

BUSINESS CONSULTANCY PROJECT FOR ADA UNIVERSITY
THE ESTABLISHMENT OF ADA SCHOOL OF MEDICINE AS PART OF ADA GROWTH STRATEGY



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Business Consultancy Project

ADA University and Maastricht School of Management (MSM)

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List of Acronyms

BMD Bachelor of Medicine degree program

SEC State Examination center

LLB Undergraduate degree in Law

WHO World Health Organization

WFME World Federation in Medical Education

FAIMER Foundation for Advancement of International Medical Education and Research

BCP Business Consultancy project

UG Undergraduate

GR Graduate

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Abstract

From its inception, University established new programs on undergraduate and graduate levels to grow further and become a world-class university. As a public university, new program launching was aligned to the mission and vision of ADA and served the needs of the country to develop human capital. From the modest partnership with the Information Technologies University a decade ago, to today's complex of public, private and international collaborations, the academic programs' profile of ADA University has evolved immensely. However, desire to tap new market segments in order to explore new opportunities in higher education through alliances and collaborations with local and international partners remains severe.

Today ADA University's mission is not only to provide qualitative education, but also to grow as an international brand, to be competitive in the market of higher education and raise value proposition of qualitative education in different fields.

In an effort to help ADA University to enhance competitive advantage and to reveal hidden potential and capacity, this project proposes a new School of Medicine establishment as a way to grow and to build a strong brand image as multi-profiled university.

Keywords: medical program, medicine, undergraduate education, university, growth strategy, partnership, alliances.

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1. Introduction

1.1 Rationale of the study

Universities as businesses pursue organic growth by developing existing activities, creating new products, optimizing business models or performing better in sales and marketing (McKinsey report, 2017), whereas inorganic growth can be maintained only by mergers and acquisitions. Some universities choose a primary strategy for organic growth and expansion, while others prefer to grow in both organic and inorganic ways of implementing multiple strategies. According to the research conducted by Shanghai Jiao Tong University World University and Times Higher Education Rankings, world-class universities have three main features: they are highly internationalized comprehensive universities with a wide range of subject coverage, the quality and significance of academic research is very high, 97% of world-class universities have medical schools, which gives them competitive advantage than other institutions without medical school (Hsiou-Hsia, 2018).

To help the leading university in Azerbaijan - ADA University to reveal hidden potential and capacity, to foster research and intercalate innovations in education, this project proposes a new School of Medicine establishment as a way to university organic growth by the increase in the number of programs and enhancing competitive advantage in the market.

The recent practice of new programs opening by ADA University is a result of high competition in the market for higher education, decrease in student admission and retention rates, that forces ADA to tap new customers and expand further. New medical school with a new program (Bachelor of Medicine) can help to meet the university needs. Eventually, in the long run, ADA University School of Medicine can also help to increase government subsidies for providing high-quality medical education and foster research.

Increase in government support can be also explained from an economic perspective: the market for higher education is an ideal example of a positive externality. Externalities in both markets for higher education and health care can call for government action to remedy market failure (Mankiw, 2017). For instance, medical research, in the case with finding a new way of medical treatment of incurable disease or inventing something new, benefits the whole society. Meanwhile, the government usually responds to this externality by subsidizing research, education and health care, to monitor the quality of the service (education and medical service) and avoid negative outcomes by various regulations – licenses, accreditations, and grants, etc. However, licenses can be granted only after graduating from accredited Medical School and successful passing examinations and tests. Therefore, in the situation of physicians' shortage to ensure qualitative medical service in the country government is becoming one of the key strategic partners – represented by the Ministry of Health and Ministry of Education. To the same token, the government tries to avoid uncertainty in GDP spending to healthcare and education and starts to plan State Insurance program (as of 2020), that makes it a mediator between a patient (demand) and physician/health care provider (supply). Hence, the newly established medical school has become a powerful economic engine due to the positive externality effect.

It is important to note, that the new School of Medicine will help to acquire strong market positions. Challenge of branding strategy implementation is based on the hardship to become an internationally accredited and accepted university with international status worldwide. Even here, the new BMD program establishment can ease this process for several reasons:

Firstly, ADA University School of Medicine will design an integrated type of curriculum following international accreditation standards. Secondly, all students will get local and international experience to understand the specifics of local and international medicine. Finally, the benefits of new medical program launching will be tangible in the long run, when ADA as a hotbed of innovation will transform into the epicenter for research in different fields and become a world-class university. To achieve program internationalization, accrediting bodies as World Federation for Medical Education (WFME) and Foundation for Advancement of International Medical Education and Research (FAIMER) impose new standards. To be more specific, in order to meet international standards of opening a new medical program/school WFME designed “Guidance for governments, regulators and universities” Following these standards, ADA University can establish School of Medicine in accordance with international standards of medical education, thus developing market product and adding value to the academic programs’ profile.

1.2 Background

As one of the leading universities in Azerbaijan, ADA University grew with a combination of multiple strategies. The first step towards the establishment of the world-class university was made in 2011 when Azerbaijan Diplomatic Academy (heir of ADA University) was transformed to ADA University with by merging with Azerbaijan Information Technologies University. As a public university, the role of government in the process of transformation was critical. The merger was initiated by the government in the form of “excellence initiative” and found its reflection in “hybrid formula” (Salmi, J., 2009) of two mono-profiled educational entities, that helped to achieve a certain synergy and transformed into bigger entity with internal coherence and resource leverage (Salmi, J., 2009). Nowadays ADA University still maintains organic grow. The current academic enterprise of ADA University consists of ADA High School, ADA College, and four schools: School of Information Technologies and Engineering, School of Business, School of Education and School of Public and International Affairs.

In general, ADA University implements multiple strategies, that brought good results and helped the university to grow from mono-profiled Diplomatic Academy to multi-profile ADA University. The importance of growth was essential for achieving the goal of university and fulfill its mission to expand further and grow into the world-class university, that facilitates innovations and foster research in different fields to meet the needs of the country and become a global player in the market of higher education. ADA University positions itself as a unique education service provider and a flagman for innovative learning and academic excellence. Notwithstanding the institutional efforts to differentiate its service, current market competition is high. In a highly competitive market of higher education, Universities evolve to meet the needs of students through academic excellence, special programs offerings, and unique resources. ADA University continues to grow, new programs are opening, new

buildings are constructing. Further market expansion is regulated by combining different strategies (market penetration, product diversification, and product development).

1.3 Problem statement and research objective

Contestability of market for higher education and decrease in enrollment numbers forces ADA University to expand program scope and acquire new market segments. As a result, ADA University launched Law program, ADA High School, ADA College to increase the number of students and strengthen its market positions. New programs always helped to develop the quality of ADA education, promote its brand and facilitate the research input. To the same token, new ADA University School of Medicine can help retain ADA leading market position and justify its brand image as a pioneering university in Azerbaijan by producing competent professionals with strong critical and analytical thinking not only in IT, Business, International Relations, and Law but also in Medicine. Whenever ADA launches a new school/program it forges a strategic partnership with partners. Therefore, the new ADA School of Medicine establishment may become a stimulus for new product development, whereas strategic alliances with multiple partners can add value to the program quality.

The research objective of this project is to explore opportunities for new product development and answer the research questions below.

1.4 Research questions

1.4.1 Major Research Question

This Business Consultancy project aims to show that opening a new school at ADA with strategic partnership can help the university to outperform its rivals and gain significant market share by following ADA University strategic plan for diversification, growth and market expansion. This BCP will reveal the potential of ADA University and shows the necessary steps to a successful school establishment. So, the major research question is:

What would be the benefits of the new School of Medicine establishment for ADA University?

1.4.2 Minor Research Question

To elaborate more on the major research question, we can also add the following minor questions:

1. *Which specific targets could be achieved by ADA University in case of successful School of Medicine establishment?*
2. *How the launch of ADA new program introduction would help ADA to strengthen its position in the market as a provider of innovative educational services and research?*

This research is structured not as ordinary Business Consultancy projects, the feature of this paper requires integration of market and product analysis for the successful program establishment.

1.5 Outline of the project

This paper is organized into 5 chapters in the following manner: Introduction, Research methods, Theoretical background, Findings and Discussion, Conclusion, bibliography, and appendixes.

Chapter 1 presents the thesis discussing the rationale for this study, the problem statement, the research objective, major and minor research questions and outline of the paper.

Chapter 2 describes the research methods, research design, data collection, and data analysis process.

Chapter 3 introduces theoretical background and literature review on the topics discussed in this paper as growth and alternative growth, strategic alliances, and partnerships. It also includes case studies on the topic of the new medical school establishment, that benefited the research content and structure and describes a conceptual model of the whole research.

Chapter 4 outlines the market and industry analysis, scrutinizes competitors in the market, identifies strategy and business model canvas. This chapter describes marketing mix of the proposed product.

Chapter 5 includes the findings of the conducted research and presents the findings of the survey among the high school students, then discussing the findings of interviews with competing university' representatives and reporting the findings of Delphi technique.

Last part summarizes with the conclusion of the undertaken research.

2 Research methods

This chapter is dedicated to the research methodology of this project and includes research design, data collection and main challenges for conducting this research.

2.1 Research design

The goal of this project is to show how the establishment of ADA University School of Medicine will affect its main product - educational services of ADA University. "Research Strategy is a step-by-step plan of action that gives direction to your thoughts and efforts, enabling you to conduct research systematically and on schedule to produce quality results and detailed reporting" (MacKenzie corporation, 2018).

This BCP study is designed on research questions and guided by the data and information obtained by employing different research methods. So, the research approach of this paper is data collection and data analysis. Since this research is based on a real case of existing university and doesn't involve any quantitative and statistical hypothesis testing, the research approach is mostly qualitative. Primary data collection methods were identified based on the focus areas of this project to analyze the current state of the market for medical education and identify the competitive advantage of the program offered by the new medical school. Therefore, the main methods chosen were:

- surveys of potential customers (high school students preparing for BMD program);
- site visits and personal interviews of two competitive universities and two structured interviews with their staff members;
- series of structured expert interviews (Delphi method);
- market potential estimation for BMD program.

The secondary data includes books, scientific journal articles, government publications, websites, statistical data of the ministries and state agencies. So, the research with multiple usages of data sources is more beneficial in terms of triangulation, that increases research validity.

Furthermore, this research relates to the communicative and survey studies, where the communicative study is based on data obtained from respondents through questioning by impersonal and personal means (Blumberg, Cooper, & Schindler, 2011), while survey study is based on surveys.

2.2 Data collection

2.2.1 Site visits and interviews

The goal of conducting interviews (along with site visits) was to obtain some data regarding the market and to identify the main challenges of current medical education market incumbents and competitors of ADA University School of Medicine. As a consultant (since the author acts as a consultant in this BCP), particular interest ignites gaining information from the interviewees in person and analyze the obtained data from the inside perspective. Since interviews were conducted with both competitors' representatives structured interviews seemed to be more suitable type of interviews that allow to compare the answers and conduct comparative techniques of data analysis. At the same time,

structured interviews also allowed interviewees to slightly deviate from the main questions and explain his point of view, elaborate on the question to give insight and provide with more information.

Considering, difficulties in accessing and finding related interviewees for interview participation, potential candidates were selected through convenience sampling (part of non-probability sampling) with the assistance of colleagues from other universities. Both interviewees were chosen, considering the fact, that they represent the administrative staff of competitor universities and secondly, they have extensive working experience in the market for medical education. A short description of each respondent is provided below.

The first interviewee, coded as RSP1 (see Appendix A) is the administrative worker of Azerbaijan Medical University (AMU) with approximately 15 years of experience in the medical education area. The second interviewee, coded as RSP2 (see Appendix A) is the administrative worker of Baku branch of I.M. Sechenov First Moscow State Medical University with the educational background and 7 years of work experience in medicine.

Two interviews were sufficient for this research; however, it would be very informative to interview the third market incumbent Nakhichevan State University, but due to the tiny market share, limited number of undergraduate medical students studying BMD (50-55 students), remoted distance, logistical issues, impossibility to reach any administrative or faculty member in that university during summer break in 2019, interview with the last market incumbent was omitted. The limited number of interviewees allowed to highlight the key points and identify the main challenges of operating in the market for medical education, determining comparative advantage that can get new School of Medicine.

2.2.2 Survey research

In addition to the interviews, surveys among the high-school students were also administered in order to measure potential demand and understand the current state in the market for medical education. It stresses the importance of new program design and helps to enhance competitive advantage. The surveys were conducted with the assistance of local high school administrators and teachers of physics, chemistry, and biology (these subjects' examination high school students must take and pass successfully to get admission to the BMD degree program). These surveys helped to scrutiny different reasons for choosing BMD program at local and international medical universities and to see the customer behavior during the process of medical program and university selection. The questionnaire for the survey combined closed-ended or structured and open-ended or semi-structured or unstructured questionnaires. A closed-ended part of the questionnaire consisted of the questions for descriptive analysis and contained information on the demographic profile (age, gender, school number, educational qualification, etc.) and background (grade, school, area, etc.). Measurement scale was a combination of nominal (usually variables that do not involve numerical value) and ratio scales (it is an interval scale with the additional property that the variable can take a value of zero) (Projectguru, 2019). The questionnaire types' mixture was an intentional choice to obtain a different type of data, that brings diversity to the research that reveals the demand potential and combination of measurement scales helped to confront different types of data.

Considering the massive nature of surveys, the process of potential applicants' identification hindered by accessibility issues. Therefore, potential applicants were selected through the non-probability, convenience sampling method with the support of the staff of local schools. All respondents (135) were shortlisted per their interest in applying to the undergraduate program of medicine and studying medicine within Azerbaijan or abroad.

A short description of the survey process and respondents is provided below.

Out of 135 printed questionnaires, only 70 have been answered and returned for data analysis. These responses were sufficient to determine the trends and make some generalizations about the local tendency for studying BMD program. As a result, the students of 28 high schools (private and public) were anonymously represented in this survey. The original information and questionnaire in Azerbaijani language along with its English translation was added to Appendix B.

Therefore, if interviews with competitors gave more in-depth information, surveys with potential applicants provided more general information.

2.2.3 Structured expert interviews – Delphi technique

Medical curriculum design is usually done by the appointed dean/field expert or by adopting the other university's curriculum, however, in medical literature there is a popular research method – Delphi technique, that is a consensus-based methodology to analyze the perspectives of several different groups and experts. This method seeks to elicit expert (Martino, 1983) or informed individuals (McKenna, 1994) opinion in a systematic manner. It is applicable when there is incomplete knowledge about a problem or phenomenon (Skulmoski, G., Hartman, F., & Krahn, J., 2007).

Delphi method is a research method of structured questionnaires or "rounds" to gather information on the principle of "group consensus". Delphi team consists of 15 professionals from different fields of medicine (1 Associate Dean, 2 Researchers, 3 Gynecologists, 5 Physicians/Therapists, 2 Surgeons, 2 University professors) (more detailed information in Appendix C).

The goal of using this method is to get expert opinion achieved by consensus principle about the core component – integrated curriculum of new BMD program at ADA University School of Medicine. The most important principle in curriculum design is to ensure the best possible learning by having experts, scholars, and practitioners working together to combine theory, practice, and research. A vast array of successful cases in medical curriculum design was dedicated to Delphi technique as the ideal method for finding "constructive alignment (Pathol, 2006). Salehi (Salehi, Hashemi, Sabeer, & Imanieh, 2015) with establishment of MD/MPH dual degree program, Sturmberg, Reid and Khadra (Sturmberg, Reid, & Khadra, 2002) while designing Greater Murray Clinical School, Phillips and Lewis (Phillips & Lewis, 2014) in the research of curriculum for Australian College of Sports Medicine, McMillan in setting the guidelines for hospital pharmacy practice in Australia (McMillan, 2016) chose Delphi method, due to the fact, that it is the most useful consensus method, used in medical research for idea/theme generation, determination of priorities and facilitation of "constructive alignment".

Virtually, the curriculum adds value in shaping the competitive advantage of new program. Therefore, considering the fact, that researcher has no educational background or experience in the medical field, so, the medical experts' involvement was considered essential in the identifying the core subject

knowledge, skills and experiences for practicing medicine and being professional not only in Azerbaijan but also abroad. “The Delphi method is a forecasting process framework based on the results of multiple rounds of questionnaires sent to a panel of experts. Three rounds of questionnaires are sent out to the group of experts, and the anonymous responses are aggregated and shared with the group after each round. The experts are allowed to adjust their answers in subsequent rounds, based on how they interpret the "group response" that has been provided to them. Since multiple rounds of questions are asked and the panel is told what the group thinks as a whole, the Delphi method/technique seeks to reach the correct response through consensus” (McMillan, 2016).

In the current study, Delphi technique was used (more detailed in Appendix C), since this method is frequently used in situations where individual judgements and knowledge of professionals from the industry must be combined to complete state of the research. First and foremost, was required to select panelists. First 5 medical experts were selected through the non-probability, convenience sampling method in the local clinics and hospitals. Next 3 panelists (associate dean from Medical University and 3 researchers from Medical University) via non-probability, snowball sampling method by invitation from the interviewee (RSP1) from the potential competitor university. The rest of the experts (7) were invited by the first group of 5 panelists (snowball sampling). So, the final number of panelists was 15 (Table 1).

	Classification	N (%)
Gender	Male	10 (67)
	Female	5 (33)
Job Position	Associate Dean	1 (7)
	Researcher	2 (13)
	Gynecologist	3 (21)
	Physician/Therapist	5 (33)
	Surgeon	2 (13)
	University professor	2 (13)
	Average Age	Mean

Table 1. Characteristics of Delphi team panelists

Opinion and contribution of 15 panelists were valuable for this research. A convenience sampling (part of non-probability sampling) of Delphi team includes physicians, medical doctors, teachers of medical studies and researchers in different fields of medicine who anonymously completed questionnaires through 3 Delphi rounds.

Secondly, the questionnaires for each round were designed. Analysis of new BMD curriculum (Knowledge topics, skills, and experiences) design within ADA University School of Medicine was conducted based on the curriculum courses, skills and experiences' analysis through 3 Delphi rounds.

The first round – “*Topic generation*”.

In the first-round questionnaire was open-ended and semi-structured. Three open-,ended questions with the nominal measurement scale were designed to collect data about core knowledge, skills and experience necessary for the BMD program design. Then printed copies of the questionnaire were distributed among the 15 Delphi panelists and collated after 2 days. Generated ideas/courses, skills

and experiences were clustered into emerging themes. These themes have become inputs for the second round.

The second round – “*Rating and Weighting*”.

After identifying most frequent core subjects, skills and experiences needed to prepare BMD students and design curriculum of the new program, Delphi team was asked to rate the importance of each item and rank according to the ordinal scale principle or a 5-point Likert scale (ranging from 0-not important to 5-very important). These items rating and weighting were crucial for calculating strength scores, frequency percentage, nominations of items in the list, mean, averages, percentage endorsed scores.

The third round – “*Final categorization*”.

After ranking all the subjects by priority, Delphi panelists were given the list of top courses and asked to sort them into 3 categories according to the ordinal scale principle 3) Highly recommended 2) Partially recommended 1) Not recommended. During the third-round strength scores, frequency percentage, nominations of items in the list, mean, averages, percentage endorsed scores were calculated to identify core subjects, skills and experiences that “important”, “optional” and “not important” (see Appendix C for detailed information). So, the Delphi technique helped to identify the structure of the curriculum and necessary skills and experience that are critical for being a medical doctor or researcher in the modern world.

2.2.4 Documents and reports

Secondary data of this study was obtained via reports and statistical data from ministries, state agencies and government organizations. These documents and reports played an important role in conducted qualitative research. Besides, specific internet and online library resources were deployed to analyze the data and process it.

2.2.5 Data processing

The method for data recording and processing used by the researcher during the interviews with competitors and medical experts was note-taking and writing transcription manually on the computer. Despite it was very time-consuming process, still, it has been done to ensure a thorough analysis of obtained data.

2.3 Data analysis

Data collection periods were June 10-July 10, August 5-9 & 14-24, 2019 in Baku. The interviews along with site visits and expert interviews were conducted in person, face-to-face, while surveys were conducted remotely with the assistance of schools’ staff and faculty. In both interviews’ researcher traveled throughout the city. Initial contacts of all interviewees were taken by phone, where the researcher explained the research purpose, provided sufficient information regarding the background of the study and promise to share the results afterward.

Content analysis of the interviews, expert group interviews and surveys were scrutinized and processed via Tableau and NVivo.

Survey research

Data were entered, cleaned and analyzed using Tableau 2018.2 business intelligence platform for analytical solutions.

Site visits and interview

Content analysis of interviews was processed through NVivo 12 software, the content of interviews was analyzed via word frequencies analysis, that represents an empirical way to identify the main challenges of the market incumbent.

Structured expert interviews - Delphi technique

All data obtained during three rounds of interviews were processed via Excel MS Office program, thus identifying all core subject knowledge, skills, and experience required for integrated curriculum designing. Moreover, all required calculations of strength scores, frequency percentage, nominations of items in the list, mean, averages, percentage endorsed were done via formulas in Excel.

2.4 Reliability

When Likert-type scales are used in qualitative researches it is imperative to calculate Cronbach's alpha coefficient for internal consistency reliability for any scales might be used. Secondary data – case studies analysis showed that researchers in medical areas very frequently used Cronbach's alpha coefficient α for testing reliability. However, considering the fact, that interviews contained no questions with the answered measured via Likert scale, while the survey questionnaire was adopted on previous research of ADA University for establishing MSE program. The only data that can be used for reliability test was questionnaire and information obtained via the Delphi method. In Appendix L, Cronbach's alpha coefficient was calculated $\alpha = 0.712$. As Pallant mentioned in his research to have adequate internal reliability, the Cronbach's coefficient alpha should be above $\alpha > 0.7$ (Pallant, 2007).

According to Santos research paper, the closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. Cronbach alpha coefficient is an important concept in the evaluation of questionnaires. It is crucial to estimate the quantity to add validity and accuracy to the interpretation of data. Cronbach's alpha coefficient determines the internal consistency or average correlation of items in a survey instrument to gauge the reliability of the questionnaire. Therefore, the higher the score, the more reliable the generated scale is. Thus, Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct" (Santos, 1999).

As a result, calculations (in Appendix L) demonstrated acceptable questionnaire data reliability. To overcome validity and reliability threats during the interview and surveys, the author introduced the purpose, outlined the procedure, recapped the results and inquired in case of any questions from the interviewees and survey respondents. At the end of interviews, the author shared her interpretation of the results to get confirmation from the respondents.

