consciousness of students before school leaving exam and students taking part in vocational training after school leaving exam?*

K8: *Is there a difference between the further learning awareness of men and women?*

In order to achieve international and Hungarian economic standards, choosing the appropriate research methods is essential, so I applied both qualitative and quantitative techniques. Besides statistical methods mathematical analyses were also used.

	Investigation of factors influencing university choice	Examining the communication habits of potential students	Measuring the further learning awareness of potential students
Secondary research	International and Hungarian professional literature		
Qualitative research		**Focus group interview:** - 12 freshers	
		In-depth interview: - 1+3 in depth-interview with university choice marketing managers and professionals	
Quantitative research	Questionnaire surveys	- Questionnaires (based on a panel): high school graduates - national questionnaire survey (BA students - economics training)	

2. Table: Methodology of the dissertation
Source: compiled by the author

Questionnaire surveys were carried out for each of the examined areas includes questionnaires, the details of them are given in the following table:

Details of questionnaire surveys	Examination of factors influencing university choice 1.	Examination of factors influencing university choice 2.	Examining the communication habits of potential students and measuring their further learning consciousness 1	Examining the communication habits of potential students and measuring their further learning consciousness 2
Population	University of Miskolc, Faculty of Economics freshers, full time (68,9%) and correspondence (31,1%) students	full time and correspondent freshers N=1568	Berzeviczy Gergely Commercial and Catering Secondary School: students in their final year (before school leaving exam and vocational students) N=210	BA freshers taking part in economic courses in Hungary
Sampling framework	NEPTUN database	NEPTUN database	Electronic school diary	-
Sampling technique	Layered sampling with proportional distribution	Census	Census	Census
Response rate	n= 100	n=1316	175/210	476
Data collection	Online questionnaire survey	Questionnaire survey	Questionnaire survey	Online questionnaire survey
Reliability	π=95,0%	π=95,0%	π=95%	π=95%
Accuracy	Δ=±8,6%	Δ=±1,08%.	Δ=±3	
Distribution of the sample by gender	men: 66,7%; women: 33,3%	men: 45,9%; women: 54,1%	men=41%; women=59%	men=26,2%, women=73,8%
By training level	business administration and management: 26,9%; commerce and marketing: 19,6%; international economics: 14%; accounting and finance: 19,1%	GÉIK: 28,1%; ÁJK: 8,0%; GTK: 21,1%; BTK:13,6%; EK: 18,9%; BBZI: 2,1%; MFK: 5,3%; MAK: 2,9%	students before school leaving exam=51%; vocational students after school leaving exam=49%	-

3. Table: Questionnaire surveys in connection with the dissertation
Compiled by the author

3. Research model

Understanding the process of further learning in detail plays an important role in making university choice marketing more effective. The university selection process is often divided into five main stages in the literature, which are based on five steps of customer decision: demand arousal, information gathering, evaluation of alternatives, decision and enrollment, post-purchase evaluation (Al-Fattal, 2010; DesJardins, Dundar és Hendel, 1999).

The models, while provide an approach for understanding the process better, do not give insight into the goals of the universities, the methods they use, and the timing design. That is the reason I choose the method of **Customer Journey** to set up my research model. (Marquez, Downey és Clement, 2015 ; Rosenbaum, Otalora, & Ramírez, 2017)

Steps of the Customer Journey was set up by Kotler's Marketing 4.0., (Kotler és tsai, 2017) the main steps of which were defined on the basis of the concept of the *"New Customer Path"*. The five steps were corresponded by eight steps in the model of "*Student Further Learning Path*". The model includes the methods used by the university, as well as the models and concepts of dissertation (EDUCATIO, UNIPOM and Further Learning Consciousness) that could help university decision-makers at different stages of their student journey. The "New Customer Path" is a further development of the AIDA method, which uses five steps (aware, appeal, ask, act, and advocate -5 A's) instead of 4 steps (attention, interest, desire, and action - 4 A's).

Steps of Student Journey:

Aware: The first step begins with the idea of further learning, so the student begins to think that he or she should continue his or her studies at some higher education institution. This idea may arise in primary school, but most students tend to take the subject more seriously during their high school years, most of them in their final year of high school. A „to be aware of" means you know something and you are interested in it, you think it is important. This is a phase where our student is exposed to a range of past experiences, marketing communications, opinions when thinking about a particular higher education institution or institutions, in case they are familiar with our institution. In the model I call this phase reputation.

Appeal: at this stage, potential students process the messages and information to which they are exposed and select the most appropriate majors and institutions for them. Which higher educational institutions they choose (**decision on the institution**) can be influenced by several factors, which I will write about in detail in the chapter *"Factors influencing university choice"* (factor analysis, cluster analysis) (EDUCATO model). After comparing higher educational institutions, considering their own aspects (financial situation, willingness to move, abilities, possible score limit, etc.), they may, of course, choose none of the universities or colleges. The value proposition of the university plays a prominent role at this point to be better than the other higher educational institutions.

Ask: The next step (information about admission procedures, majors, institutions) is when the potential student starts to gather information about further learning. Several sources of information can be listed here, including the reference group (family members, friends, high school teachers, alumni, etc.), communication sources (TV, radio, internet, etc.), recruitment rankings, open days, etc. I also dealt in detail with the order of importance, popularity and optimization of information sources in the chapter on promotion optimization (UNIPOM) of the dissertation.

Act: Once the student has been convinced by the information gathered, he or she enters the action phase, which can be further divided into three stages regarding further learning:

Decision on admission: Having the information, you can decide if you really want to take part in the admission process. It is possible that the choice of university takes place, but the student is not willing to take part the process, which can be due to numerous reasons (poor financial situation, lack of motivation, fear of failure, bad results, would rather work, etc.).

Decision on institutions: Although there may be more sympathetic universities that have already caught the student's attention in the second phase (appeal), he or she may further narrow the range of higher education institutions when submitting the application forms.

Decision on enrolment: Students who are admitted are far from certain to enroll our institution. In such cases, encouragement from the institution is very important. Even at this time, it is worth informing students about scholarship opportunities, cheap accommodation, possible student work, tuition fee reductions, etc.

Advocate: Active referrals will express a positive opinion about our institution even if they are not asked. But there are loyal, passive recommenders who only activate themselves when they hear a negative opinion about their beloved institution and need to defend it, or perhaps someone asks for their opinion.

I have divided this section into two further sections:

Participation in training: I do not close the research model by enrolling and starting my studies, as it is important to increase students' satisfaction and build their loyalty during their student years.

Keeping contact, return: Emphasis should be placed not only on winning students, but also on building their loyalty and satisfaction, keeping them in various courses and trainings at the university as well as recalling them after graduation.