2.5 Limitations

The main aim of the study was to identify the benefits of new medical school establishment for ADA University, and as every study, this research has its limitations. The points mentioned below will help to avoid the shortcomings of this research in future research.

Limitations of Survey research: The sample chosen represented only schools in Baku, however, it would be beneficial to have larger sampling including students from regions and remoted schools. Time constraints, schools' access issues, and logistical challenges hindered the process of data collection from the remoted regions.

Also, leniency in some cases (tendency to assign the high scores, due to the lack of interest in the survey results), motivation and interest of participants in filling up the questionnaire need to be considered as a limitation. The number and specifics of the questions were limited. This research results could demonstrate a bigger picture if the design of questions was more complex with more open-ended questions.

Limitations of interview: The interview's limitations were subjectivity and interpretation bias. However, to decrease the extent of subjectivity, the author chose interviewees with very extensive work experience and knowledge of the universities on both strategic and tactical levels, so the data can be considered as a reliable source of information. Interpretation bias could be partially overcome if data processing is done by software (NVivo), however, this doesn't guarantee avoidance of interpretation bias. One of the other challenges was interviews' arrangement process and contacting more people having expertise in the field of medicine from rival institutions. Only two persons agreed to participate, however, these two interviews shed light on the key strategies and main challenges that medical schools in Azerbaijan have. Therefore, data obtained during these interviews were sufficient to conduct competitor's analysis.

Limitations of the Delphi technique: this research is limited due to the number of panelists (medical experts) we could involve. All participants were locals, and no expat was involved. Delphi panelists consisted of only experts, not students, some Delphi panelists suggested adding medical students' opinion to the Delphi technique to get more expansive data, however, contacting that students were a challenge for the author.

2.6 Ethical issues

Major ethical issues faced by the author were getting informed consent from the survey and interview participants as well as from Delphi panelists. All participants were informed about the essence of the research and anonymity and confidentiality as respect for the dignity of data obtained. Moreover, following non-disclosure agreement with ADA University, the author also promised not to publicize available financial information related to ADA University except the information given in Appendix G.

2.7 Author's perspective

As a Recruitment Manager of ADA University, I have been involved in the process of market research, recruitment, outreach, and enrollment to all existing and new program/products of ADA University since 2013. My wide experience in education and research background (Ph.D. degree) allowed me to propose the new program along with the new school opening as an additional source for university academic diversification, research development, and strong brand establishment.

3. Theoretical background

In accordance with the rationale of this study and problem statement outlined above, the literature review on this topic is very limited. Mostly literature review includes business plans and university proposals on successful implementations or planning activities to launch a new School of Medicine in developed, developing and underdeveloped countries. Although the literature review covers only some concepts, the conceptual model will be used in this research to explain the key points of the project. The main concepts explored in the BCP are the following:

What is growth? Which growth strategy to choose? How to analyze rivalry level? How to measure environmental attractiveness for the new product? How to create competitive advantage and comparative advantage? What are the internal resources and competencies for competitive advantage? How strategic partnerships can add value? Which models are used in budget planning? Which medical curriculum to choose?

3.1 Growth concepts

Nowadays, in the business literature, there are different concepts analyzing ways of the company's growth. In this project, the concept of growth more intrinsic to business enterprises is extrapolated to the higher education industry, where institutions are education services providers that earn from offering services to different segments of the market. Growth is a process of company expansion in its production and consumption opportunities (Harvard Business Review, 1983).

In growth theory, there are two types of growth:

- Organic growth occurs naturally when the company's management focuses on developing operations and increasing profitability and revenue by improving efficiency internally. The cost of organic growth is minimal, and the process is much more flexible.
- Inorganic growth, by contrast, involves mergers or acquisitions. Companies often put off inorganic growth efforts until organic growth has stopped or the business has an excessive amount of cash reserves that would cover the merger or acquisition cost (Haglund, 2018).

During the period of university existence, ADA grew organically and inorganically, however, following the university's strategic plan organic way of growth is preferable for becoming a world-class university. So, this project of a new medical school establishment proposes organic growth in the form of strategic alliances and partnerships.

Alternative growth concepts

Besides the organic and inorganic growth strategies, I. Ansoff developed "Strategies for Diversification" (Ansoff, 1957) as alternatives for general growth strategies. Ansoff Matrix (Product/Market Expansion Grid invented by I. Ansoff) proposed a planning framework with four strategies for alternative growth based on product and market.

1. Market penetration. In the market penetration strategy, the organization tries to grow using its existing offerings (products and services) in existing markets. In other words, it tries to increase its market share in the current market scenario. This involves increasing market share within existing market segments.

This can be achieved by selling more products or services to established customers or by finding new customers within existing markets.

2. *Market development.* In the market development strategy, a firm tries to expand into new markets (geographies, countries, etc.) using its existing offerings and also, with minimal product/services development.

3. *Product development.* In the product development strategy, a company tries to create new products and services targeted at its existing markets to achieve growth. This involves extending the product range available to the firm's existing markets.

4. *Diversification.* In diversification, an organization tries to grow its market share by introducing new offerings in new markets. It is the riskiest strategy because both product and market development are required (Ansoff Matrix, n.d.).

In order to justify the new school opening as a way to organic growth for the university, we need to analyze the growth path of ADA University, from its inception. And as we see the following growth strategies patterns can be identified:

ADA School and ADA College launching as *market penetration* – increase sales of existing education services on the current market for higher education by increasing enrollment plan for current programs. Eventually, skills and market need alignment has been disrupted due to inadequate human capital development. So, ADA University's second move was market development that intends to introduce current service to a new market, which means expansion to a new group of students and ADA University launched ADA High School. Also, international students' number was increased owing to the government support and international scholarship programs;

Training and non-degree programs' offerings as *product diversification* entails moving to new market segments with new services. ADA University opened the Non-degree English Language program, Professional certificate programs, CPLT training, etc.;

Master of Arts in Education Management, Law, Mechanical Engineering programs' openings as *product development* means developing new courses for the same market segment. This is the most prominent and successful move made by ADA University, considering lack of growth and growing competition in the existing customer segments. The new programs were opened in IT, Business and Educational Management areas.

Considering the fact, that ADA University is a teaching university, with main focus on undergraduate programs as a source of revenue (while "research type universities" rely more on graduate programs), any type of university amalgamation mostly started with opening undergraduate programs. Government supports ADA University to pursue potential market opportunities and encourages with some programs' launching as Law, IT, ADA School. The Medical program is also in this list of government suggested programs, although university management had not decided on that yet. All new programs increase the number of students, diversify university academic profile, develop the product/service of ADA and affect revenue.

So, this project proposes to reveal potential growth opportunities by establishing ADA University School of Medicine. The new School of Medicine establishment is aligned with the "mission of ADA university to cultivate highly intellectual solution providers who are closely collaborating, efficiently communicating

members of the global community, possessing ethics and a sense of citizenship” and “vision of ADA University to be a world-class university in Azerbaijan with the excellence of research and teaching embedded into an innovative learning culture” (ADA University, 2019).

New ADA University School of Medicine can contribute to the mission and vision in various ways:

Innovative program: BMD program will combine research excellence and academic excellence.

Research Excellence: through innovation in medical science and patient care, contribution to the knowledge economy and publications;

Academic Excellence: through producing and developing new courses and programs can respond to the needs of the country, fostering a new generation of medical doctors, who possess unique qualities, social engagement, and innovation;

Innovative curriculum: BMD program will have an integrated model of curriculum, that incorporates required subject knowledge, professional skills and experience (local and international) followed by innovations.

Innovations Introduction: through constant innovations intercalation following integrated curriculum courses, blended program design, and patient care services.

Innovative alliances: Through external relations School of Medicine will build a model of innovative alliances on different levels with government, international university-partners, corporate business sector and medical hospitals, clinics, and research centers.

External Relations: through forging collaborations with international partners to develop medical programs at the undergraduate level, engaging with partners in industry, health care and engaging with society.

3.2 Case studies

New school or program establishment is a general practice in most universities around the globe. In this paper, several cases of successful school/program establishment have been reviewed to determine the general structure and identify the main challenges for ADA University School of Medicine establishment.

The most idealistic research on a new medical school establishment was proposed by R.Hays to set up a school that adopts the organizational structure of the World Federation of Medical Education. The proposed model described a combination of education design, emerging technology and a focus on future health care needs (Hays, 2018). Inspiring by his idea, I tried also to follow the guidelines of WFME in successful medical school set-up because local and international accreditation of new medical school was intended by this project. To the same token, a special interest excites K.Mahbubani by his book “Lee Kuan Yew School of Public Policy” describing the whole process of establishment and rapid growth of a Public policy school in Singapore. This book provides insights into main challenges along the way of new school opening (Mahbubani, 2012). Also, I would like to stress the importance of advantages and benefits of new medical schools in the era of innovations and technological advancements stated in the articles of H.Hamdy (Hamdy, 2018), H.Jason (Jason, 2018), M.Wilkes (Wilkes, 2018). Another group of researchers R.Grant and N. Vapiwala (Grant, R. & Vapiwala, N., 2018) elaborated on the idea of importance to open more medical schools to meet the market demand and produce more physicians

due to the increase in world population. On the way to set up a new medical school R.Harden highlights ten key features in the medical school of the future, and some of them were used in this BCP (Harden, 2019). Davis proposes a new medical school model “without walls”, reflecting curriculum revamping as one of the key factors (Davis, 2018).

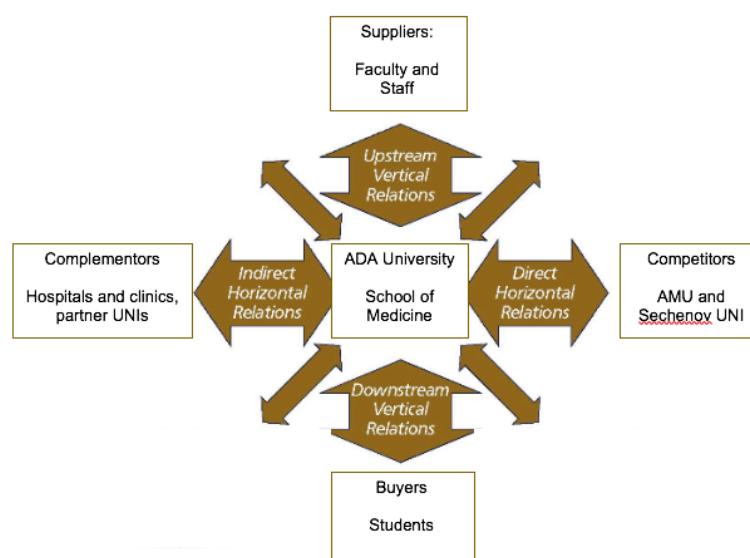
I would also like to stress the importance of key papers of W.Flexner and E.Berkowitz that helped me in the analysis of the general state of medical schools and navigated through the whole research process (Flexner, 1910). Some connotations and concepts were adopted from J.Salmi (Salmi, J., 2009) and A.Usher (Usher, 2016) works on world-class universities establishment.

More practical implementation of new medical schools opening was reviewed in the proposals of establishing a new medical school in Tohoku (Japan), Texas (USA), Manitoba (Canada), Saudi Arabia, Doha, Rhodesia, Israel, Croatia, UK, Iran, Iraq, Libya, Nigeria, etc.

All the narrative could shed light on the common challenges and opened a way to critical analysis of the process for new school set up.

3.3 Strategic alliances

The term “alliance” is broad and encompasses different variations. First, one can make a distinction between dyadic and multi-partner alliances. The former contains two partners, while multi-partner alliances contain more than two partners. Both are relevant objects to study. As most alliances are dyadic (Das, 2002), studying two-partner alliances is most relevant for real-life situations. Secondly, strategic alliances can be horizontal and vertical. The difference relates to the kind of stakeholders a firm ally with. While vertical alliance simply buyer-supplier alliances, horizontal alliances are relationships among firms in the same industry (Bucklin, 1993). In horizontal alliances, firms cooperate with their competitors and complementors (Bloch, 2002). This kind of ‘coopetition’ (Nalebuff, 1996) makes alliances both interesting and complex to study.



Pic. 1 SEPT framework: The entity and its web of relational actors,
Source: Adopted from Strategy Synthesis book for ADA University School of Medicine

From the picture above, we can observe the main categories of relationships between the university and its industry parties. Upstream vertical (supplier) relations, Downstream vertical (buyer) relations, Direct horizontal (industry insider) relations, Indirect horizontal (industry outsider) relations (Wit, 2014). Strategic alliances are formal arrangements between two or more independent organizations to achieve shared or compatible goals (Lewis, 2017). To build a sustainable and efficient model of strategic alliance, the entity should emphasize three key elements for successful collaboration:

Compatibility. As medical school and teaching hospital faculty and administrators continue to explore local, national, and international alliances to add value, enhance mission, and ensure survival, they would do well to learn from and build upon the experiences of organizations in other sectors as well as their colleagues who have already peddled down those paths (Mallon, 2017).

The most crucial element is compatibility on an organizational, cultural and structural level, when partners can get along with each other, to understand and respect others' cultures and values (Harvard Business Review, 1994). Compatibility issues are rooted in the "cornerstone of strategic partnership success" – trust (Spekman R., 2017).

Trust is a sine qua non for the successful collaboration between the partners. In case of trust between partners, this alliance remains intact and prone to produce value benefitting both parties. "Interorganizational trust also reduces the perception of opportunistic behavior—that the other partner is just waiting to pounce" (Sussman, 2005). Pouncing comes from the lack of communication between the partners.

Communication in a proper way is a path towards a successful collaboration. Poor communication on different levels can bring the alliance to failure, while good communication skills and using appropriate channels, knowledge of cultural and business etiquette can bring desired outcomes from any strategic partnership (Alliances: Beyond Organic Growth, 2016).

Most literature discusses strategic alliances based on five main theories:

1. Transaction cost economics – the main principle is acquiring assets and minimize costs (Hennart, 1988);
2. Resource-based theory poses that there is a relation between the resources of a firm and its performance. What a firm possesses or has access to determines what it accomplishes (Porter, 1985);
3. Strategic behavior theory explains alliances formation as an act to improve the company's competitive position vis-a-vis its rivals (Kogut, 1988);
4. Game theory - is a theoretical framework for conceiving social situations among competing players (Neumann, 1944).

To design a successful model of effective partnerships, we need to consider abovementioned theories. Out of four main strategies, we will use the resource-based theory. This theory derives from the fact, that any organization is a bundle of resources and capabilities. Resources are all assets, capabilities, processes, information, and knowledge controlled by the organization and are a potential source of competitive advantage. Degree of competitive advantage depends on how valuable and rare are these resources (Barney, 2001). This theory is usually adopted to design new models of alliances that add value and enhance the competitive advantage of the organization. The choice can be explained by the

necessity to acquire required assets, minimize costs and leverage resources to achieve competitive resource profile (resource-specific theory). K. Eisenhardt mentioned that in order to achieve the desired resource profile, an alliance is the best option of certain intangible resources are needed since it is hard to produce them internally within a given period and if these resources are complementary to company's resources (Eisenhardt, 1996). Capabilities are location- and person- related, the alliance gives the organization access to other firm's resources. Based on this theory, ADA University's new school can benefit from alliance to leverage resources, integrate activities and align positions in the market. Complementary alliance strategy will help the School of Medicine to take advantage of the partnerships, that can contribute assets and skills to the school operations (Picture 2). International partner-universities can raise ADA brand awareness in new geographic markets, government relations can help to raise funds, collaborations with teaching hospitals will bring necessary competencies and experiences.



Pic. 2 Proposed schemas of strategic relationships between new ADA University School of Medicine and its partners (developed by the author)

ADA University School of Medicine will build: *Efficiency alliances* with teaching hospitals and clinics will leverage resources and *Resource driven alliances* between the university and its complementors (international partner institutions).

In a highly competitive market of higher education, forging partnerships has become a necessity for service differentiation and sustainability. Value creation through offering new service is dependent on the University's capacity. However, when University is newly established and is not yet internationally accredited – choosing the right strategic partner is a pivotal decision in terms of brand awareness, recruitment, and long-term success. Every partner adds value to the program and enhances the competitive advantage of ADA University, some partnerships developed the curriculum and program of study, while others reduce the financial burden.

Strategic partnerships and alliances have been always in the DNA of most universities and schools. Since its inception, the establishment of the new program at ADA University has been accompanied by forging a new strategic alliance with public/corporate ally or another university. In 2011 ADA University merged with the Information Technologies University to establish a new school at ADA – School of Information Technologies and Engineering. In 2013 ADA University and Madison College, USA launched a Master of Arts in Educational Management program (MAEM). In 2014 ADA and MSM signed

an agreement about launching a joint academic program – Executive MBA. As of 2019 ADA and Duke have started a new dual degree Leadership in Management program. As of 2020 new alliance with George Washington University will give a start to the new Master program in Electrical Engineering. Another partner – MGIMO University (Moscow State Institute of International Relations) starts its cooperation with ADA as of January 2020.

Strategic alliances and collaborations are an integral part of ADA university strategy. ADA's partnerships with government, high schools, corporate entities, and other institutions can be divided into 3 types:

1. State-to-University type of partnership refers to organizing short-term trainings and workshops for government and ministries' employees by ADA University; this type of partnership helps ADA University to deliver its mission in other underdeveloped regions, to train government employees, to improve town-gown relationships, to increase awareness and maintain government support. On the other hand, government, ministries, state agencies utilize ADA's facilities and use ADA's "people resources", expertise and accrue their benefits.

State-to-University alliance help to build financial strength and enhance strategic growth. ADA University School of Medicine will have collaborative arrangements in the form of contractual agreements with the Ministry of Health and Ministry of Education to maintain continuous state funding and stability in future. Moreover, new medical school will drive innovation and technology-driven economic growth in the country by improving quality of health care services and training health workforce that meets the need of the country. In addition, collaborating with the Ministry of Education gives a golden opportunity to all students of ADA University School of Medicine to opt for long-term or short-term medical programs abroad. Student and group of students will get a chance to study abroad, to gain knowledge and experience required for a medical specialty. Based on agreements and following program curriculum students can acquire research or practical elements of their studies in partner universities abroad. This will be regulated and fully funded by the Ministry of Education of Azerbaijan within the "Study Abroad" program offered for medical students only.

2. Business-to-University type of partnership that helps to solve corporate problems in the form of Capstone projects undertaken by fresh graduates, thus bringing innovation and leading to change. Faculty and students can get a practical experience and better opportunities for research; whereas companies can get a "fresh and critical look" from outside and ample entrepreneurial ideas from students and faculty. Additionally, we can refer to the establishment of the first Big Data, "ADA University Data Sciences Instruction and Research Center" in Azerbaijan with partnering BP Company, that adds value to ADA University School of Information Technologies and Engineering. In some cases, both options create partnerships with new sources of philanthropic support. But the third one is purely profit-driven.

Business-to-University alliance refers to collaboration with Azerbaijani teaching hospitals and clinics to maintain students' experience in both local and international medical centers and clinics: The National Ophthalmology Center named after the Academician Zarifa Aliyeva, National Center of Oncology, Topchubashov Scientific Surgery Center, Eyvazov Scientific Research Institute of Hematology and

Transfusion, Central clinic hospital, City clinic hospital, Association of Forensic Medicine and Pathological Anatomy, Scientific Research Institute of Obstetrics and Gynecology, Farajov Scientific Research Institute of Pediatrics, Republican Neurosurgical Hospital, Scientific Research Institute of Lung Diseases, Central Hospital of Oil workers, Republican Clinical Urological Hospital, Scientific Research Institute of Cardiology, Institute of Traumatology and Orthopedics, Endocrinology center, Narcology center, Republic Hygiene and Epidemiology Center, Children's Clinical Hospital, Central Clinic, Center Diagnostic Center, Republican Psychiatric Hospital, Clinic for Venereal and Skin diseases, Baku State clinic hospital, Center for Public Health and Reforms, Children's Neurological Hospital, Mental Health Center, Baku Health Center, MediClub hospital, National Institute of Sports Medicine and Rehabilitation. All medical students can get a chance to have medical practice (local component) in these clinics and hospitals.

Moreover, students can pursue their residency and Ph.D. programs at these clinics, governed by ADA University School of Medicine. Contractual agreements will be put in place for the appropriate resources to be made available for new medical school students and fulfill the commitment to provide a high quality of medical education in Azerbaijan. For ADA University School of Medicine, this will be low-cost activities.

This type of alliance will help to develop the program's local practical components (clerkship, internship, residency, Ph.D., hands-on experience, and observership) and foster research in different areas of medicine. While the consortia/agreement with foreign universities helps to develop the program's international practical component.

3. Consortia/Agreement with foreign universities is a very specific type of partnership that involves other university partners. At ADA partner institutions are divided internally to "program supporters" and "student exchange facilitators".

Consortia/Agreement will add value to the new product by maintaining innovative partnerships *partnering with international universities* and leveraging resources and integrating activities. This kind of contractual agreements includes dual degree program opportunities, faculty exchange programs, student exchange programs, study visits, experience and practice, clerkship, observership programs, hands-on experience, residency program, etc. Currently, ADA University has contractual agreements in the form of Memorandum of Understandings (MoU) regarding student and staff exchange programs with more than 100 foreign universities in 63 countries, and 80 of them have BMD degree program. Hence, to partner with some of them and send students and staff for one or two semesters, for clerkship period or residency preserving cost-efficiency. Having so many foreign partners will help to diversify the program and give students a choice to select the most suitable university under their area or chosen specialty. Consortia will serve to the internationalization purposes and resource leveraging. These opportunities will help medical school students achieve the goal of becoming true global citizens, which is embraced aim of internationalization at ADA University. In this regard, the School of Medicine could position and market itself as the school with an internationally accredited program, a unique integrated curriculum, distinguished faculty, and various student experience. Benefits of ADA University partnerships brought to ADA students' scholarships (Ministry of Health and Ministry of Education),

employment after graduation (teaching hospitals), accredited diplomas (international accreditation organizations), exchange opportunities and international component (Partner Universities abroad).

As a result, all types of strategic alliances of ADA University enhance reputation, build synergy and also serve the needs of the country. For the new School of Medicine, strategic partnerships are the way to improve quality, increase efficiency, develop the program content and curriculum, increase brand awareness and diversity. Alliances and collaborations can provide economies of scale. Recently, ADA University tries to develop collaborative agreements among its partners to increase program efficacy, improve outcomes and boost enrollment.

To conclude this chapter, I can restate my idea that strategic partnerships and alliance is proposed for optimizing cost, efficiency, and competitiveness of a resource profile, acquiring resources efficiently, gaining optimal strategic position. ADA University School of Medicine with its partnerships will become the springboard for the future economic development of Azerbaijan.

3.4 Conceptual model

The conceptual model is based on the major research question: *What would be the benefits of the new School of Medicine establishment for ADA University?* and literature reviewed in Chapter 2. So, developed conceptual model illustrates three groups of innovative developments called 3 “I”s as a result of ADA University School of Medicine establishment. This 3 “I”s model consists of Innovative program, Innovative curriculum, and Innovative alliances.

Innovative program: BMD program will combine research excellence and academic excellence.

Research Excellence: through innovation in medical science and patient care, contribution to the knowledge economy and publications;

Academic Excellence: through producing and developing new courses and programs that are responsive to the needs of the country, fostering a new generation of medical doctors, who possess unique qualities, social engagement and innovation.

Research attainment in Azerbaijan

1. The WFME global standards underline, that “the medical school must have a policy that fosters the relationship between research and education” (WFME, 2017). As a goal for medical program quality development, its interaction between research and education activities should be reflected in the curriculum and influence current teaching and should encourage and prepare students to engagements in medical research and development (Quality Assurance Task, 2007). Research fostering and innovations intercalation through innovation in medical science and patient care, contribution to the knowledge economy and publications is essential. Medical education traditionally rests on the “three-legged stool” of research, education, and service. Hence medical students are sometimes referred to as “triple-threat academicians” (Alpert, 1998). School of Medicine will create a culture of research and innovation in medicine and health care. As a matter of fact, medical research reveals many of the problems associated with other areas of society - social, political, religious and cultural. Association for the Study of Medical Education (ASME) has focused on the contribution of medical schools as research hubs towards improving the quality of research in medical education (ASME, 2003). Medical School can contribute to the medical research narratives by innovation intercalation, development of new

approaches to treatment, diagnosis, and prophylactics. Also, it can contribute by scrutinizing and evaluating results of the research published in peer-reviewed journals, medical publications as Medical Teacher, Medical Education, Academic Medicine, Advances in Health Science Education and Education for Health. Azerbaijan has 3% scientific impact on medical research publications (Thompson, 2018), which is extremely low. Therefore, the more research tradition will be fostered, the more research output university can get from the BMD. Eventually, the medical research development will affect increase in multidisciplinary and cross-disciplinary research, that will enrich the whole university building image and reputation of ADA University as a research institution (Salmi, J., 2009).

In general, research in Azerbaijan is separated from education and concentrated in the Azerbaijan National Academy of Sciences, that consists of around 60 academic institutes and 10 research centers with 10 000 scientific workers (ANAS, 2018). In medical education in Azerbaijan this separation is explicit. All medicine-related research is fully concentrated in Azerbaijan Medical University, which is the only Ph.D. program provider in our country. All medical universities' task is teaching theory during the undergraduate period and practice during residency, research starts only on the Ph.D. level.

The current system of medical science and education in the country has been centralized under control of the Ministry of Health. All medical educational institutions are state agencies whose activities are determined and regulated by state structures, in particular, the Ministry of Health (Mammadov, 2016). Therefore, the initial actions of the newly established School of Medicine should be achieving its program accreditation by the Ministry of Health and Ministry of Education of Azerbaijan.

Furthermore, with the new accredited medical program, that will incorporate research component into integrated program curriculum ADA University can fulfill its vision to become a world-class university in Azerbaijan with the excellence of teaching and research and proceed further with international accreditation and recognition.

Innovative curriculum: BMD program will have an integrated model of curriculum, that incorporates required subject knowledge, professional skills and experience (local and international) followed by innovations. The Integrated curriculum, an education that is organized in such a way that it cuts across subject-matter lines, bringing together various aspects of the curriculum into the meaningful association to focus upon broad areas of study (Shoemaker, 1989).

- Horizontal integrations defined as integration across disciplines but within a finite period. One example, which combined first-year courses in anatomy, physiology, biochemistry, and neurobiology, took two years to design and implement but, by diminishing redundancy in content and examinations, students reported more time for independent study and greater satisfaction with their education (Klement, 2011);
- Vertical integration represents integration across time, attempting to improve education by disrupting the traditional barrier between the basic and clinical sciences. A student begins his or her education with mostly, but not entirely, basic science education and progresses through all years of a curriculum to finish with mostly, but not entirely, clinical science education. Benefits of this model are attributed to earlier clinical exposure, which increases student confidence in selecting a future specialty and improves perceived preparation for post-graduate training (Wijnen-Meijer, 2010);

- Spiral integration. Integration in its most ideal form might then represent a combination of both horizontal and vertical integration, uniting integration across time and disciplines (Bandiera, 2013). The Integrated medical curriculum is accepted by “The International Standards for Accreditation of Medical Education Programs Leading to the BM degree” by the LCME (Leading Committee for Medical Education) adopted worldwide by most top-ranking universities. Therefore, ADA School of Medicine will be the first medical school in Azerbaijan applied this type of curriculum along with medical innovations introduction.

Innovations Introduction: through constant innovations intercalation following integrated curriculum courses, blended program design, and patient care services.

To design the new curriculum of ADA University School of Medicine would be helpful to revise “The International Standards for Accreditation of Medical Education Programs Leading to the BM degree” by the LCME (Leading Committee for Medical Education) where key areas of medical curriculum are determined and elaborated in the research of Irby and Cooke. The key elements of this new curriculum include the following:

- biomedical, behavioral, and socioeconomic sciences to support medical students' mastery of contemporary scientific knowledge and concepts and the methods fundamental to applying them to the health of individuals and populations;
- content and clinical experiences related to each organ system; each phase of the human life cycle; continuity of care; and preventive, acute, chronic, rehabilitative, end-of-life, and primary care in order to prepare students to recognize wellness, determinants of health, and opportunities for health promotion and disease prevention, to interpret symptoms and signs of disease, to develop differential diagnoses and treatment plans, to recognize the potential health-related impact on patients of behavioral and socioeconomic factors, to assist patients in addressing health-related issues involving all organ systems;
- instruction in the scientific method (including hands-on or simulated exercises in which medical students collect or use data to test and/or verify hypotheses or address questions about biomedical phenomena) and in the basic scientific and ethical principles of clinical and translational research (including the ways in which such research is conducted, evaluated, explained to patients, and applied to patient care);
- fundamental principles of medicine provide opportunities for medical students to acquire skills of critical judgment based on evidence and experience, and develops medical students' ability to use those principles and skills effectively in solving problems of health and disease;
- instruction in the diagnosis, prevention, appropriate reporting, and treatment of the medical consequences of common societal problems;
- opportunities for medical students to learn to recognize and appropriately address gender and cultural biases in themselves, in others, and the health care delivery process;
- instruction for medical students in medical ethics and human values both before and during their participation in patient care activities and requires its medical students to behave ethically in caring for patients and in relating to patients' families and others involved in patient care;

- specific instruction in communication skills as they relate to communication with patients and their families, colleagues, and other health professionals;
- preparation of medical students to function collaboratively on health care teams that include health professionals from other disciplines as they provide coordinated services to patients. These curricular experiences include practitioners and/or students from the other health profession (Irby, Cooke, O'Brian, 2010).

Innovative alliances: In today's world many universities are partnering with other institutions and design blended program using revenue share agreements that minimize risk to the parent university. So, partnership and strategic alliances are essential for ADA University to maintain sustainable product/service development. School of Medicine will use partnerships with universities abroad, ministry of education and organizations, so students will benefit from unique international experience during their studies, clerkship, and residency. It will reduce the financial burden of the new school and creates more education and career opportunities for students. The framework of the strategic partnerships will be designed according to the exchange practice of ADA University Undergraduate programs, clerkship and residencies will be fully-funded by the ministries, future career options will be provided by the collaborations with hospitals, clinics, and medical centers.

Through external relations School of Medicine will build a model of innovative alliances on different levels with government, international university-partners, corporate business sector and medical hospitals, clinics, and research centers. The process of leveraging resources, integrating activities and aligning positions of the partners is the key of successful program establishment.

The establishment of the medical school can be seen as a response to various pressures, expectations, and changes in society, education, and medicine. These pressures include increased public expectations relating to health care, which place increasing demands on healthcare professionals; societal trends towards increased accountability; educational developments that call for increased sophistication on the part of teachers in the health professions; the increased scope of and specialization within medicine that focus attention on what to teach and how to educate doctors; and the need to train more doctors within existing resources (Margery, 2005). For ADA University School of Medicine establishment is an implementation of product development strategy to increase enrollment number, facilitate research and innovations, acquire new market segment and build the brand of ADA as a world-class university with diverse program scope.

To sum up, the developed product of ADA – BMD program will be the core product/service, actual product will be unique student experience, the augmented product will be employability and competitiveness of Azerbaijani graduates in the international medical labor market.

4. Market and industry analysis

“Town must meet gown” (Akinkugbe, 1993) this quote will introduce Chapter 4, that elaborates on market and industry analysis.

The process of establishing a new school requires a thorough analysis of the industry. This, in turn, would help to determine a current situation in the market and justify the need for opening the new medical school.

According to the research presented by Karle, the optimal number of medical schools in any specific country will depend not only on population size and the status of the health care system, but also on population density and need for coverage of rural as well as urban areas. There might be reasons for deviations from a consensus on the optimal value, which could be estimated to be around one medical school per 1.5–2 million inhabitants (Karle, 2010). Therefore, for Azerbaijan with an estimated population of 10.05 million (2019), the optimal number of medical schools can be increased by five. However, it can be difficult to define the optimal size of a medical school measured by the number of students or graduates, but a fair estimate would be 200–300 graduates per year within an acceptable range of 200–500 (Karle, 2010). The new school will produce around 200-220 students in the first year (Enrolment and tuition model in Appendix G).

4.1 Market estimation

To launch a new program successfully, it is important to estimate market potential. In order to reckon new medical school’s potential, we will go through five steps: calculate the market size, determine market growth rate and identify the buyer type. The market potential is the total demand for a product in a given business environment (Miller, 2017). On the initial stage of market potential estimation is market size calculation. As shown in Table 2 (below) market size 3,720.000 AZN (annual total tuition paid by the admitted students) of all undergraduate students, studying BMD program at local universities. Next, we need to determine the market growth rate (Chart 1)

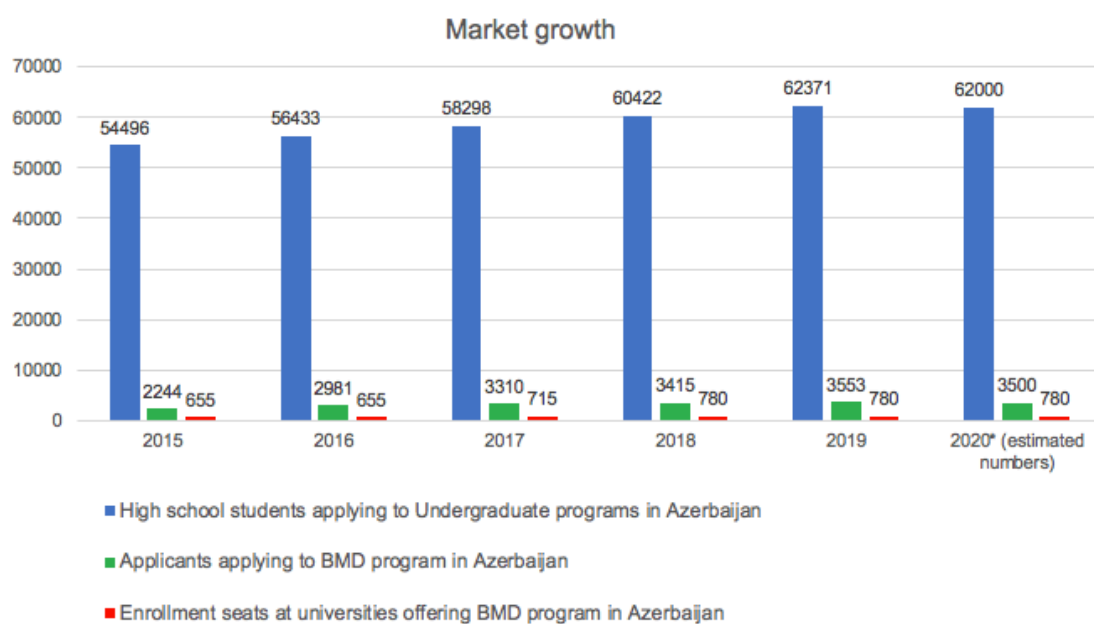


Chart 1. Market growth (developed by research) Source: Abiturient journal 2018

As we see from the chart above, the ongoing trend in the market for uptrend at the approximate 3.4% average increase rate. Once the trend is analyzed, we can calculate the cost and approximate revenue by establishing the cost of education for the new BMD program and minimum enrollment seats (Table 2). Secondary data provide with the necessary information for potential market estimation. In the special edition of Abiturient journal by the State Examination Center of Azerbaijan, all the numbers are given.

University name	# of enrollment seats	Annual tuition (AZN)	Market size (AZN)
Nakhichevan State University	55	4000	220,000
Baku branch of I. M. Sechenov First Moscow State Medical University	125	5000	500,000
Azerbaijan Medical University	600	5000	3,000,000
Available in the market		2420 students interested in applying to BMD	

Table 2. Market size of competitors (collected by researcher) Source: Abiturient journal 2018

Therefore, in 2020 out of 85,000 expected high school graduates 62,000 is expected to apply for Bachelor degree. The total market opportunity is around 3,500 students. However, local Medical universities can admit only 780 of them due to the limited enrollment capacity. As a result, the total addressable market is around 2,700 students interested in Medical programs who will apply to other medical majors in Azerbaijan or go to study abroad BMD abroad. Annual statistics shows that around 300 high school students apply to BMD degree at universities in Turkey, Germany, Russia, USA, UK, and Canada. So, we can estimate market potential or BMD program at ADA University School of Medicine (Chart 6 in Appendix F).

Meanwhile, we can also reckon the market share of our competitors (Chart 2) based on their enrolment and tuition figures and we will observe the 21% has AMU, 3% has Baku Branch of FMU named after Sechenov and only 1% has Nakhichevan University.

Market share of Bachelor in Medicine program providers

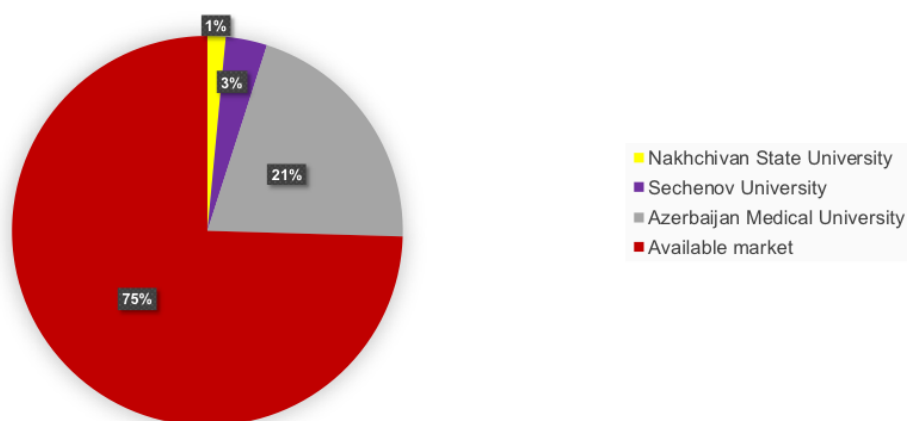


Chart 2. Market share of BMD program providers

Source: Developed by researcher according to available data from Abiturient journal, 2018.

Comparing all our findings with the decrease in the number of physicians per 10000 population in the country (diagram below), we can firmly restate our idea, stated at the beginning that ADA University School of Medicine would serve the need of the country and produce more qualified medical doctors (Appendix E).

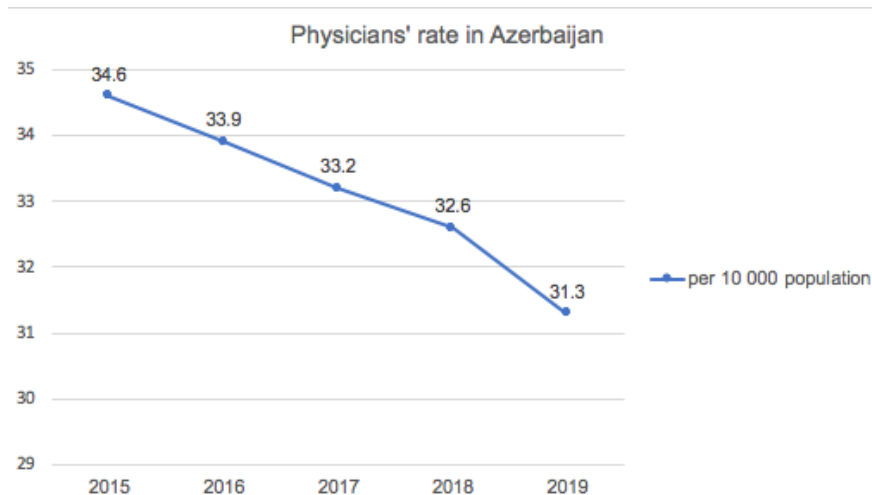


Chart 3. Physician rate in Azerbaijan

Once the market potential is estimated, ADA University School of Medicine will design its market positioning strategy and marketing mix.

4.2 PESTEL

PESTEL is macro environmental analysis is based on three stages: situation and environment analysis, strategy formulation and implementation (Aaker, Day, & Kumar, 2002). PESTEL stands for Political, Economic, Social, Technological, Environmental and Legal factors affecting macroenvironment of ADA University School of Medicine operations. All the factors give an overview of the target market of medical education. PESTEL analysis is critical to understand the external threats & opportunities arising because of the macro environment developments. Changes in macro environment forces can impact the industry attractiveness. Thus, significantly impacting the ability of the new program to build sustainable competitive advantage in the market (Harvard Business Review, 1995).

The macroenvironmental analysis includes PESTEL tool that helps to determine environmental factors that might impact new medical school positively or negatively.

Political

The political system is stable with consistency in economic and foreign policies. Azerbaijan has a low probability of entering into an open armed conflict with Armenia because of Nagorno-Karabakh

occupation. Political responsibilities are segregated between different government agencies. The country has a good record of adhering to local and international treaties;

Economic

Azerbaijan's Inequality Index / Ranking on the Gini Index is 31, fluctuating inflation rate (3%-5%) (Azerbaijan State Statistical committee, 2017). Economic development and increase in international investments create more economic opportunities for medical school to get state funding (the more GDP increase, the more budget government allocates for health care and medicine); Economic factors as low unemployment rate can make faculty recruitment process more challenging, while high unemployment may have an opposite effect and lead to hiring skillful faculty and staff at lower cost. Tuition fees may fluctuate in case of currency devaluation, thus affecting enrollment numbers, international faculty recruitment issues and income of Azerbaijani population.

Social

Customers buying process and behavior patterns play a significant role in analysis of market segments, Demographic shift and increase in population in the country is also positive trend for medical school, State Insurance program and social benefits are available for people of all ages, gender composition in the market of medical education is unequal (mostly female).

Social factor has a critical role in the future labor market orientation. As soon as the government starts State Insurance program (2020) the need for physicians and qualitative health care will increase dramatically.

Technological

Technological advancements, artificial intelligence, and machine learning transform the environment for School of Medicine, Big Data and innovative methods of ailment and diagnosis will affect processes of the new school, Increasing investments in research and development capacity of Azerbaijan. Technological factors need to be considered based on the fact, that artificial intelligence and technological advancements can serve as a driving force for adding value to value-chain operations, for instance, using innovations in diagnostical, testing and treatment processes. To the same token, technological factors affect teaching and learning processes at new medical school, by implementing simulations and live observations of surgeries and other medical procedures.

Environmental

CSR has gained popularity in the country, so CSR activities may impact brand and image of the school, however, environmental issues (for instance, deforestation during the new corpuses building) can increase some costs of new medical school, which in turn may affect the reputation of ADA University. Environmental sustainability is also critical in market positioning and new school of Medicine may use environmental issues to adjust its financial and social performance.

Legal

Medical ethics and legal regulations of medical complaints can be threats, creating at the same time opportunities for the development of some Law-related medical program courses of ADA University. Established procedure for health and safety laws during the process of learning and teaching in medical school is essential. Legal factors affect some organizational matters of the new school, related to the

discrimination, patronage and nepotism issues, recruitment and job openings for international and local nationals, equal opportunities for everyone, inclusiveness, etc.

4.3 Industry rivalry analysis: Porter's Five forces

Porter's Five forces are a tool for analyzing competition level and attractiveness of an industry in terms of its profitability. Porter's five forces include three forces from "horizontal" competition - the threat of substitute products or services, the threat of established rivals, and the threat of new entrants - and two others from "vertical" competition - the bargaining power of suppliers and the bargaining power of customers (Porter, M: Harvard Business Review, 1979). This tool will help to understand the industry and shape the strategy of the new ADA University School of Medicine.

With its aging population of about 10 million, the country is confronted with an unsaturated demand for medical doctors (Statistics, Health Nutrition and Population, 2017). The number of doctors per capita has fallen most rapidly in the last 10 years – and there has been a significant reduction in the number of nurses per capita. Countrywide there is a shortfall in the number of physicians per 10 000 population and the downtrend (see Appendix E) (Azerbaijan State Statistical committee, 2017).

Currently, only three universities in Azerbaijan offer BMD program in the market for medical education: Azerbaijan Medical University, Nakhichevan State University in the Nakhichevan Autonomous Republic and the Baku branch of I. M. Sechenov First Moscow State Medical University. Several unlicensed private medical schools established 10 years ago tried to gain the market share, but by the decree of the Ministry of Education, they were closed in 2006. Based on the statistical data and information published by the State Examination Center and Ministry of Health we can measure the current market share of our rivals and observe the trend in demand and supply of medical education in the market. In addition, we can measure the rivalry level and identify the type of market competition, competitors' strategy and main challenges.