My research is mostly limited to recruitment, including high school students' university choice, exploring their information gathering habits on admission and assessing their further learning awareness. As the scope of the doctoral dissertation was limited to recruiting and I was able to form a more credible picture of the segment of secondary school students as a teacher. However, the **measuring consciousness** may go somewhat beyond the admissions process, as students who are genuinely interested in further education may be in our sights, more diligent than average, and with their talent care we can either win them for further training or encourage them to pursue PhD.

Student Journey	Aware	Appeal	Ask	Act			Advocate	
	Reputation of the university	Appeal	Information gathering	Decision on admission	Decision on institutions, majors	Decision on enrollment	Taking part in education	Keeping contact, return
Potential student	Knowledge of universities, Impact of older marketing communications (own and others) opinions about institutions	Selection of universities and colleges that have outstanding values for the student	Admission procedure About majors About institutions	He/she decides whether to take part in the admission process.	Selection of the most appropriate institution(s) Application	He/she enrolls or not	Satisfaction, loyalty	Second degree Postgraduate courses PhD courses Company short trainings / courses /Workshop
Felsőoktatási intézmény	University reputation, Goodwill Uni-Brand	University value proposal	Precise choice of medium, proper timing (month by month) Message, channel			Incentive: Scholarships Student work Cheap accomodation Tution reduction	Creating / strengthening a loyalty Increasing student satisfaction Meeting student expectations	Talent management Alumni Collaboration with former students (lectures, joint projects, research)
			Monitoring the factors influencing university choice, their use for communication Creative material based on factors					
Methods used by the university	Positive word of mouth, programs (eg researchers' nights, lectures, conferences, music and cultural events), continuous communication of university successes, positive role models, etc.	Distinction from competitors, emphasis on uniqueness (eg campus character, individual trainings, professionally outstanding instructors, prestige institution, etc.)	Information about the admission procedure, majors, university	Motivational questionnaires	Career counseling	Competence survey	Course evaluation Instructor review Major review	Competence survey Graduate career tracking
			Enrollment events: High school visits, open days, exhibition, use of communication tools (traditional and digital)					
Model	EDUCATIO MODELL							
Timing/Application	Full school year and before							
Model		UNIPOM MODELL						
Timing/Application		Whole year (from the beginning of September to the end of August)						
Modell	Further Learning Consciousness							
Timing/Application	From childhood to graduation and after it							

2. Figure: Student Journey: Research model
Source: Compiled by the author

4. New and novel results of the research

Although the number of professional literature on higher education has increased significantly in recent years, the conscious usage of marketing tools is still unsolved in many places. In order to achieve a successful university choice, it is essential to think with the students' heads and constantly monitor their expectations. To design a successful marketing campaign, we must be to be aware of the interfaces where potential students can be reached and what are those messages that can influence their university choice decisions.

4.1. Investigation of factors influencing university choice: EDUCATIO model

Hypothesis 1
The factors influencing university choice are very diverse, however, they can be classified into six independent, homogeneous groups, which are: availability, price, communication, subjective opinion, objective opinion, physical environment. I live with the assumption that, as in the professional literature, this grouping is also true for the influencing factors regarding the BA freshers of the Faculty of Economics of the University at Miskolc.

After reviewing the professional literature, I identified 28 factors influencing university choice, which in my opinion can be grouped in terms of content, and are often mentioned in groups in the literature as well: availability (Al-Fattal, 2010; Băcilă, 2008), price (Beneke and Human, 2010; Bonnema and Van der Waldt, 2008), communication, subjective opinion, objective opinion, physical environment (Kuráth, 2008). I live with the assumption that, as in the literature, this grouping is also true for the influencing factors regarding the BA freshers of the Faculty of Economics at the University of Miskolc.

Availability	Closeness to home Easy access regarding traveling Closeness to the family
Price	Don't have to spend on tuition fee Dormitory room on good price Low price university services Cheap flat rental options Easy to finance living expenses
Communication	Own events of the university Official university website Social medias of the institution Advertising
Subjective opinion	Recognition and reputation of the university Competitiveness of the degree Opinions and advice of parents, siblings, relatives Opinions and advice from friends and schoolmates Suggestion from secondary school teachers Opinions on forums, social media
Objective opinion	A prominent place of higher educational institution in the university ranking Expected score limit, easier entry Professional opportunities offered by the university Additional offer of the university Opportunities and services provided by the city
Physical environment	Campus nature of the educational institution Condition of buildings Modernity of classrooms, laboratories The technical equipment of the university

4. Table: Independent groups of factors influencing university choice (hypothesis)
Compiled by the author

In terms of accessibility, I examined how many students were influenced by the fact that the given institution was close to her home, easily accessible in terms of travel, not to get far

from the family. At the price, I examined tuition fees, affordable dormitory rooms, low-cost university services, cheap flat rental options, and easy to-finance living costs. In connection with communication, I concentrated on the influential strength of such factors as the own events of university, official website, social medias of the institution and advertising. Among the subjective opinions I included the recognition and reputation of the university, the competitiveness of the degree, the opinions of parents, siblings, relatives, the suggestions of the secondary school teachers and the opinions that can be read on the forums and social sites. In connection with the objective opinion, I examined the influence of the followings: the prominent place of higher educational institution in the university ranking, expected score limit, easier admission, information about the given subject, professional opportunities offered by the university, additional offer of the university as well as the city opportunities and services provided. Regarding the physical environment, the importance of campus nature of the educational institution to the students, the condition of the buildings, the modernity of the classrooms, laboratories and the technical equipment of the university.

In the survey, the students had to rate the factors on a scale of one to five, that is how much the factors examined affected them when choosing a university (1 = not at all, 5 = explicitly). Factor analysis was performed by principal component analysis with varimax rotation (KMO = 0.733; Bartlett's Sig. = 0.000). The empirical grouping of the variables differs from the hypothetical one, as the factors are grouped around 8 factors instead of 6. This is how I got to the EDUCATIO model composed of English initials. (Annex 2 in the dissertation)

Thesis 1:

In the case of freshers of the Faculty of Economics at the University of Miskolc, based on the results of exploratory factor analysis, the variables influencing university choice can be divided into 8 independent, homogeneous groups (factors): Environment, Difficulty, promotion (Communication), contact, proximity, travel aspects (Availability), tuition (Tuition fee), quality, university reputation, ranking (Image), reference group (Opinion).