The current market structure allows us to conclude that type of competition is oligopoly with 2 main competitors in Baku: Medical University and Baku branch of I. M. Sechenov First Moscow State Medical University (Nakhichevan State University with very little enrollment seats in Nakhichevan city). The Five forces along with Pentagonal tool demonstrates market competition forces below.

Entry Barriers are high:

State regulations: Government regulates the supply of physicians in the market. The university and program standards are set by the Ministry of Health and the Cabinet of Ministers to protect market incumbents and reduce the number of "amateur" institutions to enter the market of medical degree program providers. In July 2009, the government endorsed a new law on medical education. The new concept for medical education should be based on the European model and include features such as residency programs (World Health Organization Report, 2018). Nevertheless, the whole cycle for obtaining BMD program diploma and becoming a doctor requires 8 years of UG education (4 years of Academic program + 4 years of Residency program). Not every university has the facility, equipment and academic capacity for establishing and maintaining the whole cycle of BMD program. The lack of high qualitative and professional doctors can facilitate the process of entering the market for medical education by new players. The planning of health personnel is conducted by the Department of Human

Resources, Education and Science in the Ministry of Health. The department collects and analyses data on vacancies in health facilities in the public sector. Based on the aggregated data, the Ministry of Health sends a request to the Azerbaijan Medical University, which is the only medical school in Azerbaijan. In accordance with the request, the university allocates graduates to various specialty residency programs and internships (World Health Organization Report, 2018).

The threat of new entrants is low due to the barriers

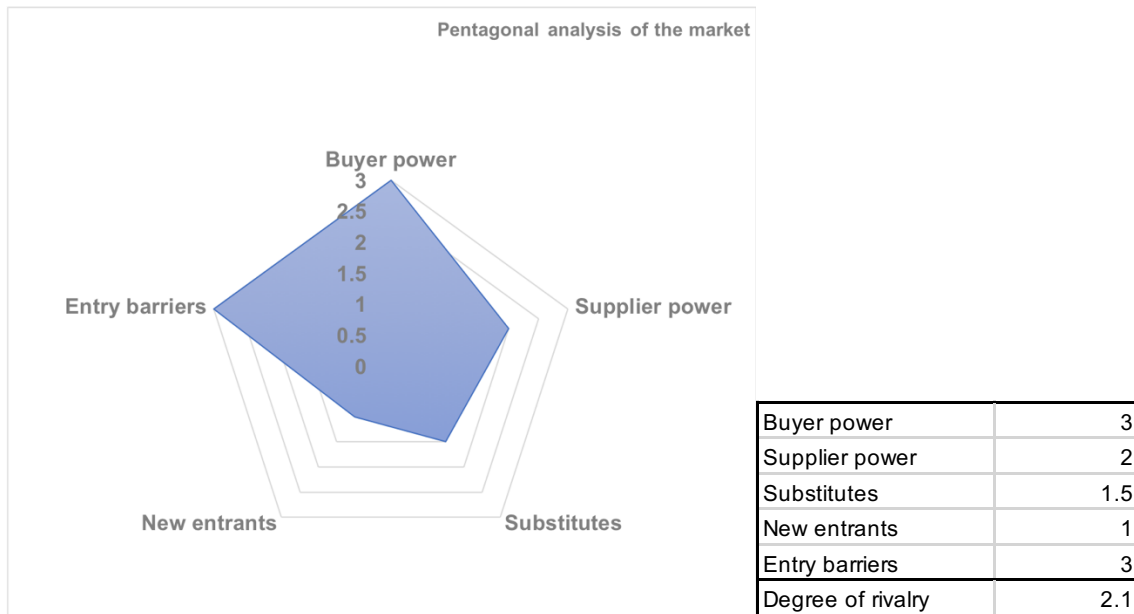
The threat of Service Substitution is low: There is no other substitute for the BMD program in Azerbaijan, except 3 market incumbents. If the applicant could not get admission to one of the medical degrees offered universities in Azerbaijan they have only 1 option – to study abroad which is a financial-resource consuming process and is available only for high-income families. Not every family can afford to study medicine and cover the tuition cost even in neighboring countries (Russia, Iran, Turkey, Georgia, etc.). Hence, uniqueness of service offered by the medical universities decreases the threat of substitutes that are functionally equivalent to the desired BMD diploma in the local market (World Health Organization Report, 2018). The switching cost for customers is low due to the low number of direct/indirect alternatives for medical education in the country.

Bargaining Power of Buyers is high:

Since the service offered is unique and available medical universities implement their generic strategies, that adds value and affect competitive advantage. In case of cheap and available options, full scholarships or funding for studying medicine abroad, applicants may switch to other substitutes. Therefore, the bargaining power of buyers (potential students) is high. ADA University School of Medicine could maintain good customer service to build strong relationships and to strengthen customers' brand loyalty by adding differentiation factors to its service

Bargaining Power of Suppliers is very moderate:

Suppliers are qualified and experienced faculty members. The quality of faculty is very important. Considering the peculiar market structure – oligopoly and only 2 dominant suppliers (medical universities) with great control and power, experienced faculty members and practitioners have moderate bargaining power because the medical school can switch to another local or international supplier.



Pic. 3 Pentagonal graph of Porter's five forces for ADA University School of Medicine (developed by the author)

According to the conducted Porter's Five forces analysis and its reflection in Pentagonal graph (Picture 3), we can conclude that *Industry rivalry* is moderate/medium, due to the oligopoly type of competition, low switching costs for buyers, high buyer power, high entry barriers, and medium supplier power. This forces ADA University School of Medicine to differentiate its product/service from the one offered by competitors.

As a result, we can conclude that:

- The level of rivalry is moderate/medium (calculated rivalry level is 2.1 from the Picture 3, where 3 is high, 2 is moderate, 1 is low), entering the marketing might be challenging, however, government support can ease for ADA University School of Medicine the process of overcoming the entry barriers. The Ministry of Health of Azerbaijan grants a license to practice medicine after graduation from Azerbaijani medical universities and there is a statutory medical licensing examination, so ADA as a public university needs to go through the process of local program accreditation at the Ministry of Health and Ministry of Education with the process of BMD program registration to provide students with locally accredited diplomas (World Health Organization Report, 2018);
- Service differentiation and having BMD program in English following internationally recognized higher education standards (what always distinguishes ADA University) can help to garner significant market share;
- Market competition is low since BMD program and medium of English will be "blue ocean strategy" for ADA University School of Medicine and will strengthen ADA customer loyalty. Generally, ADA University will be able to transform the market of BMD programs in Azerbaijan.

4.4 Internal analysis of resources and competencies

4.4.1 VRIO

VRIO is an acronym that stands for Valuable resources, Rareness of these resources, Inimitability for competitors, and Organizational Competence and Support to maintain these resources. This tool identifies the major resources of the company for competitive advantage. By this core capacity utilization, the company can identify its competitive distinction and advantage over other market incumbents.

The conceptual model suggested for this project is based on the internal analysis of the resources and capabilities of the new program. VRIO analysis helped to identify key resources and capabilities of ADA School of Medicine for competitive advantage. Based on VRIO tool we could group the key resources and capabilities of medical program that maintain three types of competitive advantages:

- Sustainable competitive advantage ensured by valuable, rare resources and capabilities that have organizational support: corporate culture, the human capital of university (faculty and staff);
- Temporary competitive advantage, ensured by valuable resources and capabilities that have organizational support: financial resources, international environment, and diversity.
- Strong competitive advantage is maintained by valuable, rare, inimitable resources and capabilities with organizational support: innovation intercalation to learning and teaching process, integrated curriculum, international experience, unique program, BMD program in English, unique student experience and career development opportunities worldwide.

Resource/Capability	V	R	I	O	Impact of competitive advantage
Financial resources	✓			✓	Temporary competitive advantage
International environment and diversity	✓			✓	Temporary competitive advantage
Student activities	✓			✓	Sustainable competitive advantage
Corporate Culture	✓	✓		✓	Sustainable competitive advantage
Faculty and staff	✓	✓		✓	Sustainable competitive advantage
Innovation intercalation to teaching & learning process	✓	✓	✓	✓	Strong competitive advantage
Integrated curriculum	✓	✓	✓	✓	Strong competitive advantage
International experience	✓	✓	✓	✓	Strong competitive advantage
Unique program	✓	✓	✓	✓	Strong competitive advantage
BMD program in English	✓	✓	✓	✓	Strong competitive advantage
Unique student experience	✓	✓	✓	✓	Strong competitive advantage
Career development opportunities worldwide	✓	✓	✓	✓	Strong competitive advantage

Table. 3 VRIO Framework for ADA University School of Medicine (developed by researcher)

As a result of VRIO analysis (Table 3), we can determine main resources and capabilities for shaping new school's competitive advantage.

4.4.2 SWOT & TOWS

The most popular and widespread analytical tool is SWOT analysis of main strengths, weaknesses, opportunities and threats. Each element is crucial since it highlights the key points of the intersection between external and internal environment. If SWOT is more oriented toward the current situation of the company, TOWS matrix deals with strategy identification. “Strategic analysis provides a deep understanding about the business’s strengths, weaknesses, opportunities and threats (SWOT); the strategy formulation identifies strategic options, then evaluate and select the strategy (TOWS)” (Burns, 2007). Harvard Business school and Stanford Research Institute highlight the importance of SWOT-TOWS matrix to incorporate the new framework into strategic planning.

SWOT & TOWS framework is presented in Picture 4 below:

Strengths	<ul style="list-style-type: none"> • ADA’s brand and strong reputation • High skilled local and international teaching staff • Endowment fund – ADA Foundation • Innovative way of learning and teaching • World-class campus facilities • Integrated curriculum in accordance with international standards • Student Exchange programs • Unique library in the whole region
Weaknesses	<ul style="list-style-type: none"> • “Brain drain” tendency after graduation • No teaching hospital and medical centers belonging the School of Medicine • No financial autonomy • Lack of additional sources of funds for research development • No accreditation • Lack of systematic mechanisms for the quality assurance • No collaboration between faculty • No Ph.D. programs
Opportunities	<ul style="list-style-type: none"> • Improvement of health care services owing to the innovation’s intercalation and research development • Lack of physicians will increase demand and secure jobs and placement after graduation • Establishment of agreements with the corporate sector of medicine • Wide range of staff and faculty mobility and exchange opportunities • More state funds can be allocated because of the medical research component

	<ul style="list-style-type: none"> • New funding opportunities are driven by new program openings and innovations intercalation • International grants • Artificial intelligence can enhance patient care and activities and diagnosis methods • The ideal environment for increasing research capacity by new programs establishment
Threats	<ul style="list-style-type: none"> • Decrease in international faculty due to devaluation of AZN – current volatility (International faculty may leave in case of funding reduction) • The Increasing level of competition on national and international market • No fundraising tradition/donation in the country

Pic. 4 SWOT analysis for ADA School of Medicine
Source: Adopted from McKinsey report for ADA University and developed by the author

TOWS Strategies (Picture 5) based on SWOT Analysis

	Strengths	Weaknesses
Opportunities	<p>Smart Campus facilities will create opportunities to offer courses with the alliance with strategic partners at a lower cost</p> <p>Research component in BMD program will facilitate the process of research capacity building at other university programs (as IT, Computer Sciences, Education, Social Sciences, Business, etc.)</p> <p>Strong brand establishment as the only multi-profile university in the country offering medical degree along with sciences, humanities, law and IT</p> <p>Innovative methods of teaching and learning will make university capable to compete on the international level</p>	<p>In the case of state disinvestment, the medical school will search for international grants</p> <p>Lack of teaching hospitals will forge alliance building with existing clinics and medical centers</p>
Threats	<p>Private sector investments into health care and partnerships with companies and organizations might increase funding, as well as dependency</p> <p>Attracting high qualified physicians to support BMD program for short-term until the funding is sustainable</p>	<p>Increase the quantity and quality of physicians and medical doctors will lead to brain drain</p> <p>Innovations and new medical technologies introduction can be terminated in case of budget cuts</p>

Pic. 5 TOWS framework for ADA School of Medicine
Source: developed by the author based on SWOT analysis

4.4.3 Porter's Value Chain

Developed by Michael Porter and used throughout the world for nearly 30 years, value chain is a powerful tool for disaggregating a company into its strategically relevant activities in order to focus on the sources of competitive advantage, that is, the specific activities that result in higher prices or lower costs. These activities include Support (Firm Infrastructure, HR Management, Technology Development, Procurement) and Primary activities (Inbound, Operations, Outbound, Marketing and Sales). Both types of activities create margin – customers' willingness to pay more for this product. (Porter, M: Harvard Business Review, 1979).

The analysis aim is to show cost and value structure of ADA University School of Medicine and helps to understand how value is added on each stage of the medical school's operations. Value chain in this particular case demonstrates a full range of activities required to bring prospective medical students through enrolment, teaching, learning and practicing to a job-ready professional. Complex university's activities can help analyze the value creation process in the new medical school and develop innovative methods for maintaining qualitative medical education/service in the School of Medicine.

The most prominent research in modifying value chain model to university activities was done by Gabriel (2005), who proposed that: If we take the Higher Education as a service, some of the activities of Porter's value chain generic model like inbound and outbound logistics cannot be inclusively applied to the service industry (Gabriel, 2008). Another research from this area of Sison (2016) showed, that university's value chain can be is divided into three major categories: pre-education, education and post-education. Hence, two generic value chains need to be incorporated in the university's both activities: one is education-centered, the second one is research-centered (Sison, 2016). Therefore, we can analyze ADA University School of Medicine primary and supporting activities in accordance with the proposed conceptual model and analysis (Picture 6).

Primary activities

Inbound logistics: application process and student recruitment

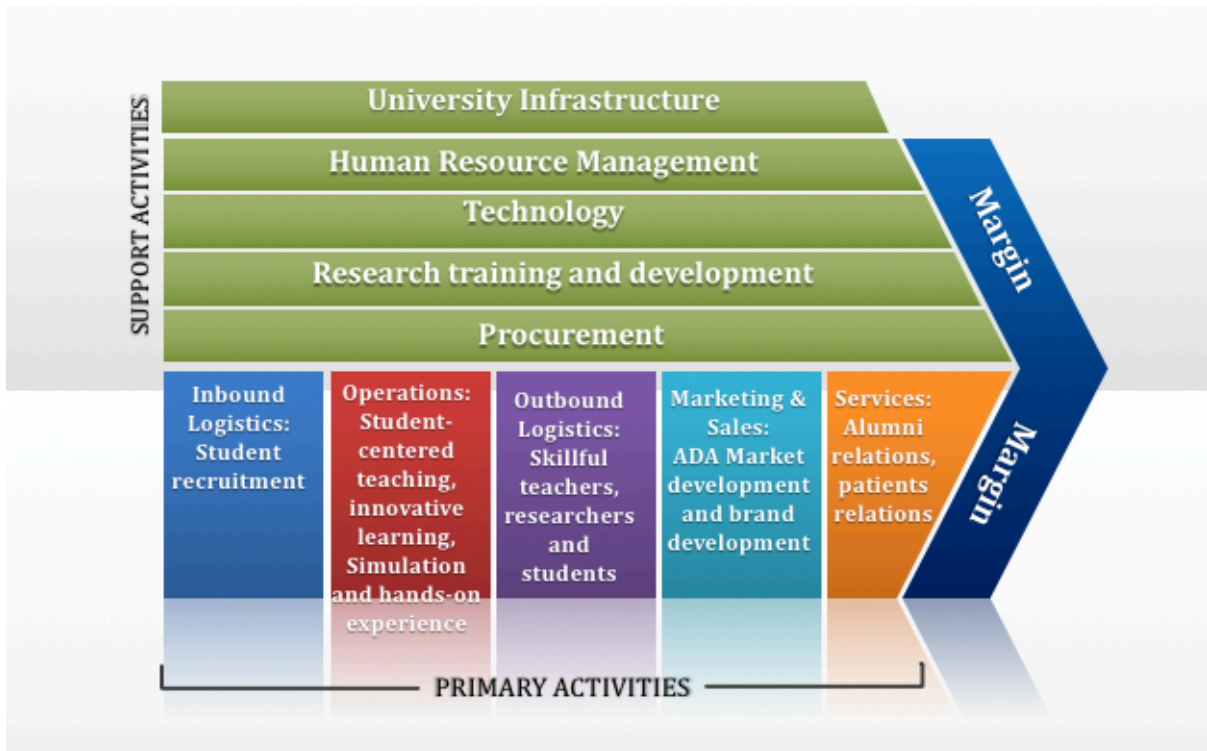
Operations: education process with innovative methods of teaching medicine (lectures, tutorials, simulations, hands-on experience, observership) and learning process with innovative student learning software (Blackboard, Banner, etc.). Operations also include community medical service, research and development.

Outbound logistics: graduates' placement, journal publications, performance and quality assurance.

Marketing and sales : promotion and outreach, brand enhancement, research and development (R&D).

Service: academic and university support, Alumni relations and potential customer relations.

This paper proposes the following value chain for ADA University School of Medicine:



Pic. 6 Value chain of ADA University School of Medicine (proposed by the author)

Support activities

University infrastructure: follows design and standards of ADA University. The medical campus is “green-and-smart” and uses alternative sources of energy. Different departments cooperate to keep the School of Medicine operations running (management, legal, finance). Financial activities are depending on state funding mostly, but includes other sources of revenue (see Appendix G). Management and Legal departments deal with the government and legal issues of the medical school, agreements signing with partners, teaching hospitals, clinics and patients ensuring that the legislation is compiled with the national and international standards.

Human Resource Management: Recruitment process of medical school is very sophisticated and staff and faculty selection process consists of several rounds of initial introductory interview, mock-lecture, selective interview of shortlisted candidates and final interview with the rector. All hired local and international staff and faculty members are professional, well-educated professionals in their field with international experience or education abroad. The faculty of ADA School of Medicine are scholars, researchers and practitioners with extensive work experience in medicine who work alongside the mission of the medical school.

Technology development: ADA University School of Medicine uses integrated learning and business systems as Banner by Ellucian, Blackboard, SAP, etc. to maintain all operations and activities smoothly and provide students with unique experience and innovative ways of teaching and learning. The most developed systems are utilized by ADA Library, that gives access to most comprehensive data and online resources worldwide.

Research training and development: training and developing research in medicine and encouraging students from other majors to join for conducting interdisciplinary research.

Procurement: services of the medical school works to meet the medical students' need in materials for experiments, white coats, scrubs and other required items and equipment for teaching, learning and operating activities.

Altogether, primary and supporting activities of ADA School of Medicine will add value to the program and will build a strategy for successful operations.

4.5 Strategy Analysis

4.5.1 Business Model canvas

The business model canvas is a great tool to help you understand a business model in a straightforward, structured way (Osterwalder, Pigneur, & et.al, 2014). Designed Business Model canvas will be emphasized on the value proposition, customer relationships, segments, partners, activities cost and revenue structure of new BMD program. Strategically, the new school set up is usually based on university business model, because, university management tries to extrapolate future results from a well-understood and predictable platform of experience (Harvard Business Review, 1995). With the new School of Medicine, the university business model needs to be amended, since new segments and new value proposition will be offered.

In the business model canvas for the proposed School of Medicine (Appendix D) key partners are suppliers who can provide clinical placements and access to teaching and learning: faculty, parents, alumni, ministry, pharmaceutical organizations, medical centers, hospitals, research centers and partner universities

Key activities include all activities that incur costs and provide revenues streams.

Customer Relationships include channels of communication with customers, such as CRM system, Banner Ellucian and Blackboard (learning platforms that ensure students learning process, orientations, development courses and all other students' activities and communication: chats, blogs, etc.)

Customer segments are mainly local and international students interested in BMD program, stakeholders, as government, state hospitals and their patients, corporate sector of medicine.

Key resources: students (as future Alumni), faculty, administration, campus facilities, partnerships.

Channels for reaching the applicants are social media ads, commercials, banners, marketing and outreach channels, TV & Radio.

Cost structure consists of fixed and variable costs, service costs, maintenance costs

Revenue streams for the medical school are: tuition fees, grants, government support and endowment

Value propositions: innovative program with engaging learning environment, unique student experience, innovative curriculum with research component, innovative partnerships on local and international levels.

The Business model canvas designed for ADA School of Medicine is in Appendix D.

4.5.2 Porter's Generic Strategies

Porter developed three main generic strategies: cost leadership, differentiation, niche/focus strategies. According to Porter's definition, cost leadership is a defensive strategy, that defends the firms against market forces. The main goal is to sell the products or services at average industry prices to gain higher profit or sell below the average industry price to gain its market share. Differentiation strategy is based on strong brand identity and differentiation in the product's qualities, making buyers less sensitive to the changes in price. Niche or focus strategy concentrates on the segmented market by specialization in product or services and achieving differentiation or cost advantage in this narrow market (Porter, M: Harvard Business Review, 1979).

The strategy choice usually derives on the market scope and competitive advantage of the company. Considering the fact, that School of Medicine will be one of the faculties of ADA University as other schools, so it will continue traditions of differentiation strategy in offering high qualitative unique education services in medicine in English.

ADA University School of Medicine's strategy choice was analyzed in comparison with the strategy choices of its competitors in the market. As a result, strategies of competitors have been identified and compared with the proposed strategy of the new medical school (Picture 7).

Industry forces	Generic Strategies		
	Cost leadership AMU	Differentiation ADA SM	Focus/Niche BB of FMU
Entry barriers	Can decrease the tuition to intimidate new entrants	Due to customer loyalty, new entrants might be discouraged	Core competencies development can create a barrier
Buyer power	Ability to offer a better price to keep customers	Even a few programs can give market power	Even a few programs can give market power
Supplier power	Flexibility with the cost increase	The price increase may be a burden for customers	Focus differentiation may lead to a burden for customers in case of price increase
Substitutes	Low price avoids switch cost for substitutes	Strong brand and customer loyalty	Focus/Specialization protects from switch costs for substitutes
Rivalry level	Low: The best position in the price war situation, due to the lowest tuition for BMD degree programs	Medium: Strong brand loyalty	Low: Niche customers' brand loyalty

Pic.7 Porter's Generic Strategies for ADA SM (ADA University School of Medicine) competitors: AMU (Azerbaijan Medical University), BB of FMU (Baku branch of First Medical University named after Sechenov)

4.6 Marketing Strategy: Marketing Mix

When a company differentiates its product/service it should consider market positioning strategy, which divides the product/service by its perceptual and physical attributes. Physical positioning focuses on the physical characteristics, while perceptual positioning emphasizes on serving customers and their customer experience. Most buyers do not know much about the physical attributes of luxury products, but they do care about the benefits they get (Walker & Mullins, 2011). Before starting to implement any strategy, it is crucial to scrutinize and understand resources, capacities, customers, market state and competitors.