Thesis explanation:

The initials of the model refer to the following English terms, words: **E**nvironment (physical environment), **D**ifficulty (difficulty of entry, score limit), **U**sual costs (usual costs beside tuition) **C**ommunication, **A**ccess (travel considerations), **T**uition fee, **I**mage (quality: university reputation, ranking, etc.) and Opinion (reference group: parents, teachers, etc.) After testing, the 8 factors developed as: tuition fees as well as general, indirect costs gone into different factors arouse during the school year. Score limit to expect and easier entry were removed from the objective performance group, so I renamed the latter quality (Figure 2)

Availability	Closeness to home Easy access regarding traveling Closeness to the family
Price	Don't have to spend on tuition fee Dormitory room on good price Low price university services Cheap flat rental options Easy to finance living expenses
Communication	Own events of the university Official university website Social medias of the institution Advertising
Subjective opinion	Recognition and reputation of the university Competitiveness of the degree Opinions and advice of parents, siblings, relatives Opinions and advice from friends and schoolmates Suggestion from secondary school teachers Opinions on forums, social media
Objective opinion	A prominent place of higher educational institution in the university ranking Expected score limit, easier entry Professional opportunities offered by the university Additional offer of the university Opportunities and services provided by the city
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Communication	Own events of the university Official university website Social medias of the institution Advertising
Opinion	Opinions and advice of parents, siblings, relatives Opinions and advice from friends and schoolmates Suggestion from secondary school teachers Opinions on forums, social media
Image	Recognition and reputation of the university Competitiveness of the degree A prominent place of higher educational institution in the university ranking Professional opportunities offered by the university
Difficulty	Expected score limit, easier entry
Environment	Opportunities and services provided by the city Campus nature of the educational institution Condition of buildings Modernity of classrooms, laboratories The technical equipment of the university

3. Figure: EDUCATIO model (hypothesis, thesis)
Source: Compiled by the author

Hypothesis 2:

The freshers of the Faculty of Economics at the University of Miskolc form well-separated, homogeneous groups with marked characteristics based on the importance of the factors influencing university choice.

According to Gabriella Kuráth (2008), potential students form groups based on institutional choice criteria. When processing the data, I became aware of groupings, which also allowed me to conclude this. I also performed the cluster analysis on the basis of factors, with the difference that I used hierarchical cluster analysis instead of K middle cluster analysis.

Based on the EDUCATIO factors, I came to the following result for the freshers of the Faculty of Economics at the University of Miskolc.
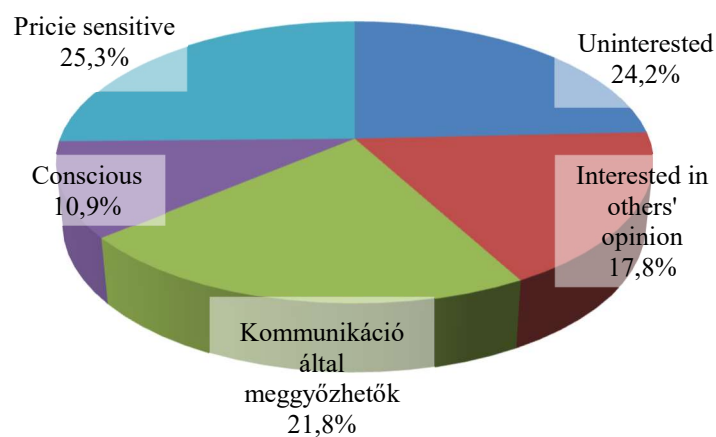
4. Figure: Cluster analysis according to the EDUCATIO factors
Hierarchical cluster analysis, 5 clusters
Source: Compiled by the author

Using hierarchical cluster analysis (based on EDUCATIO factors), after reviewing several versions, I arrived at the 5 clusters, which were given the following names. A detailed calculation is provided in Annex 3 in the dissertation.

Thesis 2:

The freshers of the Faculty of Economics at the University of Miskolc can be classified into 5 homogeneous groups based on the factors influencing the choice of university (EDUCATIO model) using hierarchical cluster analysis. I gave the following names to the segments created in this way.

1. *"Adults fighting for diploma" (24.2%)*
2. *"Students from far can be convinced by the reference group" (17.8)*
3. *"Wayseekers can be convinced by marketing communication" (21.8%)*
4. *"Conscious students from the neighbourhood" (10.9%)*
5. *"Price-sensitive local ex-secondary school students" (25.3%)*

Thesis explanation:

The freshers of the Faculty of Economics at the University of Miskolc can be classified into the following clusters based on the factors influencing university choice.

The first cluster is **"adults fighting for diploma"**. For them, nothing seems more important than getting a degree. The following students were overrepresented in this group: students majoring in financial accounting, correspondence students, and those who pay tuition fee. Furthermore, those with admission score below 200, ones over the age of thirty, who are married or in a relationship with children and employees are also more represented in this cluster.

The second cluster was called **"students from far can be convinced by marketing communication"**. Here, a large number were represented by those who went to international busines, the single childless, who live at least 101, but not more than 200 kilometres from Miskolc, who come from a family of four, and whose family income ranged from 250 thousand to 300 thousand forints.

The third cluster was named "**wayseekers convinced by marketing communication**". Students who specialize in commerce and marketing, had an admission score between 201 and 300 points, already have a degree, and live alone in a flat are overrepresented in this cluster.

The fourth cluster is made up of **"conscious students from the neighbourhood"**. For them, the physical environment, general costs, closeness, tuition and image are all important. Those who attend commerce and marketing, state financed, their admission score was over 400, with no workplace, live 51-100 kilometres from Miskolc, their father is a vocational worker and their mother has an elementary school qualification and live in large families (more than four families) can be found in large number in this cluster.

The fifth cluster consists of "price-sensitive, local, ex-secondary school students". For them, tuition alone is important. Those who took their school leaving exams in the city, in a grammar school and Borsod-Abaúj-Zemplén county, who go to tourism catering, full-time students at the of are present in a large number in this group. Students with no employment, live in Borsod-Abaúj-Zemplén county, live in a house and their families have three member are also overrepresented.

Adults fighting for diploma	Students from far can be convinced by the reference group	Wayseekers convinced my marketing communicátion	Conscious students from the neighbourhood	Price sensitive local, ex-secondary students
• Paying tuition fee • Admission score: below 200 • In their thirties	• International business students • Singles, childless • 101-200 kilometres from Miskolc • Family of four members • Family income: 250-300 thousand	• State financed • Admission score: 201-300 • Live in Miskolc • No employment • Parents with low level qualification	• State financed • Admission above 400 • Live from Miskolc: 51-100 km • No employment • Family income: 50-100 thousand forints	• Live in: B. A. Z. conty • Around their twentieth • No employment • Parents with low level of qualification • Family income: 100-150 thousand forints

5. Figure: EDUCATIO clusters (thesis)
Source: Compiled by the author

4.2. University promotion optimization (UNIPOM) model

The aim of promotion optimization model (UNIPOM) is to understand the university choice process better. The model helps to determine which marketing communication tools should be used in a given month of a given academic year in order to create a marketing communication mix with the highest total usage intensity, in this way to ensure the most optimal reach of potential students from the scarce budget available.

Promotion Optimization Model (UNIPOM) also helps higher education institutions to use their scarce resources marketing in the most optimal way. All this can be achieved by surveying the information gathering habits of the potential students every month. After these the communication tools and messages (Designing the message using the EDUCATIO model and related research-Chapter 3.1) are allocated that are the best to convince potential students.

Method of UNIPOM model

There is a full-year longitudinal data available on the information gathering habits of students who want to continue their studies at a university. This data set forms the basis of the optimization model to be created. The initial problem is described by the following formulas:

$U = xU_x + yU_y + \ldots + zU_Z \rightarrow \max$ (U=usage intensity, x, y, …, z=different marketing communicational activities at different times)

$I \geq xP_x + yP_y + \cdots + zP_z$ (I=budget, P=cost of communicational activity)

x, y, …, z=? (binary coefficients)

The essence of the formula is that I want to achieve the maximum usage intensity (U) using different communication tools (x, y… .z), but unfortunately the available financial framework is finite and I cannot buy all the necessary communication tools, so I have to select from them taking into account the goods and their intensity of use.

The optimization of the communication mix - according to my previous research - can be traced back to the so-called backpack problem well known in operations research and algorithm theory. (Dantzig, 1930; Mathews, 1897).

In order to narrow down the alternatives, it is necessary to select the means of communication, the information output, and the precise choice of media. Backpack task can help us with this problem.

The large number of communication tools, in addition, the fact that I investigated the intensity of communication tools on a monthly basis for 12 months would have made calculation and the solution of the backpack problem impossible. So a promotion optimization software was created for this purpose to select the tools taking into account the price, the intensity of use and the scarce budget. The software offers the most optimal alternative by performing calculations with dynamic programming.

I used a focus group interview to help me with compiling the questionnaire for the longitudinal data set, and I also conducted in-depth expert interviews to refine the data entered into the software.

Data collection related to the UNIPOM model

The results of the **secondary research** are included in the dissertation entitled "Higher education marketing communication and its optimization". In addition, I used **qualitative** (focus group interview, in-depth interviews) and **quantitative** (questionnaire survey: a longitudinal study covering 12 months) research.

Hypothesis 3:

The intensity of information gathering related to regarding the first BA freshers of the faculties of economics did not show an even distribution in the academic year of admission. The most intensive periods were around the application deadlines (January-February) and a few weeks between the publication of the admission results and the additional admission deadline (mid-July-early August). I base my above suggestion on the results of a previous exploratory research (focus group interview).

The BA freshers of the faculty of economics had to draw the intensity of information gathering on a graph on an A4 sheet. The horizontal axis represented the last school year from the 1st September of the previous year to 31st August of the following year. The vertical axis contains the intensity of information gathering from 1 to 10. Although the school year ends in June, we must not forget the importance of the summer, as the admission points will be published in July, and after that enrollment will be preceded by a kind of information search (lodgin, enrollment).
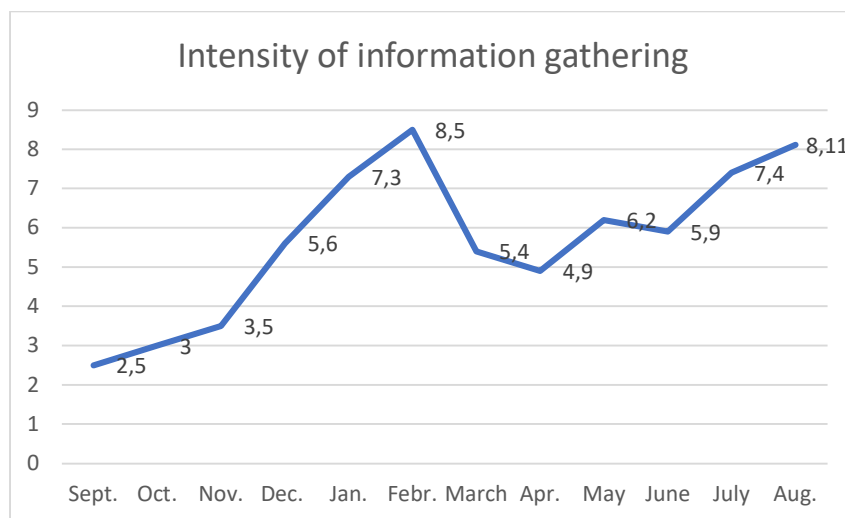
6. Figure: Average intensity of information gathering (hypothesis 3)
Source: Compiled by the author

The lowest level of intensity of information gathering intensity is in September, when students scored an average of only 2.5 on a scale of 1-10. The most intense month is in February, when it is the deadline of application (8.5). There was another peak in August (8.1), but it is slightly below the February value. I will also examine the intensity curve on the basis of the national survey (Hypothesis 3, Thesis 3)

Thesis 3:

According to a national survey of BA freshers in the faculties of economics, the intensity of information gathering related to further education is the most intensive in January and February, and then decreases continuously. There is a slight increase in August.

The results of the focus group interview and the questionnaire survey show a completely different result in terms of the intensity of information gathering, which is illustrated in the following figure.
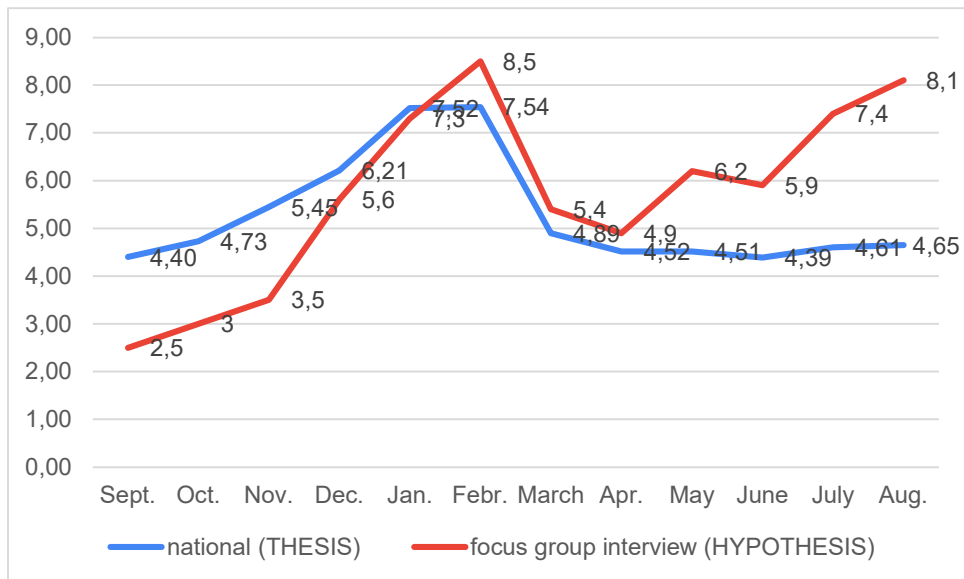
7. Figure: Average intensity of information gathering according to the focus group interview and survey questionnaire (hypothesis 3)
Source: Compiled by the author

Based on the results of the focus group interview, I assumed that the first intensive period falls around the application deadline, that is for January and February, which is also confirmed by the results of the national questionnaire. In March, its use declined somewhat, which is also due to the fact that students are now more likely to conduct formal affairs electronically. The second intensive period, which I assumed for the month of August, could not be verified by the questionnaire survey. Therfore, my premise formulated on the basis of the focus group interview was only partially confirmed, so I reject Hypothesis 3.