Marketing mix strategy

As we can see from the previous analysis (VRIO, Value chain, Porter's Five forces) the concept of the new medical school's strategy fits with differentiation strategy, meaning that ADA School of Medicine will use differentiation of educational service, staff, international experience, teaching & learning concept and brand as the positioning strategy in the market. In order to succeed in establishing the new program, it is required to ensure that marketing strategy can fill the gap between customers' needs and education services. The combination of 5Ps (product, place, price, promotion, and people) is called "Marketing mix".

1. Product/Service

ADA University School of Medicine is one of the departments of ADA University academic enterprise, which offer BMD (Allopathic Medicine) degree program. New School of Medicine provides the unique model of innovative program, curriculum and experience. The school set up follows two principles: the first principle – Bachelor of Medicine program must meet national and international accreditation standards of World Federation of Medical Education (WFME). The second principle – the new program is blended, so students will spend at ADA School of Medicine substantial period, however some courses will be taught by ADA partner institution in online/on-campus format.

ADA University School of Medicine is an educational school providing full-time program leading to a medical qualification, that permits to obtain a medical license to practice medicine as a physician or a medical doctor. In accordance with the "Criteria for establishment of a new medical school: Guidance for governments, regulators and universities" by World Federation for Medical Education of 1991. This is a set of internationally recognized standards addressed the process of medical education and focused on the structure and function of medical schools, including educational procedures, duration of programs, facilities, number of staff available for instruction, and other resources necessary to provide educational experiences for students (Alemu, 2016).

New ADA University School of Medicine will provide high level of qualitative education in medicine to educate a diverse physician and medical doctors workforce in accordance with international standards; facilitate research, medical innovations intercalation and gain reputation of research-based university that prepares competent and ethical students; create a platform for the expanded clinical and medical research programs to advance competence and knowledge of medical students; enhance clinical

system and special rotation programs, internships and residency programs for training future physicians.

The Mission of ADA University School of Medicine is to foster a new generation of physicians by educating and training of medical students, who will be able to implement innovative methods of diagnosis, prevention and treatment of diseases, thus developing medical research and improving the health care services in Azerbaijan.

Goal and mission help to determine *key points* of establishing the new school as:

- Renewal of ADA' products
- Research for impact
- Building Valuable partnerships
- Engage different segments of the market

The new medical school embraces social responsibility and social accountability and is dedicated to meet the needs of society in qualitative health care.

The Vision of ADA University School of Medicine is “To be known as a world-class university that realizes student potential and promotes research benefiting Azerbaijan and the world”. The School of Medicine aims to be a research-intensive institution that fosters life-long learning approach and integrates new knowledge generation with high-quality patient care and research excellence.

Accreditation is the process by which a credible, independent body assesses the quality of a medical education program to provide assurance that it produces graduates that are competent to practice safely and effectively under supervision as interns (or equivalent), and have been provided with an appropriate foundation for lifelong learning and further training in any branch of medicine (IAMRA, 2015). All medical schools in Azerbaijan go through the accreditation process by the Ministry of Health of Azerbaijan and the Ministry of Education of Azerbaijan. ADA University as a public university can also request national accreditation as soon as decides to launch the new program. Therefore, firstly it should gain recognition by the State Authorities. In order to open the new program, ADA University management must write an official letter to the Cabinet of Ministers of the Republic of Azerbaijan, mentioning full name/title of the program, degree level, field, enrollment seats and an annual tuition fee of the newly established program. As soon as official permission is granted, letters should be sent to the Ministry of Health, Ministry of Education and State Examination Center of Azerbaijan to get a new program recognition and official registration for the program.

There is a clear need for the promotion of internationally accepted quality assurance methods and recognition of medical schools and for easier access to obtain adequate information about medical schools. One step will be the new Avicenna Directory of Medical Schools, established in 2007 according to an agreement between the WHO, the University of Copenhagen (Faculty of Health Sciences) and the WFME. Such a register will allow a kind of international meta-recognition of medical schools and will help regulatory agencies, responsible for the licensing of doctors, in evaluating the educational background of foreign medical doctors. It will also allow research on medical education in relation to demographic data (WDOMS, 2019).

Clinical training: ADA University School of Medicine needs to create its methods and approaches to providing medical education to students and future medical residents. Before constructing a new A list of selected teaching clinics and hospitals within existing residency and clerkship programs needs to be developed in accordance with the quality of medical services provided by these medical clinics and compatibility of organizational culture.

2. Place

Being part of ADA University, School of Medicine will be located in the newly constructed building of ADA Campus, in the center of Baku, Azerbaijan. School of Medicine offers BMD program only. School of Medicine will be the 4th medical school in the country. Advantages of campus location – the proximity of teaching hospitals, library resources, databases, amenities, facilities. In the future, there is enough land to enlarge the medical corpus. Buildings' facilities and amenities are ideally suitable for teaching and learning process: labs, simulation rooms, concilium meetings, smart boards, etc.

3. Promotion

Promotion is a process of communication between a university and service used to create a positive attitude on products and services, leading to their favoring in the process of purchase on the market. Promotion is efficient if other instruments as well (product, price, distribution, people, process and environment) efficiently perform their roles, i.e. promotion cannot compensate for weaknesses and inefficiency of other instruments (Gajic, 2019).

ADA University is associated with the most prestigious university in Azerbaijan, that includes the largest library in the region and qualitative education in an English-speaking environment. Promotion and outreach strategy designed by ADA University relates all programs of ADA, so, BMD program will be also promoted along with other ADA programs, but the target audience and marketing tools may vary. More focus can be on social media since the target audience is high school students and their parents, TV and radio commercials, on-campus events and off-campus presentations in Baku and regions. School of Medicine can increase awareness of the potential applicants by informative marketing and advertising, guerilla marketing, real experience events, direct marketing by e-mail/phone and PR. In accordance with the promotion and outreach strategy, communication strategy needs to be designed that will incorporate key messages conveying the mission and vision of new Medical school and the difference of its program.

4. Price

Setting the price of the educational service is an essential and sensitive task since it directly affects sales revenue. There are different pricing strategies as competitive pricing method (sets the cost of service/product in the context of competition); cost-based pricing methods (sets the cost solely in the context of internal fiscal needs disregarding external market environment); non-incremental pricing method (sets to raise net operating revenue and is useful if price is at low end of competitors or company has substantial number of low- and no-need students); tuition reduction (sets the cost of product/service in enrollment-numbers-driven context, can alter market position and lower discount rate) (Kotler, 2002). Generally, universities consider the competitor's tuition level and its costs while setting the cost of

education, but not in the case of ADA University. ADA sets the highest tuition for its services differentiated by the quality, brand, Alumni' employment rate, and high salaries paid to the staff.

Newly established School of Medicine will also choose a certain pricing strategy to cover the cost of education and raise some money for financial stability. Considering the differentiation strategy of all ADA University programs, price policy will adopt "price equals quality" approach or Chivas Regal or Tiffany pricing method (Noah, 2016). The practice of most universities in the USA adopted the same strategy and started to raise their tuition fees to raise more money, proved that or can observe an increase in enrolment since the high cost of education was associated with a better standard and quality of education. Considering the reputation of ADA University as a university with the highest tuition fees in Azerbaijan, Chivas Regal/Tiffany approach in pricing strategy for new BMD program would be more relevant, rather than decreasing the cost of education comparing new School of Medicine with local medical institutions.

Meanwhile, the government supports the strategical plan of ADA University for further program diversification and expansion and subsidized investment in physical campus infrastructure, including the construction of new corpuses: for ADA College, for ADA High School. The third corpus building is still under construction, so the final decision has not been made yet.

ADA uses target sales margin is around 40%, therefore, we can calculate the annual tuition fee, considering the average total annual cost of the service 5000 AZN (per student)+Target margin 40%+VAT 18%=Tuition prices including taxes (Tran, 2014).

In accordance with Chivas Regal/Tiffany strategy annual tuition for the Bachelor degree in Medicine program must be higher, thus guaranteeing required level of quality and amenities utilization. This paper proposes set margin as 50%, so we will get 5000 AZN (average annual cost per student at ADA)+2500 AZN+VAT=8850 AZN. This is the optimal price, that will keep us buoying in the market, considering the operating budget of ADA School of Medicine (for more details see Appendix G). For the convenience, this number will be rounded to 9000 AZN in other chapters. The tuition will be increasing every year in accordance with the average inflation rate in Azerbaijan (5%).

Initial tuition revenue and students' number projections for the next 5 years:

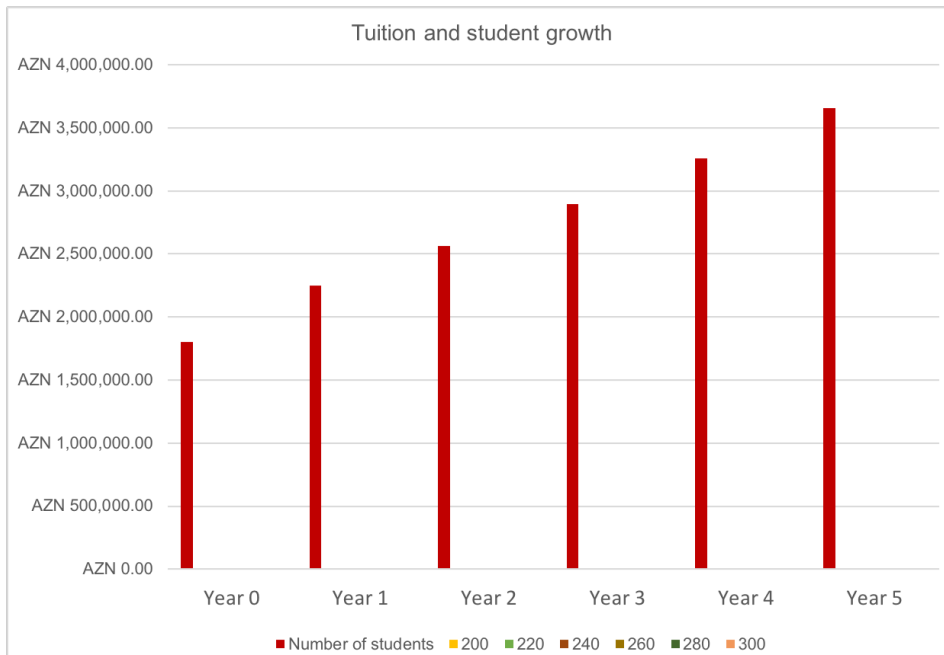


Chart 4. Tuition revenue and enrollment growth (developed by researcher)

In accordance with existing operating budget of ADA University we can calculate the operating revenues and expenses for ADA School of Medicine (Chart 5) (More detailed data is in Appendix G and Appendix H).

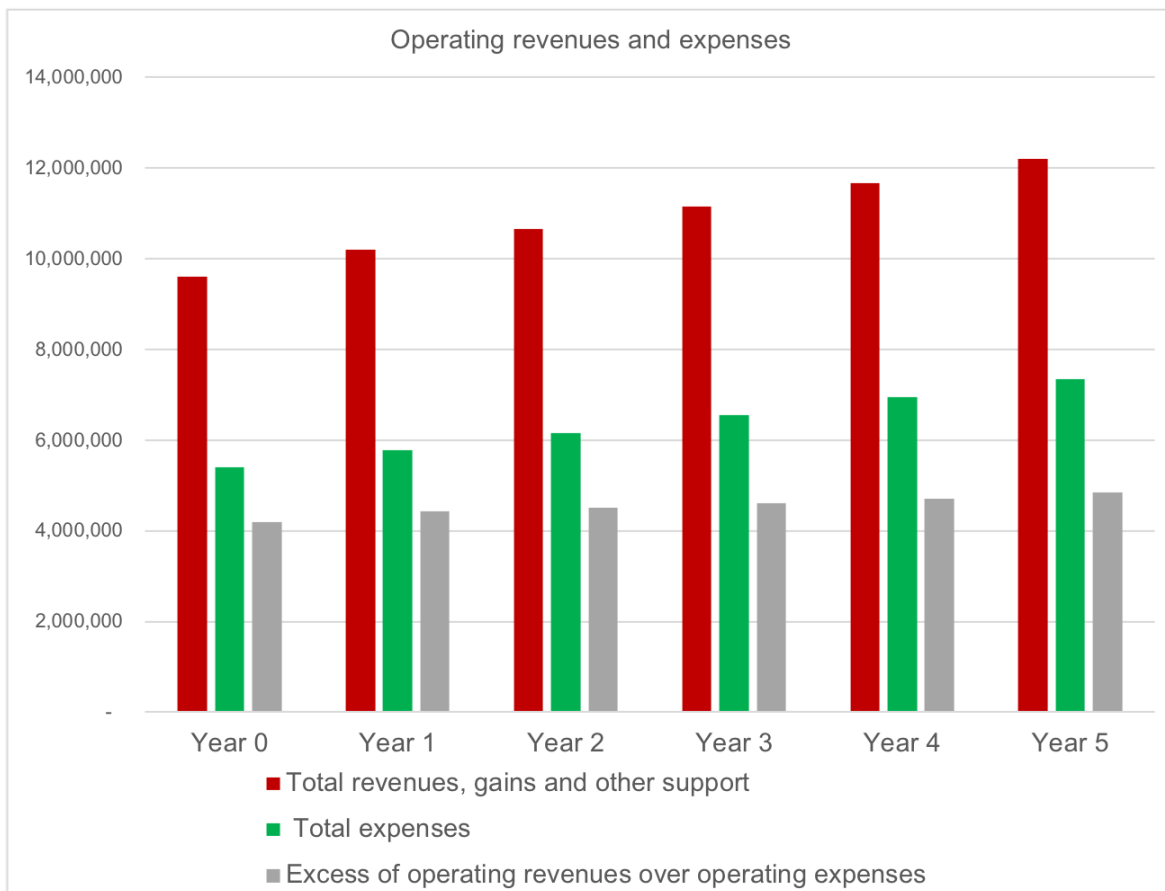


Chart 5. Operating revenues and expenses (developed by the author)

5. People

People are staff members, faculty, students are all agents that can be the key in a successful medical program establishment. At the same time, to keep the promise of good quality, ADA School of Medicine must find scholars and practitioners for teaching medical subjects. In the situation of physician shortage, Azerbaijani teaching clinics usually invite two categories of faculty: senior practitioners who are about to retire or teaching scholar, young graduates or researches with little experience. However, newly established School of Medicine can benefit from its partnership agreements and recruit full-time, part-time or adjunct faculty from abroad. Nevertheless, if we consider the fact, that we will have an agreement with the Ministry of Health and the Ministry of Education, they can fund the selected faculty invited from partner institutions abroad within the framework of "Study Abroad" program. Moreover, the medical school can use a "headhunting" recruitment strategy from competitors or use the Alumni who studied Medicine in the English language abroad.

5. Findings and discussion

Having presented the research's design process in the previous chapter, the following parts serve to discuss the findings and derive theoretical and practical implications. The chapter presents the results of research with the reference on theoretical concepts described in Chapter 3, that answers to the research questions in Chapter 1.

The following section presents the current state and demand for BMD programs among high school students from local and private schools in Azerbaijan. The results below and in attachment shows the students' interest and motivation, their desired university and specialty, their career aspirations while choosing to apply for BMD program.

1. Survey results description;

General findings:

Data were entered, cleaned and analyzed using Tableau 2018.2 business intelligence platform for analytical solutions. The analysis results are described below:

1. Two groups of high school students were identified: 14-16 and 16-18 with a female majority in both groups 57% and 80% respectively;
2. Total of 27 schools was represented, 80% was public schools, 20% - private ones.
3. Out of 9 universities listed as desired for study BMD, more than half of respondents (57%) chose Azerbaijan Medical University for studying Medicine (American University, Bilkent University, Koc University, McGill University, McMaster University, Ottawa University, Sabanci University and Baku branch of Medical University named after Sechenov). International universities represented were mostly from Turkey, USA, and Canada. Students from private schools were oriented to study abroad rather than in Azerbaijan.
4. The main factor for university choice was mentioned Major (73%), tuition fee (9%) and faculty (7%);
5. The main reason for choosing BMD program was future career aspirations and interesting program of study 48% and 47% respectively;
6. Almost 75% of students had not decided on the specialty, however, 10% chose was surgery, 6% chose gynecology, others mentioned ophthalmology, genetics, and radiology;
7. 65% of students evaluated their English language proficiency as good (32% - very good and 3% average), but only 30% of respondents had an IELTS score above 5.0;
8. Despite the fact, that half selected university with the medium of instruction Azerbaijani (then English, Russian and Turkish), 65% of student would study in university in English in Azerbaijani;
9. 100% of all students think about pursuing a residency program after graduation from Medical University;
10. Ideal duration/length of studies was selected 6 years on full-time Medical program.

To sum up, we can conclude that survey as a tool for obtaining primary data regarding the understanding of the current market situation was the best option to measure demand and assess other options for starting up a new medical program.

Results:

Major matters, but specialty not: Main reasons for students' medical university choice

73.2% (n=51) indicated 'major' as the main reason for their medical school choice, followed by 'tuition fee' (8.7%, n=7), 'faculty' (7%, n=5), 'program curriculum' (5.6%, n=4), 'university reputation' (5.6%, n=4). In addition, participants were asked about the reason for their choice of studying BMD program and 48%, n=34 chose 'future career aspirations' while 47%, n=33 selected 'program of study is interesting' as an option for choosing BMD degree specifically. Around 6%, n=4 had 'no other choice' as a preferred answer.

However, in the question about the specialty choice most respondents 75%, n=52 did not decide on their medical specialization, while made their decision towards program choice, since the students were interested in BMD program and did not want to study in other fields of Medicine (as Pediatrics, Stomatology, Nursery, etc.), so they are focused to become physicians or medical doctors. Among the chosen medical specialties most popular were surgery 10%, n=7, gynecology 6%, n=5, radiology 4%, n=3, genetics 3%, n=2, ophthalmology 3%, n=2).

While the decisions of major have not made, the decisions of pursuing residency after the studies were firm and 100%, n=71 were willing to continue their education.

Demand for local BMD program in English among respondents with different levels of English proficiency

All survey participants 100 %, n=71 with different levels of English Language proficiency (without IELTS/TOEFL certificate 70.4%, n=50 and with IELTS/TOEFL 29.6%, n=21 certificate) would like to apply for other local universities with English as a medium of instruction.

Respondents reported their level of English as 'good' (65%, n=45), 'very good'(32%, n=23) and 'average' (3%, n=3).

Medical student migration

As an option to study BMD degree students whose level of English is sufficient are ready to go and study in other countries 27%, n=19. Among them only 3%, n=2 would want to study in the Turkish language, others chose English as the medium of instruction in universities abroad. Those, whose choice was to study abroad are high school students from private schools, whose language of study at school is English.

This data helps to determine the main reasons for major choice among potential applicants for BMD program. Therefore, BMD degree is the most popular major of most students interested in studying at medical schools. Despite the lack of English proficiency level, students are willing to consider any other university choice for studying BMD program in English in Azerbaijan.

For ADA University students' English language level has never been a problem, due to EAPP and Foundation courses offered to all students admitted to ADA University Undergraduate programs. So, School of Medicine can also admit students with the low level of English (but strong motivation and

good academic standing) for BMD program and offer them EAPP and Foundation courses before they start the academic program.

2. Interviews and site visits;

Currently, only three universities in Azerbaijan offer BMD program: Azerbaijan Medical University, the Nakhichevan State University in Nakhichevan Autonomous Republic and the Baku branch of I. M. Sechenov First Moscow State Medical University. Several unlicensed private medical schools tried to gain its market share and were established 10 years ago, but by the decree of the Ministry of Education, they were closed by 2006.

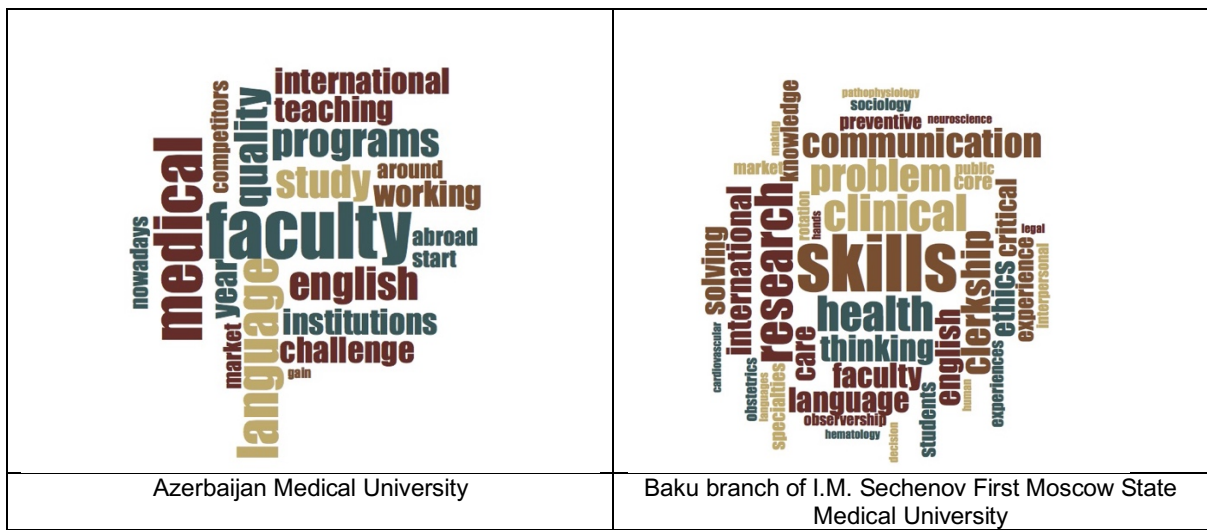
To analyze the current state of market players and understand their strategies 2 site visits were made to top two medical institutions (AMU and Baku branch of I.M. Sechenov First Moscow State Medical University) gathering onsite qualitative data from the structured interviews from the administrative staff members. Due to the remote location, the Nakhichevan State University was not included in site visits and interview. Challenges, mission, capacity development, partnerships, and student enrolment were the main topics in both visits.

Interviews were conducted in August 2019 (script and analysis in Appendix A).

Results

Content analysis of interviews was processed through NVivo 12 software, the content of the interview with AMU representative contains 1051 words, of which 211 were unique. Word frequencies represent an empirical way to identify the main challenges of the market incumbent. In the second interview with Baku branch of I.M. Sechenov First Moscow State Medical University representative content has 861 words with 180 unique words.

Comparison of the frequency of the words used in both interviews during site visits produced a quantitative ranking for the importance of concepts. Appendix A portrays the interview scripts of both interviews and detailed information along with word clouds with the most frequent words. The most frequent words used during the site visit interview to AMU was “Faculty” with 33 occurrences and “Research” with 21 occurrences. The next group of frequent words with 4 to 11 occurrences were: quality, program, international experience, teaching. If we place these in a meaningful phrase, it would sound like: “Quality of teaching faculty and research in programs along with the lack of international experience” (Picture 8).



Pic. 8 Excerpt from NVIVO 12 Word Frequency analysis results

For the second competitor Baku branch of I.M. Sechenov First Moscow State Medical University, the most frequent words were “Skills” with 29 occurrences, “Research” with 21 and “international clerkship” with ten occurrences. The most frequent words with five to nine occurrences also were: “communication”, “ethics”, “problem solving” and “English”. A meaningful phrase comprised from these words would be “Lack of English language, research, communication and problem-solving skills lead to the problems with Ethics during international clerkship program” (Picture 8). Content analysis and word frequency shed light on the main challenges of main market competitors. Furthermore, more detailed scrutiny of interview data also helped to understand the market strategy chosen by both medical universities.

Azerbaijan Medical University (AMU) with a huge number of medical students, numerous medical specialties and majors have already reached its economy of scale. The strategy of AMU is cost leadership. The average cost of the program is not so high, the demand is very high. AMU has gained financial sustainability due to the tuition fees, grants from international and local donors and government funding.

Baku branch of I.M. Sechenov First Moscow State Medical University with its “boutique” approach and highly selective process chose “niche strategy” narrowing its target segment to those who studied in Russian language at school and passed additional examinations for getting admission to their university. All faculty members are visiting expats invited for the period of the course. The Business model of Baku branch of I.M. Sechenov First Moscow State Medical University is similar to all universities, that functions as operational branches of parent institutions abroad. High variable costs (faculty) are covered from the tuition fees (currently the highest price in the market).

As a result, newly established ADA University School of Medicine can gain its market share following chosen differentiation strategy of university that will definitely find its reflection in the quality of teaching,

faculty, research, and students of BMD program. Differentiation of curriculum and unique student experience will be the cornerstone of BMD program within established School of Medicine. Porter's generic strategies described in previous Chapter 3 includes some implications on the strategies of both AMU and Sechenov's University as well as differences in their market situation.

To sum up, the interviews and site visits presented the data regarding competitor's strategy in the market and the challenges they tackle. Value of these interviews was in the openness of our potential competitors in terms of revealing required information and making projections and conclusions on the opening of new medical school. School of Medicine also anticipate some during the establishment on three levels:

Structural level: faculty and staff recruitment and development, new program and curriculum design, academic standards and accreditation, amenities and equipment; *Organizational level:* governance, regulations and policy, collaborations with other departments and schools; *Operational level:* sustainability, quality assurance of output.

3. Expert survey (Delphi technique).

The Delphi technique used in this paper helped to combine individual judgments and knowledge of professionals from the industry with the state of this research (analysis and data are in Appendix C).

Round 1

In the first-round questionnaire, panelists were asked to list all core knowledge, skills, and experience necessary for the BMD program design. In order to express a wide range of views, the questionnaire contained open-ended questions. Ready copies of the questionnaire were distributed among the Delphi team members and collated after 2 days. At the same time, online databases as Med Line, Med Portal, Medical Journal, Google Scholar, Scopus, Emerald, etc. were searched for the information, regarding program design, curriculum courses, experiences and skillset, applied by different universities in other countries. So, primary data was combined with the secondary data obtained from the search. Generated ideas/courses, skills, and experiences were clustered into emerging themes. These themes have become inputs for the next round.

Topic Generation: Some general open-ended questions were submitted to the respondents to seek their opinion.

Question: In your opinion, what are the core knowledge, skills and experiences need to prepare BMD students to treat patients effectively?

Results: Based on the NVIVO Frequency analysis, top frequent core courses, skills and experiences were identified to be used in round 2 of the Delphi method. A total of 157 items were collected from the Delphi team participants in Round 1, with an average of 13 items per participant (range 10-35 items). After the removal of duplicate items (n=68), 99 items were categorized into 76 core courses, 10 skills, and 13 experiences.

Round 2

Rating and Weighting: After identifying most frequent core subjects, skills and experiences needed to prepare BMD students and design curriculum of the new program, Delphi panelists were asked to rate the importance of each item in the list according to 5-point Likert scale ranging from 0 (not important) to 5 (very important).

Question: Using rating scales below prioritize the curriculum content proposed in the previous round by Delphi team members.

Results: The Round 2 ratings of importance for the total of 99 items across the categories of importance were: very important (very high - 42%), considerable important (high – 25%), moderate important (moderate – 18%), minimum important (low – 9%), not important at all (n/a – 7%). These responses were used calculating the strength score for each item from the list.

Strength Score= The sum of weighted frequencies, (total points) resulting from multiplying the number of participants selecting a rating (frequency of occurrence) by the Value of the rating from the Likert-type scale (strength score definition was adopted from the research of (Mitzman, 2017).

Based on the strength scores, frequency percentage per category of Likert scale was calculated, then Percent endorsed was calculated.

Pct. Endorsed= The percentage of panelists out of 15 from Round 2 who endorsed the item by selecting the highest rating: “Very important” from Round 2. (percentage endorsed as definition was adopted from the research of (Mitzman, 2017).

After calculating the mean score, strength score, pct. endorsed, frequency (in %) per category of Likert scale all items were ranked and categorized into Recommended (Must teach), Optional (Electives) and Not required/Unnecessary, so that new program can integrate the important courses to build the required curriculum. In addition, panelists recommended skills and experiences they think are crucial to gain the required knowledge from the BMD program. In addition, a significant variability of topics generated by the Delphi team was observed during initial Round of interviews. Although the final list of courses, skills and experiences did not reach the final consensus, I believe that they can reduce the variability in BMD education that currently is underdeveloped throughout BMD programs in Azerbaijan.

Round 3

After ranking all the subjects by priority, Delphi panelists were given the list of top courses and asked to sort them.

Question: Sort each curriculum topic into 3 categories: 1) Highly recommended 2) Partially recommended 3) Not recommended Final Categorization: After ranking all the subjects by priority, Delphi panelists were given the list of top courses and asked to sort them.

Results: 34 subject knowledge/core courses, 7 skills, and 7 experiences were categorized as Must teach/Highly recommended

26 subject knowledge/core courses and 1 experience were categorized as Optional/Partially recommended; 10 items were categorized as not important and eliminated from the final list.

Therefore, only 75 items were selected for the proposed curriculum of BMD program at ADA University School of Medicine (60 core courses, 7 experiences, 8 skills).

Note: it is important to mention that almost all Delphi panelists mentioned international experience (clerkship, residency, exchange, study visits, etc.) as one of the essential components in the medical program curriculum. Therefore, using ADA University Memorandums of understanding with more than 100 partner institutions around the globe incorporating Global component would not be problematic. As a result, BMD curriculum will be based on the best world practices of the integrated curriculum with core subjects, international experience.

This research goal was to provide consensus curriculum outline design for preparing future medical schools of ADA to become physicians, medical doctors and researchers. The author hopes that the resulting curriculum courses are more ambitious and innovative than in other universities and meet international and local accreditation standards. In general, all courses, experiences, and skills identified at the end are in line with the national medical curriculum standards (Appendix K) and integrated medical curriculum standards accepted worldwide in most top-ranking universities.

Overall, the most significant findings from this research were determining high demand for the undergraduate medical program in English language in the market of medical education, identifying the main rivals and their strategies in the market, defining the sources of competitive advantage and building unique conceptual model for proposed new School of Medicine within existing ADA University.

Conclusion

This project presented an ambitious perspective on what ADA University can become in the near future developing the new product – medical program. The new ADA University School of Medicine would revolutionize health care by infusing innovative model into medical education and research of Azerbaijan. Further, the new medical school would attract high-quality physicians and medical doctors to teach and practice in a new academic environment. The new BMD degree program would improve the country's ability to compete with other medical universities on a global level. Additionally, the new medical school would develop ADA University's academic capacity and synergize with research capacity, contributing to the body of knowledge.

The main conclusions are derived from the major and minor questions from Chapter 1. Overall, the research demonstrates a number of potential benefits that new BMD can bring to ADA University the new medical program establishment.

1. Minor research question: Which specific targets could be achieved by ADA University in case of the successful School of Medicine establishment?
 - I. In the case of the successful launch of the new medical school, ADA University can increase its market share by targeting different market segment, thus increasing the number of the student body at ADA University.
 - II. ADA University academic profile will be diversified and it becomes the only multi-profile university in Azerbaijan with academic programs in Law, Medicine, IT, Engineering, Computer Sciences, Business, Education, Diplomacy and Public Affairs.
 - III. ADA University School of Medicine will become an additional source of revenue, due to the highest tuition rate, endowment opportunities, and research grants.

2. How the launch of ADA University School of Medicine would help ADA University to strengthen its position in the market as an innovative education services provider?
 - I. ADA competitive advantage will be enhanced due to proposed of 3 “I”s conceptual model: Innovative program development in medicine, innovative integrated curriculum design and innovative alliances model elaborated in Chapter 3. First is the Innovative curriculum of BMD program will be built on the integrated model, that incorporates required subject knowledge, professional skills and experience (local and international) followed by innovations. Second is Innovations introduction and intercalation into the program following integrated curriculum courses, blended program, and patient care services will differentiate the program from other medical programs in the country. The third is a model of innovative alliances on different levels with government, international university-partners, corporate business sector and medical hospitals, clinics, and research centers. The new model of strategic alliances with government agencies, medical centers and hospitals and universities abroad will be cultivated. Successful partnerships can help the new School of Medicine to benefit from alliance to leverage resources, integrate activities and align positions in the market. Complementary alliance strategy will help the new medical school to take advantage of the partnerships, that can

contribute assets and skills to the school operations. International partner-universities can raise ADA brand awareness in new geographic markets, government relations can help to raise funds, collaborations with teaching hospitals will bring necessary competencies and experiences. Therefore, strategic alliances build opportunities for research and development of faculty and students and provide optimal conditions for the new medical school to capitalize on its benefits and avoid some potential pitfalls.

- II. Research capacity of ADA University will be developed due to the large opportunities of cross-disciplinary and interdisciplinary research between the majors taught by ADA schools.
- III. Product/service differentiation strategy will help to distinguish the new program from other medical programs, thus shaping comparative advantage. New Medical school will help ADA University to expand globally and compete on the international level due to the program standardization and accreditation by the international medical authorities as WFME, FAIMER, IAMRA, etc.

School of Medicine reveals the potential of ADA University and adds value to current university operations enhancing its competitive advantage and brand recognition. Innovation intercalation to teaching and learning process, unique integrated curriculum, the medical program in English aligned with international medical program standards and career development opportunities worldwide are main resources for the strong competitive advantage of the new school (more detailed in Chapter 3, VRIO analysis). The Innovative approach to the teaching and learning differentiates the product – educational service and develop research capacity of ADA University.

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Appendix A

Interview with potential rivals

RSP1: Interview script with Respondent 1 (Azerbaijan Medical University)

Date: August 16, 2019, 3pm

Question 1. *How long have you been working at AMU?*

I have been working at AMU for 9 years.

Question 2. *Azerbaijan Medical University is the first medical-related institution established in Azerbaijan, with “impeccable pedigree” and old traditions.*

What do you think about the alignment between the university’s mission and activities nowadays?

Nowadays, the mission of AMU to prepare medical specialists in different areas of medicine, so the scope of activities is very huge, hard to think about alignment. However, management tries to adopt the mission and vision to the international standards.

Question 3. *What are the main challenges of AMU?*

There are a lot of challenges: First and foremost, the curriculum of BMD is redesigned, but the faculty who teaches is not up-to-date, resources they utilize (books, journals) are outdated. Therefore, the quality of faculty and professors is still one of our biggest concerns. We have faculty members who taught at AMU for more than 50 years, who taught by the Soviet system and who don’t even know about the contemporary techniques. So, it is impossible to change faculty mindset and teaching methodology to deliver the classes by using new methods.

The second challenge is quality assurance issues, we cannot measure the quality of our students, because we usually use the best of them due to “brain drain”. “Brain drain” is the problem of the whole country, not only AMU’s. Alumni leave the country to continue their education and then this process of “brain drain” occurs, when they start studying abroad and foreign universities and hospitals recruit them. So, this outflow occurs every year. In order to solve the problem with quality assurance AMU implements the project on creation of “AMU’s Study Programs quality assurance” department within the University in order to work on the implementation of European standards and guidelines for quality assurance of Medical study programs.

Last, but not the least, is accreditation problem, students who want to pursue any medicine related career abroad, need to go through the sophisticated process of diploma recognition, licensure gaining and additional examination. Indeed, why medical doctors need to study again in order to gain the same degree they have or the same knowledge they obtained in their home country.

To the same token, the staff of clinics and teaching hospitals are not interested in teaching our students. Our medical students go there after Year 5 for hands-on experience, clerkship and further for residency, but they act as observers, not like real doctors.

Question 4. *What is AMU's advantage in the market?*

AMU is the only university with this enrollment plan, other competitors (we do not think about them as competitors, more as "others") have only marginal market share. So, it is kind of monopoly when you are the only one in the market and you start dictating your rules, so others follow. We have the history, traditions, as you said "impeccable pedigree", established curriculum and programs, but still there is a floor for improvement for us.

Question 5. *Lack of real competitors affects your activities. In your opinion, if you had a rival in the market, how it would impact AMU?*

At least we would start competing, improving and developing... We would take it as a challenge and try to outperform our competitors. Only positive changes I can associate with new entrants' existence.

Question 6. *Nowadays, 90% of current research produces in the English language. You do not offer any courses in the English Language, how are you going to compete with the rival who has it as comparative advantage and offers education in English?*

We also know that, so we are working on designing the BMD program in the English language, but unfortunately, faculty is again our biggest challenge. We do not have enough doctors, practitioners and scholars who are fluent in English. We try to utilize our Alumni who studied abroad, but most of them study in Germany or Turkish languages.

Nowadays several training and seminars on different areas of medicine, foreign languages, evidence-based medicine and basics of medical statistics are organized regularly for academic staff by the Global Soros Net and Department of Education of U.S. Embassy.

Azerbaijan University of Foreign Languages organizes English language courses for AMU's faculty.

Question 7. *How many international faculty members AMU has?*

We have around 1500 teaching faculty. Currently, around 5 % of our faculty members are expats. Age range as below:

Age of teachers	Number of teachers
22-30	45
31-40	258
41-50	323
51-65	463
More than 65	302

Number of BMD faculty members and their age range in AMU

Question 8. *Do you have any partner institutions abroad?*

Yes, we have more than 60 partner universities in the USA (Oklahoma, Thomas Jefferson, East Carolina, GW, Philadelphia), Germany (Berlin Vivantes Humboldt Clinic, Berlin German Heart Institute, Hermann-Hesse College, Berlin, Bonn, Heidelberg, Siegen, Freiburg, Aachen), Austria (Krems University of Applied Sciences), Great Britain (Leeds, Westminster, University of Northampton), France (Nise Sophia-Antipolis, Brest, Montpellier, University of Versailles), Turkey (Ankara, Bashkent, Gazi, Istanbul, Hacettepe, Chukurova, Yeditepe, OMU, Kars Kafkas, Inonu, Istanbul) and many other universities around the globe.

Our students go for exchange and have their residency programs at our partner institutions.

Question 9. *Do you offer any online/distance learning courses for BMD students?*

Yes, we started the project of development of the e-learning and distance learning and assessment in Biomedical sciences in the Caucasus region. Within the project, 3 professors from the UK worked on designing the courses in Immunology classes.

Question 10. *How AMU maintain its financial stability?*

As you know, AMU is a public university and as a public institution we receive government funding, which is our main source of sustainability, however, AMU also gain profit from the tuition (we have around 10000 students admitted to different programs at the university, with average tuition 4500 AZN). Moreover, AMU also receives international grants from international organizations and subsidies from the Ministry of Health. However, we do not have an endowment fund or individual donations from investors, however, it would have positively affected due to the wide-spread international practice.

You can also review our budget expenditures on <http://www.amu.edu.az/en/pages/3397> we officially post them every year.



Main challenges of AMU (processed based on interview script in NVIVO 12 software)

Excerpt from NVIVO 12 *frequency analysis

RSP2: Interview script with Respondent 2 (Baku branch of I.M. Sechenov First Moscow State Medical University)

Date: August 14, 2019, 5pm

Question 1. How long have you been working at AMU?

I am one of the first employees of Baku branch of I.M. Sechenov First Moscow State Medical University, so I have been working here from its inception, from September 15, 2015.

Question 2. Baku branch of I.M. Sechenov First Moscow State Medical University is the newly established branch of Medical University named after I.M. Sechenov. What do you think about alignment between the university's mission and activities nowadays?

Since we are new, so we follow our mission and vision precisely, we had not reach economy of scale yet and we plan our activities according to the mission of the university to train the limited number of students and to prepare physicians and medical doctors. We aim to train highly qualified doctors, our experts are also involved in world level fundamental and clinical research, effectively fight dangerous diseases, provide professional medical assistance. So, to follow our mission we designed a tough admission process, that consists of 2 steps.

Step 1. We admit students who scored minimum of 350 points during their examinations by the State Students Admission Commission (SSAC) for the fourth specialty group. Step 2. Then these shortlisted students take part in admission examinations conducted by the Commission of First Moscow State Medical University named after I. M. Sechenov. In addition, these candidates have an additional exam in Russian language and Math.

So, all our activities serve our mission to select the best students and train them to be professionals in the sphere of medicine they choose.

Question 3. What are the main challenges Baku branch of I.M. Sechenov First Moscow State Medical University?

Our first challenge is that we are the new, we had not shaped brand awareness among potential students, however, operating in the market with 2 only rivals as AMU and Nakhichevan State Medical University is not hard for us, because our target groups are different. We have our niche/segment of the market – high school students who study in the Russian language. Our rivals target mainly Azerbaijani speaking high school graduates.

Secondly, our variable cost is high. The BMD program of our university and curriculum design is carried out based on teaching plan and program standards of First Moscow State Medical University named after I.M.Sechenov. Our faculty members are invited professors and practitioners of this higher education institution. Our graduates are awarded the Diploma of First Moscow State Medical University named after I.M.Sechenov. Every term we invite professors for a short-term or a long-term period, they are “visiting” faculty.

Thirdly, our Alumni (we will have them in 2021) will prefer to study abroad, rather than pursue their further education in Azerbaijan and work for the local health care system. On a global scale, it is normal, but if we are talking about improvements and development of the health care system in Azerbaijan, it is problematic.

Question 4. *What is an advantage of Baku branch of I.M. Sechenov First Moscow State Medical University in the market?*

As I have already mentioned, we aim to attract the Russian native speakers, who studied in Russian language, as a result, we have our niche strategy, that gives you an advantage to offer your service directly to targeted customers.

Question 5. *Lack of real competitors affects your activities. In your opinion, if you had a rival in the market, how it would impact your institution?*

In my opinion, we do not have real competitors in the current market, only if this rival has the same curriculum and medium of instruction. Our niche strategy allows us to buoy anyway.

Question 6. *Nowadays, 90% of current research produces in the English language. You do not offer any courses in the English Language, how are you going to compete with the rival who has it as comparative advantage and offers education in English?*

We did not think about it, since we operate as a branch institution and do not have to outperform competitors. We operate in the same market and could gain an appropriate market share that meets our requirements and standards.

Question 7. *How many international faculty members AMU has?*

We have around 100 faculty members and all of them are expats.

Question 8. *Do you have any partner institutions abroad?*

Surely, this is how we operate with our parent institution - Baku branch of I.M. Sechenov First Moscow State Medical University.

Question 9. *Do you offer any online/distance learning courses for BMD students?*

No, we do not have them, all our classes are on campus and face-to-face. But our students have a chance to observe surgeries of our professors and teaching faculty conducted in Russia in online format (live).

Question 10. *How does Baku branch of I.M. Sechenov First Moscow State Medical University maintain its financial stability?*

Our financial stability grounds on tuition revenues and funding from our parent institution.