University promotion optimization software

In the followings, I will describe the university promotion optimization software in details, including how it works, its structure, and how it brings maximum total usage intensity from a given scarce budget, and what input data you it uses during operation. Furthermore, I would like to point out that the software is not my own intellectual product, as I do not have programming knowledge, so I asked for help in creating the software, in which I gave details, all aspects and the desired principle of operation.

Hypothesis 4:

A combination of such marketing communication mix elements can be created, which besides a given budget and considering the price of the possible marketing communication tools and their usage intensity, enables the highest total usage intensity (the most optimal availability of potential students).

The problem of optimizing the communication mix can be traced back to the backpack task already explained in the professional literature. There are several methods available to solve the backpack task, which are: separation and restriction method, implicit discounting, gomory cutting, and dynamic programming. I use the latest one (dynamic programming) to compile a combination of marketing communication mix elements, because it does not only gives the mathematical method to help with the selection of marketing communication tools, but it can also answer such a critical question as to which channel should be used when. A detailed description of the software can be found in the dissertation "Software operation principle". part of.

Thesis 4:

An algorithm exists that compiles the communication mix that provides the highest total usage intensity, at a given budget considering the price of the possible marketing communication tools and their usage intensity.

The software, which works on the principle of dynamic programming, solves the type 0-1 backpack task, that is it sorts the media by either keeping the given medium depending on the given price and usage intensity or discarding it.

Our initial problem is that our particular backpack cannot carry more than a certain weight, in our case this weight is the amount that we can spend on a particular communication device in a given year (scarce budget). All means of communication have a price and a usage intensity. We have to keep in mind that there is a budget that we cannot exceed. The aim is to be able to achieve the maximum overlall usage intensity while spending most of the budget.

The software includes the usage intensity and price of each communication tool, which allows us to offer the best choice for a year by entering a specific budget. I fed the different devices into the software separately, broken down into months, so they were handled separately by the machine, as if they were stand-alone devices.

I determined the usage intensity of communication tools by asking potential students about the intensity with which they used the information sources regarding further learning. They had to rate their response on a scale of 0 to 10. (0 = not used at all, 1 = hardly used… .10 = used very much) (Annex 11)

Thanks to the university promotion optimization model (UNIPOM model), in most cases almost 90% of the maximum total usage intensity can be achieved from a smaller amount that can be spent on school communication, even from half of the available amount.

By extending the model, modifying the variables, the method can be extended to any promotion plan of any organization.

Hypothesis 5:

Optimization by the algorithm used in the UNIPOM model is more effective than intuitive human decisions.

So, it can be used to generate a marketing communication mix with a higher total usage intensity (more optimal reach for potential students) from the scarce budget available than when allocating money is based on human decision. I tested the hypothesis among the potential students of the best commercial and catering secondary school in Miskolc.

1. Marketing mixes

First, I examined how many devices the software chooses at a very minimal amount (HUF 15 million), taking into account the price and intensity of use. The software spent HUF 14,988,000 of the HUF 15 million. As we can see, 13 devices were chosen. This amount was only 14.61% compared to reaching the maximum total usage intensity and therefore I reached 59.38% (311.30) compared to the maximum total usage intensity (524.22).

The next step was to run the intensity for HUF 25 million, from this framework 18 devices have already been included in the marketing communication mix. From the given budget, it spends HUF 24,996,000 and it means 70.57% total usage intensity compared to the maximum available usage intensity (100%).

In the last variation, I did not use either 40 percent (38.98%) of the amount required to reach the maximum total usage intensity (39.988,000). In this way I achived to 86.26 percent of the maximum total usage intensity.

In this variation, the software recommends the use of 23 devices, 76% of the available devices.

It is important to note that using more expensive tools (open days, exhibitions, etc.) did not fit into the budget, but if the expert wants to use the, she/he simply deducts the goods from her total budget and does the optimization.

	Sept.			Oct.			Nov.			Dec.			Jan.			Febr.			March			Apr.			May			June			July			Aug.		
	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40	15	25	40
Local newspaper																																				
National dailies																																				
Weekly																																				
Magazine, journal (periodical)																																				
Radio show: intercepted information																																				
Radio: commercials																																				
Television advertising																																				
Televíziós interjúk																																				
News on TV																																				
www.felvi.hu																																				
www.educatio.hu																																				
Universities, colleges website																																				
Facebook																																				
Other social sides																																				
Hírlevelek																																				
Internet commercials																																				
Youtube																																				
Blogs																																				
Google																																				
News portals																																				
Open days																																				
Fairs (eg EDUCATIO)																																				
Secondary school visits, roadshows																																				
Other programs																																				
Flyers and university publications																																				
Outdoor comm. tools																																				
Poster																																				
Friends, family, relatives, etc.																																				
Secondary school teachers																																				
Career counselors																																				

8. Figure: List of communication tools at different budgets (HUF 15, 25 and 40 million) on monthly basis
Source: compiled by the author

I was also interested in how effective the software can be compared to when we decide to divide a given budget into certain types of information, blocks (radio, print media, tv, internet, programs, etc.). Therefore, I researched according to an in-depth expert interview in which I asked how much of a particular budget is usually spent on specific blocks.

	Expert 1						Expert 2						Expert 3					
	15 mHUF		25 mHUF		40mHUF		15 mHUF		25 mHUF		40mHUF		15 mHUF		25 mHUF		40mHUF	
Communication blocks	mFt	%	mFt	%	mFt	%	mFt	%	mFt	%	mFt	%	mFt	%	mFt	%	mFt	%
Printed media	0	0	0	0	0	0	0,75	0,05	1,25	0,05	2	0,05	0,75	0,05	1,25	0,05	2	0,05
Rádió	0	0	0	0	0	0	0,75	0,05	1,25	0,05	2	0,05	1,5	0,1	2,5	0,1	4	0,1
Television	1,5	0,1	2,5	0,1	4	0,1	0,45	0,03	0,75	0,03	1,2	0,03	0	0	0	0	0	0
Internet	7,5	0,5	12,5	0,5	20	0,5	6	0,4	10	0,4	16	0,4	4,5	0,3	7,5	0,3	12	0,3
Event	4,5	0,3	7,5	0,3	12	0,3	6	0,4	10	0,4	16	0,4	6,75	0,45	11,25	0,45	18	0,45
Other	1,5	0,1	2,5	0,1	4	0,1	1,05	0,07	1,75	0,07	2,8	0,07	1,5	0,1	2,5	0,1	4	0,1
Total	15	1	25	1	40	1	15	1	25	1	40	1	15	1	25	1	40	1