Main challenges of Baku branch of I.M. Sechenov First Moscow State Medical University (processed based on interview script via NVIVO 12 software)

Excerpt from NVIVO 12 * frequency analysis

Appendix B

High school students survey questionnaire

To measure market demand for BMD program was surveyed among high school students in Azerbaijani schools. Total of 71 respondents participated in the survey. The questionnaire was conducted in Azerbaijani language followed with English translation, but responses were delivered in Azerbaijani and Russian languages only:

SORĞU Survey

Özünü haqqında məlumat/Personal Information

- Yaş/Age: a) 14-16 b) 16-18 c) 18-dən yuxarı/above 18
- Cins/Gender: a) Qadın/Female b) Kişi/Male
- Hazırda təhsil aldığınız məktəb və sinif: _____/Current School and Grade
- İstədiyiniz bakalavr ixtisası: _____/Desired UG Major
- Müraciət etdiyiniz universitet: _____/Desired University
- Bakalavr pilləsində təhsil almaq istədiyiniz dil:/ Preferred language of instruction at University
a) Azərbaycan/Azerbaijani b) Rus/Russian c) İngilis/English d) digər_/Other
- İngilis dili bilikləriniz/ Level of English Language proficiency: a) Əla/Very good b) Yaxşı/Good c) Kafi/Satisfactory d) Pis/Low
- TOEFL və ya IELTS imtahanını nə vaxtsa vermişiniz?/ Do you have IELTS/TOEFL certificate
a) Bəli, balınız _____/Yes, score _____ b) Xeyr/No

Digər suallar/Other questions

- Nə üçün məhz tibb üzrə bakalavr pilləsində təhsil almağı seçmişiniz? (bir neçə cavab seçmək mümkündür)/Why you want to study BMD (you can select more than 1 answer)?
a) Gələcəkdə tibb sahəsində karyeram üçün faydalıdır/ Future career aspirations
b) Proqram mənim üçün maraqlıdır/ Program of study is interesting for me
c) Qəbul imtahanlarında topladığım bala əsasən/ I choose based on my Exam score
d) Başqa ixtisas seçimi olmadı üçün/No other choice options
e) Digər _____/Other
- Tibb üzrə bakalavr pilləsini bitirdikdən sonra, həmin istiqamət üzrə rezidentura pilləsində təhsili davam etməyə planlaşdırırsınız?/Are you planning to pursue your education further and apply for residency after BMD?
a) Bəli /Yes b) Xeyr/No
c) Digər ixtisas üzrə magistr təhsili almağı planlaşdırıram/I am going to apply to different program
İxtisasın adı _____/Title of the program

11. Bakalavr pilləsi üçün universitet seçimi zamanı həlledici faktorlar hansılar olacaqdır? Xahiş edirik, ən əhəmiyyətli faktordan daha az əhəmiyyətliyə qədər sıralayın/Please rate the main factor while choosing University from most important to not important at all

- Universitetin reputasiyası/Reputation of university
- Təhsil haqqı/Tuition fees
- İxtisas/Major/ Program of study
- Dərslərin keçirilmə saatları/Class schedule
- Pedaqoji heyət/Faculty
- Dərs proqramı/Curriculum
- Qəbul üçün tələblər/Admission criteria
- Gələcək karyera imkanları/Future career opportunities

12. Sizin fikrinizcə ideal tibb proqramı neçə il olmalıdır? Xahiş edirik aşağıda kateqoriyalar üzrə qeyd edin/Ideal length (in years) of desired BMD program, please choose from the categories below:

Təhsil müddəti/Length of study a) 6 il/6 years b) 10 il/10 years c) 4 il/4 years

Təhsil forması:/Program format a) Əyani, gündüz/Full time, daytime b) Əyani, axşam/Full time, evenings c) Qiyabi/Part time

İxtisaslaşma: _____/Specialty

Xaricdə təhsil imkanları:/ Is International experience/practice preferred during BMD studies?
a) Vacibdir/Important b) Vacib deyil/Not important

Digər faktorlar/Other factors:

13. İngilisdilli Universitetdə (əgər olarsa) tibb ixtisasınızı almaq istərdiniz?/ Would you like to study in local university in English language?

a) Xeyir/No b) Bəli/Yes

Sorğuda iştirak etdiyiniz üçün təşəkkür edirik!
Thank you for your participation!

All collected responses were processed in Tableau Desktop 2018.2 software which combines features of statistical data analysis and reporting tools.

Collected responses were exported from Tableau software and added below:

Gender and Age of respondents

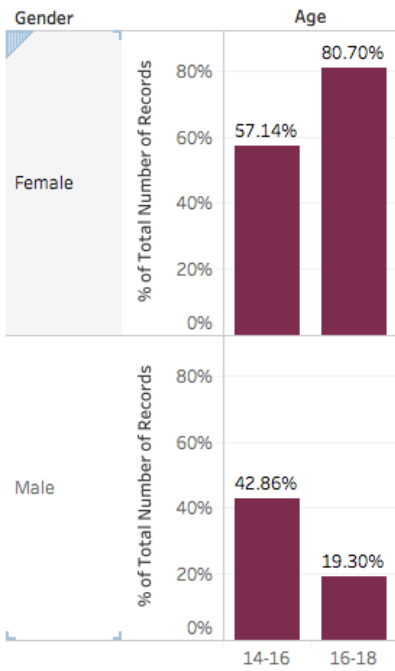


Chart 7. Gender and age distribution

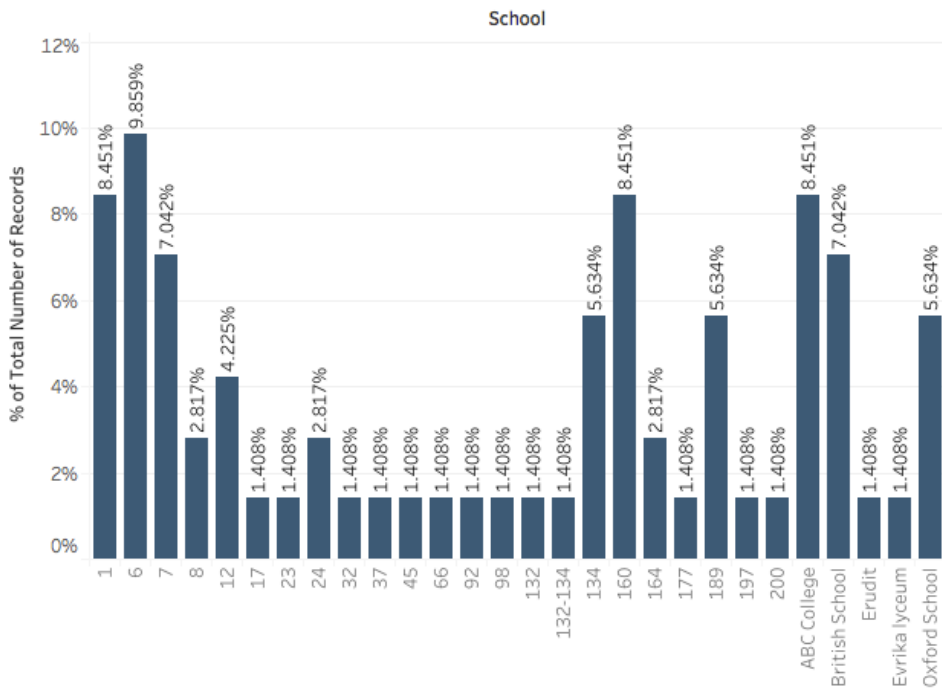


Chart 8. School representation

Desired program and university

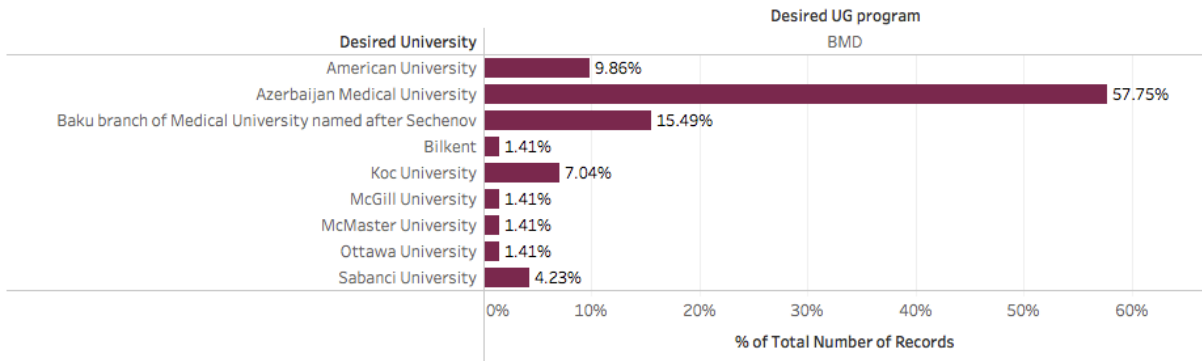


Chart 9. Desired programs of study and university

Medium of instruction at desired university

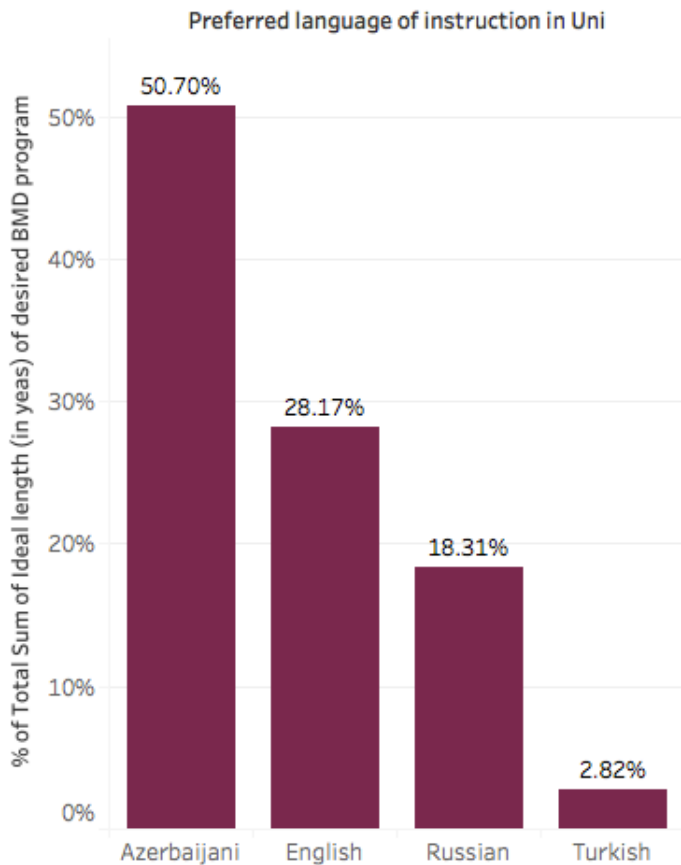


Chart 10. Medium of instruction at desired university

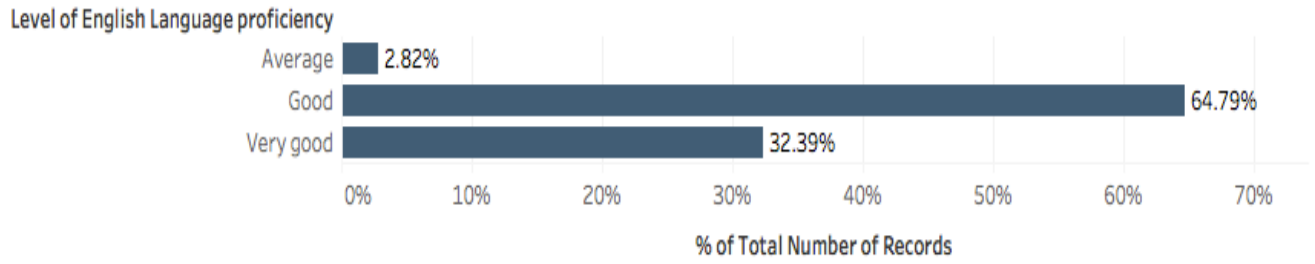


Chart 11. Respondents' level of English language proficiency (self-reported)

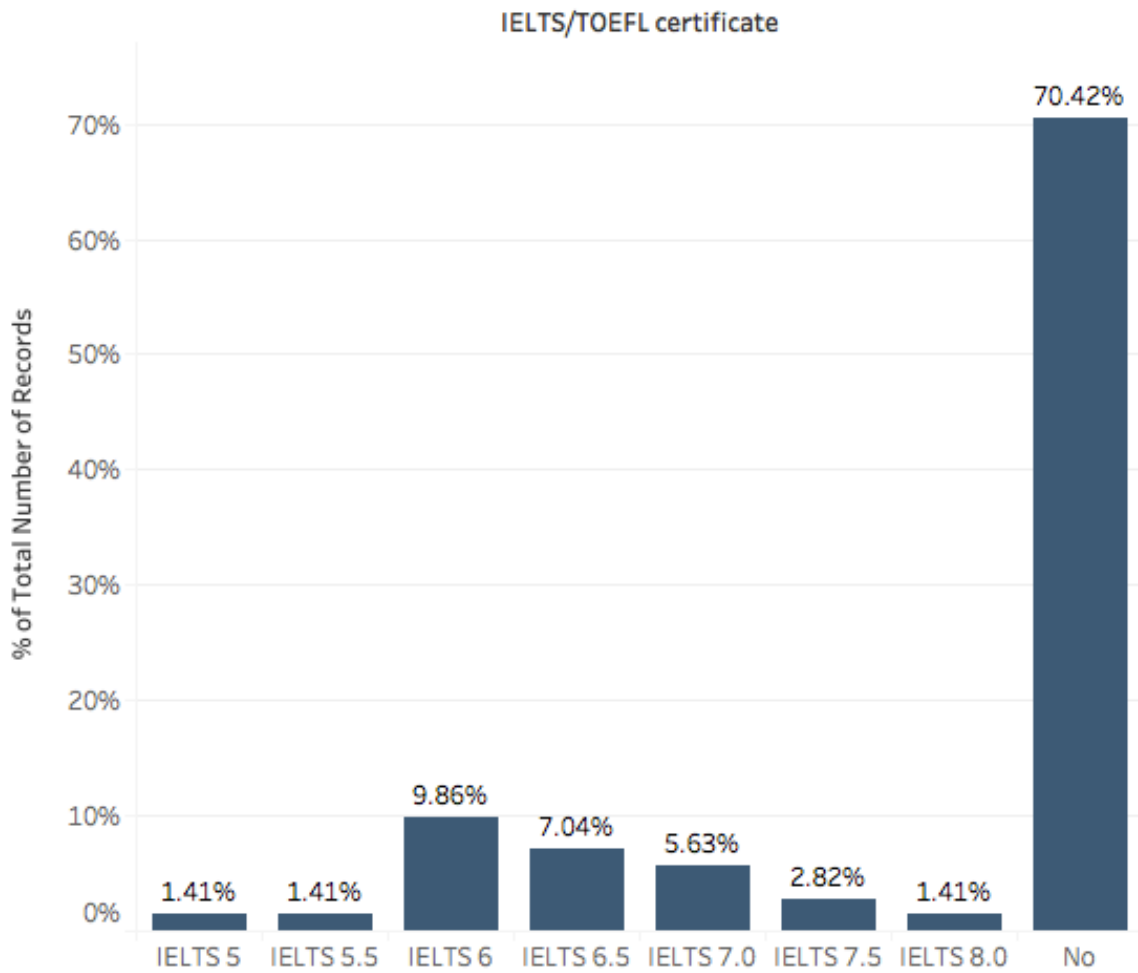


Chart 12. IELTS/TOEFL scores of all respondents

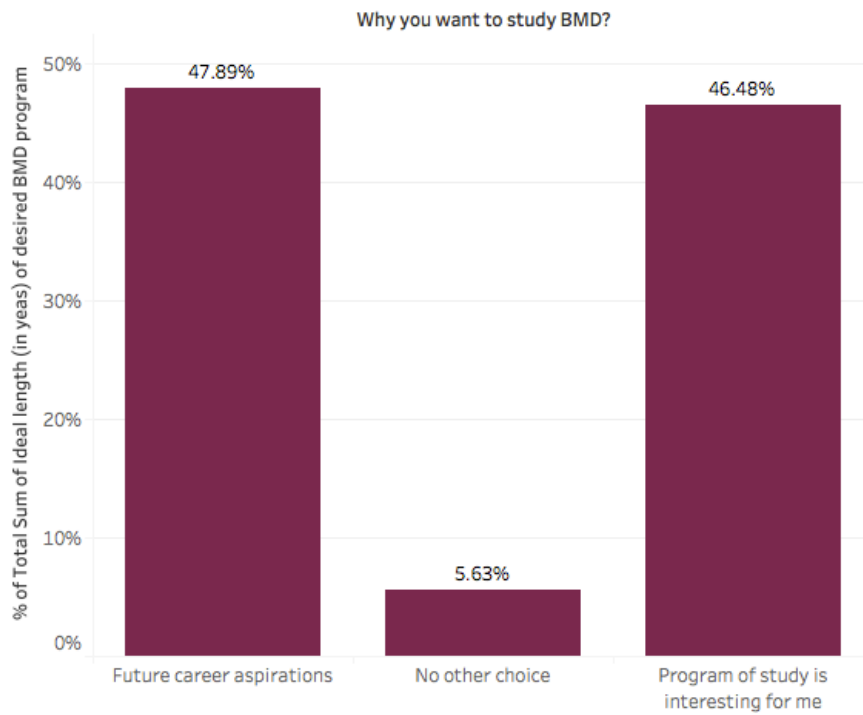


Chart 13. Main factors of choosing BMD program

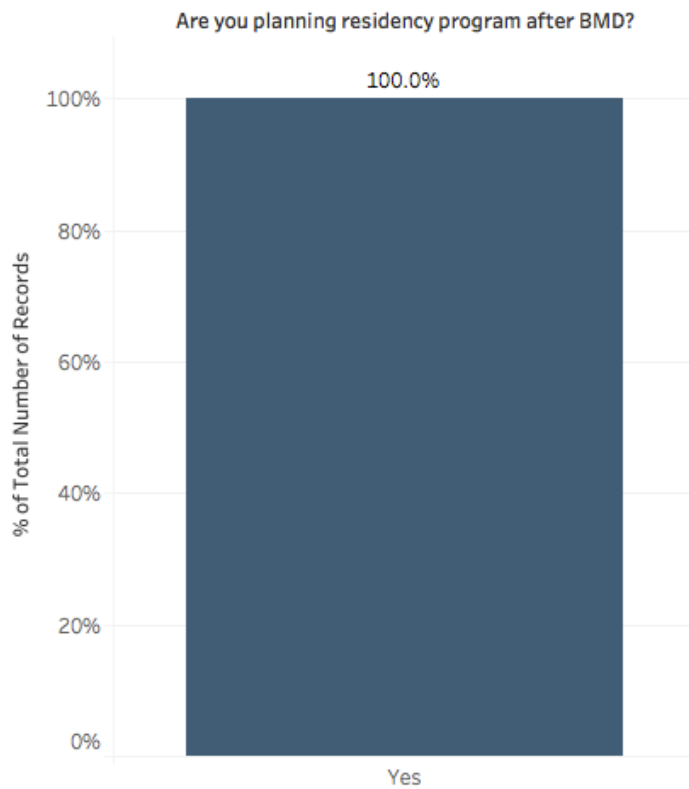


Chart 14. Plans for applying to Residency program after BMD graduation

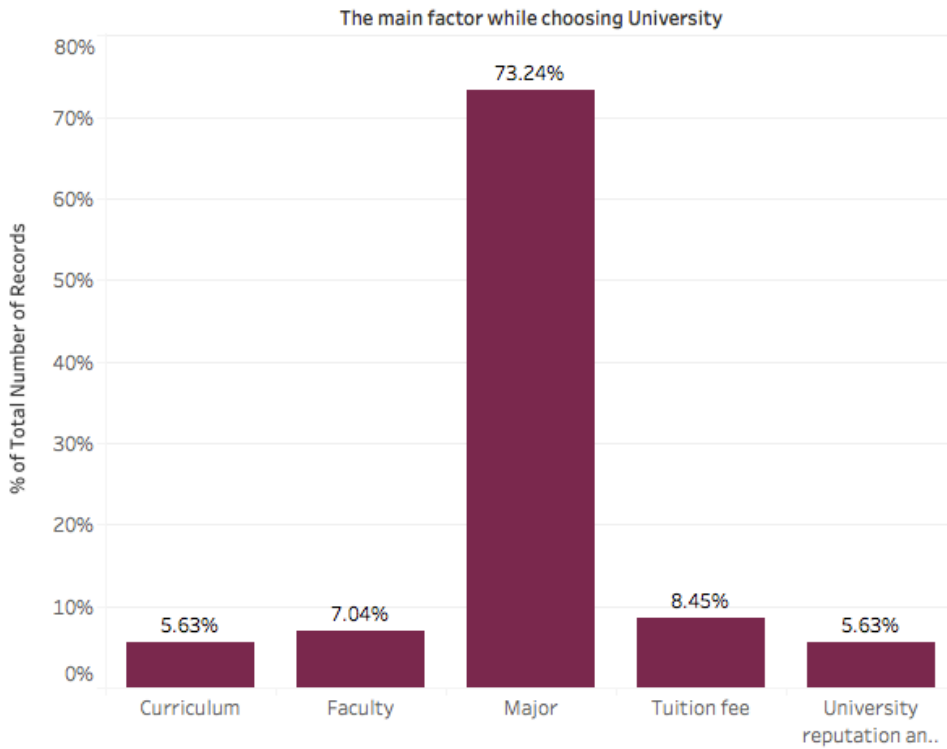


Chart 15. Main factors in choice of this university

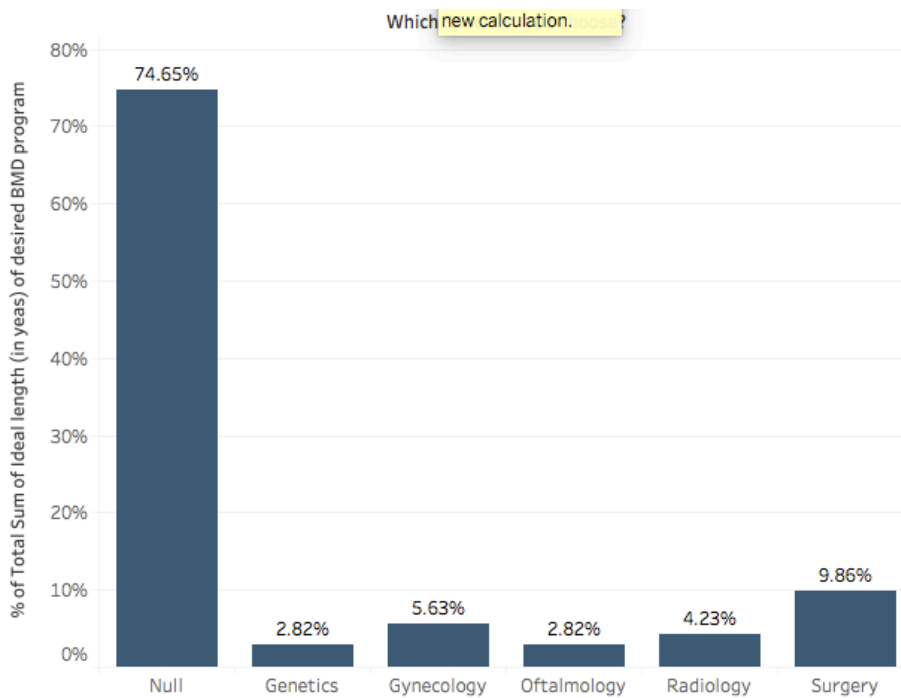


Chart 16. Preferred medical specialty

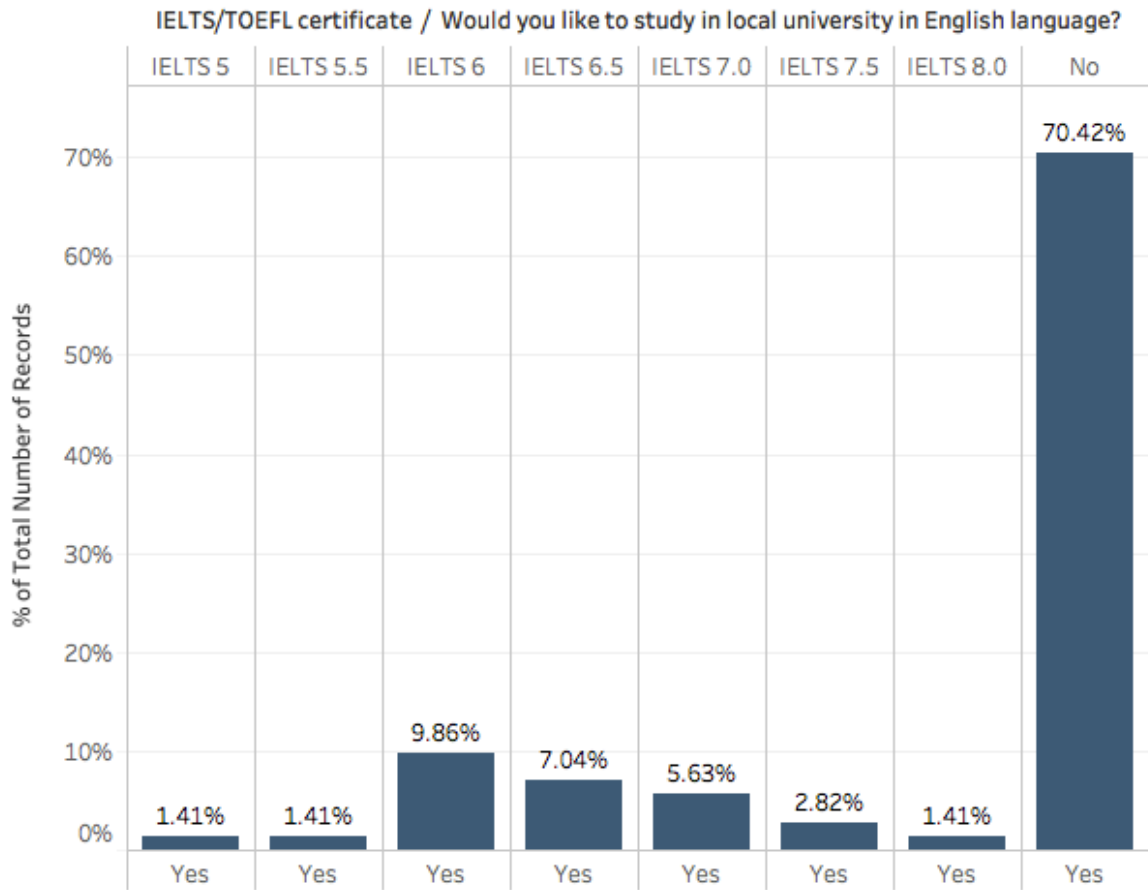


Chart 17. Demand for local BMD program in English among respondents with different levels of English proficiency

Appendix C

Curriculum design for BMD program at ADA University School of Medicine: complete results and statistics for three Delphi rounds sorted by final ranking and recommendations.