5. Table: Amounts and ratio spent on blocks by the experts
Compiled by the author

Then I examined how much the software spends on each block for the different budgets, which is included in the following table:

Communication blocks	Software					
	15 mHUF		25 mHUF		40mHUF	
	mFt	%	mFt	%	mFt	összeg
Printed media	0	0%	320	1%	4906	12%
Rádio	1080	7%	1800	7%	3720	9%
Television	1488	10%	1488	6%	2818	7%
Internet	9386	63%	15342	61%	19182	48%
Event	0	0%	0	0%	1800	5%
Other	3034	20%	6046	24%	7562	19%
Total	14988	100%	24996	100%	39988	100%

6. Table: Amounts and ratio spent on blocks by the software
Compiled by the author

In the next step, I wanted to find out whether a higher total usage intensity could be achieved with the help of software or by allocating specific amounts based on human decision. Because the usage intensities of some devices are available for the software and we know exactly what devices the decision support software selects for how many months, the total usage intensity and the total usage intensity of the communication blocks can be also easily determined. The total usage intensity of the communication blocks was determined by adding the intensities of the communication devices belonging to each block.

	15 mHUF		25 mHUF		40 mHUF	
	the amount that can be spent on a given block is HUF million	total usage intensity achieveable with a given block	the amount that can be spent on a given block is HUF million	total usage intensity achieveable with a given block	the amount that can be spent on a given block is HUF million	total usage intensity achieveable with a given block
Printed media	0	0,00	0,32	1,81	4906	17,56
Rádio	1,08	18,24	1,8	22,33	3720	30,82
Television	1,488	41,92	1,488	41,92	2818	46,40
Internet	9,386	157,35	15,342	192,15	19182	206,62
Event	0	0,00	0	0,00	1800	6,26
Other	3,034	93,78	6,046	111,72	7562	118,05
Total	14,988	311,30	24,996	369,93	39988	425,71

7. Table: Total usage intensities by the software at different budgets
Compiled by the author

However, in the case of the experts, the task was not so simple, because we do not know exactly what assets could be included in the expert marketing mix for a given amount, so I first determined the intensity per HUF 1 million per block:

$$\frac{total\ usage\ intensity\ achievable\ by\ the\ given\ block}{cost\ need\ per\ blocks\ to\ achiev\ max\ usage\ intensity} =$$
$$= intensity\ for\ HUF\ 1\ million\ per\ blocks$$

The values obtained in this way are included by the table below:

	total usage intensity achievable by certain block	costs need for max total usage intensity per block million HUF	intensity for blocks per 1 million HUF
Printed media	45,34	17,304	2,62
Rádio	30,82	3,72	8,28
Television	59,13	9,468	6,25
Internet	233,58	34,632	6,74
Event	22,78	21,5	1,06
Other	132,57	15,962	8,31

8. Table: Usage intensities per 1 million HUF
Compiled by the author

After that, I multiplied the amounts obtained by the amounts that can be spent on the given block. In this way we obtain the values of the total use intensities achieved by the experts, which are included in the following three tables.

| | Intensity per block per 1 | Expert 1. | | | | | |
| | | 15 mHUF | | 25 mHUF | | 40 mHUF | |
		mHUF	total int.	mHUF	total int.	mHUF	total int.
Printed media	2,62	0	0	0	0,00	0	0,00
Rádio	8,28	0	0	0	0,00	0	0,00
Television	6,25	1,5	9,37	2,5	15,61	4	24,98
Internet	6,74	7,5	50,58	12,5	84,31	20	134,89
Event	1,06	4,5	4,77	7,5	7,95	12	12,71
Other	8,31	1,5	12,46	2,5	20,76	4	33,22
Total		15	77,18	25	128,63	40	205,81

9. Table: total usage intensity achieved by Expert 1
Compiled by the author

| | Intensity per block per 1 | Expert 2 | | | | | |
| | | 15 mHUF | | 25 mHUF | | 40 mHUF | |
		mHUF	total int.	mHUF	total int.	mHUF	total int.
Printed media	2,62	0,75	1,97	1,25	3,28	2	5,24
Rádio	8,28	0,75	6,21	1,25	10,36	2	16,57
Television	6,25	0,45	2,81	0,75	4,68	1,2	7,49
Internet	6,74	6	40,47	10	67,45	16	107,91
Event	1,06	6	6,36	10	10,60	16	16,95
Other	8,31	1,05	8,72	1,75	14,53	2,8	23,25
Total		15	66,53	25	110,89	40	177,43

10. Table: total usage intensity achieved by Expert 2.
Compiled by the author

| | Intensity per block per 1 | Expert 3 | | | | | |
| | | 15 mHUF | | 25 mHUF | | 40 mHUF | |
		mHUF	total int.	mHUF	total int.	mHUF	total int.
Printed media	2,62	0,75	1,97	1,25	3,28	2	5,24
Rádio	8,28	1,5	12,43	2,5	20,71	4	33,14
Television	6,25	0	0,00	0	0,00	0	0,00
Internet	6,74	4,5	30,35	7,5	50,58	12	80,94
Event	1,06	6,75	7,15	11,25	11,92	18	19,07
Other	8,31	1,5	12,46	2,5	20,76	4	33,22
Total		15	64,35	25	107,26	40	171,61

11. Table: total usage intensity achieved by Expert 3.
Compiled by the author

Thesis 5:

The algorithm used in the UNIPOM model provides a much more effective solution for reaching potential students than when marketing communication tools are selected based on human decision alone.

Thesis explanation:

In case of potential students attending the best commercial catering school in Miskolc, the UNIPOM software operating on the principle of dynamic programming achieves the allocation the scarce resource to be spent on university choice communication with a higher total usage intensity than when allocation of the money is only based on human decision (experts).

The following table compares the total utilization intensities achieved by the experts and the dynamic programming software for the three budgets. Of course, if the budget is higher, the usage intensity achieved by experts will also increase as you can purchase more marketing communication tools and their intensity will add up.

Budget	Software		Expert 1		Expert 2		Expert 3	
	Total usage intensity achieved	In the percentage of max total usage intensity to be achieved	Total usage intensity achieved	In the percentage of max total usage intensity to be achieved	Total usage intensity achieved	In the percentage of max total usage intensity to be achieved	Total usage intensity achieved	In the percentage of max total usage intensity to be achieved
15 mHUF	311,30	59,38%	77,18	14,72%	66,53	12,69%	64,35	12,28%
25 mHUF	369,93	70,57%	128,63	24,54%	110,89	21,15%	107,26	20,46%
40 mHUF	425,71	81,21%	205,81	39,26%	177,43	33,85%	171,61	32,74%
Max total usage intensity: 524,22								

12. Table: Realized total usage intensities (thesis).
Compiled by the author

It can be clearly seen from the data that with the help of the university promotion optimization software (UNIPOM) operating on the principle of dynamic programming, a marketing communication mix with a higher total use intensity can be created in case of scarce budget, so I accept my Hypothesis 5.

4.3.   Further Learning Consciousness Index

After reviewing the concepts of consciousness already detailed in the professional literature overview, I define further learning consciousness as follows:

By further learning consciousness I mean the behaviour during which a potential student who is about to continue his or her education at university, based on the information and knowledge gathered about the admission process, engages in purposeful behaviour, as a result of which he or she increases his or her chances of entering the chosen higher educational institution.

Potential students can gather information from several sources, such as an admissions guide, information booklets issued by a particular higher educational institution, a university website, and so on. You can increase your chances by getting better tickets, writing an advanced school leaving exam, acquiring language exams, preparing for school from eligible subjects, and more.

A possible method to measure further learning awareness:

With creating Further Learning Consciousness Index (FLCI) related professional literature and the consciousness measurement methods included helped me.

The essence of the further learning consciousness index is given by the empirical weighting methodology also used in pedagogical psychology (p. 65), which examines the difficulty of solving test tasks. Also, in case of the consciousness index, the actions taken by fewer students for successful admission were given more weight in the calculation.
My index includes two components: a chance increasing component and an information-gathering component. I broke down chance increasing component into subcomponents, namely, preparation and score gathering subcomponents, while information gathering component had printed media, radio, television, etc. subcategories.

Measuring further learning component:

Component of chance increasing can be described by the following formula:

$$x_i = \sum_{j=1}^{m} \frac{1 - \frac{\sum_{i=1}^{n} y_{ij}}{n}}{\sum_{j=1}^{m} 1 - \frac{\sum_{i=1}^{n} y_{ij}}{n}} \cdot y_{ij}$$

where,

x_i= the value of chance increasing for the student i[th]

y_{ij}=dichotom (dummy) variable j[th] activity of student i[th] (does or does not do) the given activity

n=number of respondents

m=number of activities

Further learning consciousness index is given by the arithmetic mean values of the two components.

Based on further learning conscious index, I set up five categories to determine the level of consciousness: not conscious at all, modestly conscious, conscious, moderately conscious, or very conscious about the further learning aspirations.

Since the two components of consciousness contain a lot of factors, I determined the levels of consciousness the following way: I compared the potential students' consciousness to the best performing students achieving the highest level of further learning consciousness.

The information gathering component of further learning consciousness:

When measuring the information gathering component of further learning consciousness, I looked at the sources of information that students in the process of admission receive on a monthly basis. The weighting of the information sources was done on the same principle as in the case of the chance increase component, with the difference that I took the 12 months into account when they were gathering information and the intensity of usage of the given information source as well. (0 = not used at all; 1 = hardly used; 10 = used very much).

The more people used a given source of information in a given month, the less weight they received in the model. If only a few people used the given information source in the given month, it was given more weight, because the more conscious student in the field of information gathering tries to find information from several sources and in this way he or she increases the chance of getting admitted.

The information gathering component is described by the formula as follows:

$$Z_i = \sum_{k=1}^{l} \frac{10 - \frac{\sum_{i=1}^{n} v_{ik}}{n}}{\sum_{k=1}^{l} 10 - \frac{\sum_{i=1}^{n} v_{ik}}{n}} \cdot v_{ik}$$

where,

z_i= information gathering component of student i[th]

v_{ik} = evaluation of student i[th] for information source k[th]

n= number of respondents

l= number of information sources in all of the months

As mentioned above, I got the levels of furhter learning consciousness by averaging the chance increasing and iformation gathering component, so the FLCI formula is as it follows:

$$t_i = \frac{x_i + z_i}{2}$$

where,

t_i = is the furhter learning consciousness of student i[th]

Hypothesis 6:

Intention to go on to a university influences activities for further learning significantly (factors of further learning consciousness) regarding the potential students from the best commercial secondary school in Miskolc.

In the best commercial secondary school of Miskolc, the students who intend to go on to university prepare for the admission consciously and increase their chances (private lessons, more lessons in important subjects, competitions) and collect information from the most sources possible (internet, printed media, radio, television, etc.)

I investigated whether the values of further learning consciousness in the two groups (1=would like to go on university, 2=does not want to study there) are normally distributed. This was done by Shapiro-Wilk test. Both in case of the potential students who want to go to university (W(67)=0,988;p=0,772) and the ones who do no intend to (W(21)=0,98;p=0,482) results were normally distributed.

In the next step, I checked the homogeneity of the standard deviation of the groups using Levene test, where there was no significant difference between the standard deviations of the groups (F=0.989; p= 0.323). Therefore, there is homogeneity of the standard deviation of the groups.

In the third step, I examined the difference of the means of further learning consciousness in the two groups with an independent T-test, where significance level was 0.006. Therefore there is a significant difference between the values of further learning consciousness of the students who want to go on university and the ones who do not intend to.

Thesis 6:

There is a significant relationship between the intention to continue learning at a higher educational institution and the further learning activities (further learning awareness factors) in the case of the students of the best commercial secondary school in Miskolc

Thesis explanation:

In the case of students at the best commercial secondary school in Miskolc, the correlation between two factors and the higher level of means of further learning consciousness shows that those students who apply to higher educational institutions and prepare consciously for admission are more likely to enter university or college.

Students who intend to continue their studies will consciously prepare for admission, increase their chances (special classes, faculty, competitions, etc.) and get information from as many sources as possible (internet, printed media, radio, television, etc.)

What may even be interesting here is are the means of the further learning index among those who intend to study and those who do not. The means of further learning consciousness of those wish to continue their studies (0.3) is also higher among non-admitting students (0.23).

Hypothesis 7:

Regarding the number one commercial secondary school in Miskolc, the level of further learning consciousness of students before school leaving exam is higher than the ones participating in vocational training after school leaving exam.

In the number one commercial vocational secondary school of Miskolc, students who study in vocational training want to get a job as soon as possible and intend to earn money. There are many students in this group who have not been admitted to a higher educational institution due to their grades at school. However, there are also those who want to earn money during their university years and need a profession to do so or want to deepen their professional knowledge before starting university, but their proportion can be lower compared to worse performing students. (Focus group interview)

I examined whether the values of the Further Learning Consciousness Index are normally distributed in the two groups (1 = pre-graduation; 2 = post-graduate vocational training). I achieved this using the Shapiro-Wilk test. I was able to prove the normal distribution only in the case of pre-graduation students (W (65) = 0.993; p = 0.968) and not in the case of post-school leaving vocational students (W (41) = 0.932; p = 0.017).

Therefore, I examined the difference between the groups using the Mann-Whitney test. (U = 908; W = 1769; Z = - 2.754; p = 0.006 (bilateral). Based on the results, it can be concluded that there is a significant difference between the further learning consciousness results of the two groups.

Thesis 7:

In case of number one commercial secondary school in Miskolc, the level of further learning consciousness of students before school leaving exam (0.29) than the participants of vocational training after school leaving exam (0.24).

In the number one commercial secondary school in Miskolc, the difference between the two values can be explained by the fact that students before school leaving exam, as I wrote about in the dissertation, want to study at a higher education institution in bigger proportion (72% of students taking school leaving exam, 49% of the ones participating in vocational training after school leaving exam). Vocational students mostly think about finding a job in the labour market, so they are less concerned with continuing their studies. Many of the students with serious intentions to go to a higher educational institution prefer the correspondence course because this way they can take a job next to the university, it is much more important for them to have a permanent salary and for this they intend to pay tuition fee to get a degree. I also discussed this plan in detail with them in form teacher's class after completing the questionnaire.

Hypothesis 8:
There is a difference between men and women taking part in BA economic course in terms of further learning consciousness in favour of women. (national survey).

According to professional literature, women participate in higher education in a much higher proportion (Varga, 2017) and their secondary school results are also much better (Fényes, 2009).
This difference is also reflected in the activities towards further learning. I assume that women do more to enter higher education institutions (the action component of the Further Learning Consciousness Index) and they are more conscious than the stronger gender in the information gathering, and they are more active overall as well.
Among BA students studying at a Faculty of Economics, I examined whether the values of the Further Learning Index were normally distributed in the two groups (1 = men; 2 = women). I did this using the Shapiro-Wilk test. Only in case of women I could prove the normal distribution (W (175) = 0.987; p = 0.188) regarding men (W (62) = 0.957; p = 0.031) I could not. Therefore, I examined the difference between the groups using the Mann-Whitney test. (U = 4413; W = 6366; Z = - 2.182; p = 0.029 (bilateral). Based on the results, it can be concluded that there is a significant difference between the learning outcomes of the two groups.
At the action component of the Further Learning Consciousness, I also examined the values in the two groups (1 = men, 2 = women) also using the Shapiro-Wilk test. In this analysis, I was able to verify the normal distribution for men (W (62) = 0.965; p = 0.074) (W (175) = 0.979; p = 0.09), but not for women. As a next step, I examined the differences here again using the Mann-Whitney test U = 4240.5; W = 6193.5; Z = -2.554; p = 0.011 (bilateral). According to the results, there is also a significant difference between the results of the action components of the further learning awareness of the two groups.

For the information-gathering component of further learning consciousness, normal distribution was not confirmed by Shapiro-Wilk test in either group (men (W (62) = 0.960; p = 0.044); women (W (175) = 0.966; p = 0.00)). Therefore, here too I examined the differences using the Mann-Whitney test U = 4739; W = 6692; Z = -1.479, p = 0.139). The results did not show a significant difference between the results of the information gathering components of the further learning consciousness of the two groups.

Thesis 8:

In the case of BA students at the Faculties of Economics, women proved to be more conscious in terms of both increasing chances and gathering information and their further learning consciousness was also higher than that of men. However, only in the case of component of increasing chances and further learning consciousness was it possible to show a significant difference between the results of the two groups (women, men), not in the case of information gathering. (national survey)

On the basis of the means, fresher women participating BA course at the Faculties of Economics achieved higher results in the case of both subcomponents and the further learning consciousness index.

	Men	Women
Information component of further learning consciousness	0,249	0,287
Action component of further learning consciousness	0,210	0,262
Further learning consciousness	0,234	0,274

Note: The table contains the arithmetic mean of further learning consciousness, not the rank averages examined by the Mann-Whitney test.

13. Table: Further learning consciousness and its subcomponents regarding sex.
Compiled by the author

5. Limitations of research, utilization of results, further research directions

My PhD research is only restricted to the potential BA students willing to study at the faculty of economics and the application of research results is also subject to conditions.

Application of *EDUCATIO model* to get a base for the recruitment strategy is needed to be continuously refreshed. At the one hand the factors influencing university choice must be revised and may be expanded due to the change in their significance and number. Technological, economic, political, etc. changes could bring the appearance of further factors and the significance of certain influential factors could grow while others could have less weigh within the process of university choice. The results should be also applied with restrictions because of the range of respondents (BA undergraduates of the Faculty of Economics at the University of Miskolc and later the undergraduates of the University of Miskolc).

The limitation associated with the *university promotion optimization model* was, on the one hand, the lack of accurate information regarding the amounts spent on each communication tool. To be able to obtain more accurate date, I inquired from various sources, for example advertising prices for internet portals, advertising prices for local newspapers, radio websites and university communication plans. Furthermore, I conducted several in-depth professional interviews in 2017 and 2020 as well to get more precise information. The data used in the model may differ from the actual prices but it is enough to illustrate the practical benefits of the promotion optimization model as the software compiles the optimal mix from a lot of variations. The results of the model can also be used only to a limited extent, as the panel research covers students of one commercial secondary school in Miskolc who would to continue their studies at a university. In the national research conducted in 2020, I carried out a one-time survey due to the lack of financial resources and other constraints.

Furthermore, I would like to outline that I recommend the model and the software only for decision support purposes, so the allocation of the amount that can be spent on the recruitment campaign can be done more effectively by the experts. The knowledge and experience of experts is essential for successful student recruitment marketing.

In addition, I would like to emphasize that the UNIPOM software is not my own intellectual product, I could not have created it without programming knowledge. I asked a programmer for help in creating it and I gave him all the essential aspects and the desired operating principle as well.

The use of *further educational consciousness index* is also subject to conditions, as the tools of information gathering can change due to technological changes. It should also be noted that the range of admission scores and extra points may also change, and at the same time, the index may need to be refined in the future. The index is only suitable for calculating the further educational consciousness of the potential students intending to study in Hungarian higher education, as most of the variables used to calculate the index were included in the model according to on the Hungarian admission requirements system.

The results of the research also concern on students of one commercial secondary school who are about to continue their studies (panel research) at a university in Hungary, and the results of later research (2019/2020 academic year) refer to undergraduate students in economics (national survey).

This dissertation is a summary of my research so far, I do not intend to close it I would like to continue my research on student recruitment marketing in the future. I am interested in the relationship between university choice and the following factors: demographic indicators, attitude, environment, situation, behaviour, place of living, media, family and informedness, education, etc. To achieve this, I would rely on Ajzen's theory of planned behaviour. The model

to be set up in the future is quite complex and requires the exploration of the relationship between many factors, after which the SEM model of university choice could be created.

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