Delphi method is a research method of structured questionnaires or “rounds” to gather information on the principle of “group consensus”. Delphi team consists of 15 professionals from different fields of medicine.

In the current research Delphi technique was used, since this method is frequently used in situations where individual judgements and knowledge of professionals from the industry must be combined to complete state of the research, as it was in this BCP.

To form the Delphi team, 15 panelists were identified. Delphi team includes physicians, medical doctors, teachers of medical studies and researchers in different fields of medicine who completed questionnaires through 3 Delphi rounds. Analysis of new BMD curriculum (Knowledge topics, skills and experiences) design within ADA University School of Medicine was conducted based on the curriculum courses, skills and experiences’ analysis through 3 Delphi rounds.

Round 1

Topic Generation: Some general open-ended questions were submitted to the respondents to seek their opinion.

Question: In your opinion, what are the core knowledge, skills and experiences need to prepare BMD students to treat patients effectively?

Round 2

Rating and Weighting: After identifying most frequent core subjects, skills and experiences needed to prepare BMD students and design curriculum of the new program, Delphi team was asked to prioritize the subjects using Likert scale.

Question: Using rating scales below prioritize the curriculum content proposed in the previous round by Delphi team members.

Round 3

Final Categorization: After ranking all the subjects by priority, Delphi panelists were given the list of top courses and asked to sort them.

Question: Sort each curriculum topic into 3 categories: 1) Highly recommended 2) Partially recommended 3) Not recommended

Round 1 - Topic Generation

In the first-round questionnaire panelists were asked to list all core knowledge, skills and experience necessary for the BMD program design. Printed versions of questionnaire were distributed among the Delphi panelists and collated after 2 days. At the same time, online databases as Med Line, Med Portal, Medical Journal, Google Scholar, Scopus, Emerald, etc. were searched for the information, regarding program design, curriculum courses, experiences and skillset, applied by different universities in other countries. So, primary data was combined with the secondary data obtained from search. Generated ideas/courses, skills and experiences were clustered into emerging themes. These themes have become inputs for the next round.

In your opinion, what are the core knowledge, skills and experiences need to prepare BMD students to treat patients effectively?

Core knowledge in:

Skills:

Experiences:

Associate dean (AD):

Core knowledge in: Chemistry, Biology, Physics, Anatomy, Biochemistry, Microbiology, Immunology, Physiology, Cellular Biology, Genetics, Hygiene, Preventive care, Sociology, Pharmacology, Pathology, Geriatrics, Forensic medicine, Surgery, Radiology, Essentials of Diagnostics, Mental health and psychiatry, Palliative care, Ophthalmology, Otorhinolaryngology, Clinical Chemistry, Neuroscience, Gynecology and Obstetrics, Pediatrics, Gastroenterology, Endocrinology, Hematology, Cardiovascular pathophysiology

Skills: English Language, Latin, Medical Ethics, Emotional intelligence, Computer skills, Critical thinking, Analytical skills, Interpersonal skills, Leadership skills, Communication skills, Problem-solving skills, Decision-making process

Experiences: Team work and collaboration in groups, clinical rotation, hands-on experience, observership

Researcher 1 (R1):

Core knowledge in: Foundations of Medicine, Surgery, Biology, Chemistry, Economics, Sociology, Epidemiology, Genetics, Pharmacology, Psychopathology, clinical medicine, Pediatrics, Neurology, Radiology, Primary care, Microbiology, Immunology, Hematology, Musculoskeletal pathophysiology, Endocrinology, Cardiovascular pathophysiology, Social Medicine

Skills: Research skills, Critical thinking, Inquiry, English language skills, Problem solving, Analytical skills, Communication skills, Interpersonal skills

Experiences: Rotation, clerkship, exchange program, participation during surgeries and medical procedures with real patients

Researcher 2 (R2):

Core knowledge in: Medical Inquiry, Anatomy, Research methods, Latin, all fields and spheres of Medicine, Social care, Health studies, Surgery, Preventive medicine, Chemistry, Biology, Economics.

Skills: Research related skills, Critical thinking, Analytical thinking, Problem solving, Decision-making, Professional communication skills.

Experiences: real-case participation, case analysis, clerkship, residency, international experience

Gynecologist 1 (G1):

Core knowledge in: Physiology and pharmacology, Chemistry, Physics, Microbiology, Medical Genetics, Biology, Pharmacology, Obstetrics & Gynecology and Genito-urinary medicine, Anatomy, Psychopathology, Surgery, Endocrinology, Cardiovascular pathophysiology, Gastroenterology, Immunology, Epidemiology, Pathology, Psychology and Psychiatry, Neurobiology, Clinical Anatomy, Laboratory medicine, Surgery, Pediatrics, Orthopedics and muscle-skeletal medicine, Dermatology, Radiological Diagnostics, Palliative care, Public health, Primary care, Neurosurgery, Ophthalmology.

Skills: Communication skills, English and Latin language skills, Research methods, Problem solving skills, Critical analysis.

Experiences: Clinical experience, patient care experience, rotations, clerkship, hands-on experience.

Gynecologist 2 (G2):

Core knowledge in: Principles of Medicine, Clinical studies, Metabolism, Anatomy, Microbiology, Immunology, Gynecology, Obstetrics, Surgery, Genomics, Gastroenterology, Endocrinology, Cardiovascular system, Neuroscience, Reproduction system, Urinary system, Pediatrics, Psychiatry, Psychology, Mental health, Aged care, Economics, Sociology, Research and Inquiry

Skills: Advanced computer skills, Communication skills, Latin languages, Interpersonal skills, Team work skills, Problem solving skills, Negotiating skills

Experiences: Clinical experience and clerkship, international component of clinical and pre-clinical experience

Gynecologist 3 (G3):

Core knowledge in: Microbiology, Radiology, Ethics, Hematology, Diagnostics and Laboratory, Biochemistry, Pharmacology, Histology and Embryology, Anatomy, Physics, General, Blood and Respiratory Physiology, Psychology, Economics, Statistics, Social Science, Cells and Tissues, Cardiovascular, Gastro-Intestinal track and Renal physiology, Digestion, Nutrition and Metabolism, Genetics, Biostatistics, Endocrine and Reproductive Physiology, Pharmacology, General Pathology, Neuroanatomy, Neurophysiology, Immunology and Parasitology, Systemic pathology, Cariology, Surgery, Pediatrics, Gynecology and Obstetrics, clinical medicine, Medical Ethics, Dentistry, Anesthesia, Epidemiology,

Skills: Computer, Languages, Communications, Analytical and Critical, Community & diagnosis and Teamwork.

Experiences: Community health, pro bono experience in clinics, clerkship, rotation-based residency

Physician/Therapist 1 (Ph1):

Core knowledge in: Foundations of Medicine, Foundations of Professional Health Practice, Biostatistics and Epidemiology, Medical Anatomy, Medical Practice, Health Behaviors, Ethics, Qualitative and Quantitative Research methods, Surgery, Mental Health, Obstetrics & Gynecology, Pediatrics & Child Health, Medical Specialties, Preventive medicine.

Skills: Leadership, Critical thinking, Analytical thinking, Problem solving, Holistic thinking, English Language, Patient communication and ethics
Hands-on experience, observership

Physician/Therapist 2 (Ph2):

Core knowledge in: Physiology and pharmacology, Chemistry, Biochemistry, Physics, Biology, Microbiology, Genetics, Medical Sociology, Anatomy, Pathology, Psychology and Psychiatric, Medical Specialties, Immunology

Skills: Patient and doctor communication norms, Ethics, Analytical and Critical thinking, problem solving, informed decision making.

Experiences: clerkship, international observership

Physician/Therapist 3 (Ph3):

Core knowledge in: Anatomy, Obstetrics & Gynecology, Alimentary System, Gastroenterology, Endocrinology, Renal Medicine, Urology, Nutrition, Immunology, Hematology, Oncology, Preventative Medicine, Genito-Urinary Medicine, Neuroscience, Ophthalmology, Psychiatry, Psychology, Cardiology/ Cardiovascular Surgery, Biology, Chemistry, Pharmacology, Law, Economics, Sociology, Statistics.

Skills: Communication, Ethics, Problem solving skills

Experiences: clinical rotation-based clerkship, observership experience, program exchange

Physician/Therapist 4 (Ph4):

Dermatology, Family Medicine, Obstetrics and Gynecology, Emergency Medicine, Forensic Medicine, Dermatology, Venerology, Family Medicine, General Medicine, Medical Specialties and sub-specialties, Palliative Medicine, Pathology, Pharmacology, Immunohematology and transfusion medicine, Radio-Diagnosis, Radio-Therapy, Emergency and Critical care, Transfusion Medicine, Physical Medicine and Rehabilitation, Tropical Medicine, Social and Preventive Medicine

Skills: Communication and interpersonal skills

Experiences: rotation based clinical experience, hands-on experience, clerkship

Physician/Therapist 5 (Ph5):

Core knowledge in: Biophysics, Anatomy, Biology, Microbiology, Histology, Genetics and Embryology, Social medicine and Public Health, Parasitology and Immunology, Pharmacology, Physiology, Therapeutics, Semiology, Pathology, Pathophysiology, Psychopathology, Medical Specialties, Radiology, Diagnostical methodology, Laboratory classes, Surgery, Cardiology, Epidemiology, Legal medicine, Law, Sociology, Ethics

Skills: Language, communication, interpersonal, critical thinking, problem solving, decision making

Experiences: rotating internship, clerkship

Surgeon 1 (S1):

Core knowledge in: Chemistry, Biochemistry, Physics, Biology, Microbiology, Cell Biology, Anatomy, Latin, Ethics, Law and Legal Medicine, Scientific Statistics, Public Health, Preventive medicine, Surgery, Medical Specialties, Therapeutics, Diagnostical methodology, Pharmacology, Physiology, Sociology, Radiology, Immunology, Hematology, Human Molecular Genetics and Biotechnology, Genomics, Proteomics and Bioinformatics, Anesthesiology.

Skills: Leadership and teamwork, Patient communication, decision making, problem solving, Languages

Experiences: rotation based clinical experience and observership

Surgeon 2 (S2):

Core knowledge in: Human Anatomy, Neuroscience, Biology, Microbiology, Chemistry, Physics, Pharmacology, Infectious diseases, Immunology, Biological systems, Legal and Ethical principles in Healthcare, Preventive medicine, Human Physiology, Genetics and Evolutionary Biology, Biosciences Laboratory, Epidemiology, Metabolism, Integrative Medical Sciences, Pharmacology, Clinical Pathology, Forensic Medicine, Legal and Ethical Principles in Healthcare

Skills: Human skills for Medicine, Communication: A Linguistic Approach, Ethics, Interpersonal Skills, Psychology in Professional Contexts,

Experiences: international internship, clerkship, observership, rotational based medical practice

University professor 1 (UP1):

Core knowledge in: Research methods and Inquiry, Anatomy, Biology, Physics, Chemistry, All medical specialties, Integrative Medical Sciences, Pathology, Pharmacology, Dentistry, Immunology, Medical Sonography, Genetics and Reproductive physiology, Cancer biology/Oncology, Metabolism and Human nutrition, Molecular biology, Fetal and Maternal Pathophysiology, Public Health Practice and Research, Preventive Medicine, Ethical and Legal studies in Medicine, Pharmacokinetics and Biopharmaceutics, Neuroscience, Bioethics, Current Topics in Medical Research, Radiology, Anthropometry

Skills: Communication, Decision-making, Leadership, Analytical thinking

Experiences: community internship, international clerkship, rotation based clinical experience, observership, research project, hands-on experience

University professor 2 (UP2):

Core knowledge in: Research for Medical professionals, Anatomy, Pathology, Pharmacology, Immunology, Metabolism and nutrition, Medical specialties and subspecialties, Neuroscience, Physiology, Cell Biology, Microbiology, Chemistry, Biochemistry, Organic Chemistry, Physics, Ethics, Legal Medicine, Medical Genetics, Physiology, Foundations of Medical Science, Public Health, Preventive medicine, Human skills for medicine, Epidemiology, Hematology, Histology,

Skills: Research, Analytical thinking, Critical thinking, Problem solving, Interpersonal skills, team work, Leadership, Patient care

Experiences: Research project, Rotations, clerkship, international practice

Round 1.
Findings:

All collected responses of Round 1 were processed via NVIVO 12 software

Knowledge topics:

Word	Length	Count	Weighted Percentage
medicine	8	38	8.35%
biology	7	17	3.74%
pharmacology	12	15	3.30%
anatomy	7	14	3.08%
chemistry	9	12	2.64%
Health studies	6	12	2.64%
immunology	10	12	2.64%
physiology	10	12	2.64%
surgery	7	11	2.42%
genetics	8	10	2.20%
microbiology	12	10	2.20%
pathology	9	10	2.20%
physics	7	9	1.98%
Preventive medicine	10	9	1.98%
ethics	6	9	1.98%
Research project	8	9	1.98%
radiology	9	7	1.54%
epidemiology	12	7	1.54%
gynecology	10	7	1.54%
obstetrics	10	7	1.54%
sociology	9	7	1.54%
Cardiovascular system	14	6	1.32%
hematology	10	6	1.32%
Law	5	6	1.32%
neuroscience	12	6	1.32%
pathophysiology	15	6	1.32%
pediatrics	10	6	1.32%
biochemistry	12	5	1.10%
diagnostics	11	5	1.10%
economics	9	5	1.10%
endocrinology	13	5	1.10%
metabolism	10	5	1.10%
psychology	10	5	1.10%
gastroenterology	16	4	0.88%
Laboratory work	10	4	0.88%
Nutrition studies	9	4	0.88%
psychiatry	10	4	0.88%

Cell biology	4	3	0.66%
Reproductive system	12	3	0.66%
dermatology	11	3	0.66%
Forensic medicine	8	3	0.66%
histology	9	3	0.66%
inquiry	7	3	0.66%
Mental health	6	3	0.66%
ophthalmology	13	3	0.66%
Palliative medicine	10	3	0.66%
psychopathology	15	3	0.66%
statistics	10	3	0.66%
biostatistics	13	2	0.44%
cardiology	10	2	0.44%
dentistry	9	2	0.44%
embryology	10	2	0.44%
emergency	9	2	0.44%
genomics	8	2	0.44%
healthcare	10	2	0.44%
integrative	11	2	0.44%
Latin	5	2	0.44%
oncology	8	2	0.44%
parasitology	12	2	0.44%
therapeutics	12	2	0.44%
transfusion	11	2	0.44%
anesthesiology	14	1	0.22%
anthropometry	13	1	0.22%
bioethics	9	1	0.22%
bioinformatics	14	1	0.22%
biopharmaceutics	16	1	0.22%
biophysics	10	1	0.22%
Cellular biology	8	1	0.22%
diagnosis	9	1	0.22%
Digestion system	9	1	0.22%
diseases	8	1	0.22%
Endocrine system	9	1	0.22%
Essentials of Medicine	10	1	0.22%
Fetal medicine	5	1	0.22%
geriatrics	10	1	0.22%
hygiene	7	1	0.22%

Skills

Word	Length	Count	Weighted Percentage
communication skills	13	14	14.14%
problem-solving skills	7	11	11.11%
analytical skills	10	8	8.08%
language skills	8	8	8.08%
interpersonal skills	13	7	7.07%
decision-making skills	8	6	6.06%
leadership skills	10	5	5.05%
research skills	8	4	4.04%
computer skills	8	3	3.03%
teamwork	8	2	2.02%

Experiences

Word	Length	Count	Weighted Percentage
clerkship	9	12	17.14%
Clinical rotations	9	11	15.71%
observership	12	7	10.00%
International experience	13	6	8.57%
Hands-on experience	5	5	7.14%
internship	10	3	4.29%
Case practice	4	2	2.86%
Community work	9	2	2.86%
Exchange program	8	2	2.86%
Research project	8	2	2.86%
Residency program	9	2	2.86%
Clinical practice	7	1	1.43%
Group work	6	1	1.43%

Table 4. Interview content analysis was processed via NVivo 12 Subject knowledge Word frequency analysis tool

Based on the NVIVO Frequency analysis, top frequent core courses, skills and experiences were identified to be used in the round 2 of Delphi method. A total of 157 items were collected from Delphi team participants in Round 1, with an average of 13 items per participant (range 10-35 items). After the removal of duplicate items (n=68) 99 items were categorized into 76 core courses, 10 skills and 13 experiences.

Round 2

Rating and Weighting:

After identifying most frequent core subjects, skills and experiences needed to prepare BMD students and design curriculum of the new program, Delphi team was asked to rate the importance of each item on a 5-point Likert scale ranging from 0 (not important) to 5 (very important).

Using rating scales below prioritize the curriculum content proposed in the previous round

Knowledge subjects

5=Very important, 4=Considerable important, 3=Moderate important, 2=Minimum important, 1=Not important at all

Skills

5=Very important, 4=Considerable important, 3=Moderate important, 2=Minimum important, 1=Not important at all

Experiences

5=Very important, 4=Considerable important, 3=Moderate important, 2=Minimum important, 1=Not important at all

The Round 2 ratings of importance for the total of 99 items across the categories of importance were: very important (very high - 42%), considerable important (high – 25%), moderate important (moderate – 18%), minimum important (low – 9%), not important at all (n/a – 7%).

Topic and nominations	Weighted Percentage	A D	R 1	R 2	G1	G2	G3	Ph1	Ph2	Ph3	Ph4	Ph5	S1	S2	UP1	UP 2	Mean
anatomy (14)	3.08%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
cardiology (2)	0.44%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
cardiovascular system (6)	1.32%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
chemistry (12)	2.64%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
gastroenterology (4)	0.88%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
medicine (38)	8.35%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
neuroscience (6)	1.32%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
oncology (2)	0.44%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
pharmacology (15)	3.30%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
surgery (11)	2.42%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
therapeutics (2)	0.44%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
endocrinology (5)	1.10%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
hematology (6)	1.32%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
Latin (2)	0.44%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
pathology (10)	2.20%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
pediatrics (6)	1.32%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
psychology	1.01%	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.93
biology (17)	3.74%	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5	4.87
ophthalmology (3)	0.66%	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	4.87
diagnostics (5)	1.10%	4	5	5	5	5	5	5	5	5	5	4	4	5	5	5	4.80
gynecology (7)	1.54%	4	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4.80

histology (3)	0.66%	3	5	5	5	5	5	5	5	5	4	5	5	5	5	4.80
cell biology (3)	0.66%	5	4	4	4	4	5	5	5	5	5	5	5	5	5	4.73
immunology (12)	2.64%	3	4	4	4	5	5	5	5	5	5	5	5	5	5	4.67
physiology (12)	2.64%	3	4	4	5	5	5	5	5	5	5	5	5	5	4	4.67
psychiatry (4)	0.88%	5	5	4	5	4	5	4	5	4	5	4	5	5	5	4.67
obstetrics (7)	1.54%	4	4	5	4	5	4	4	5	4	5	5	5	5	5	4.60
psychopathology (3)	0.66%	5	5	5	5	5	5	4	4	4	4	4	4	5	5	4.60
microbiology (10)	2.20%	5	4	5	4	5	4	5	4	5	4	5	4	5	4	4.53
parasitology (2)	0.44%	3	5	4	5	4	5	4	5	5	5	4	4	4	5	4.47
reproductive medicine (3)	0.66%	3	5	4	4	4	4	4	5	5	5	5	5	5	5	4.53
biochemistry (5)	1.10%	5	5	4	4	5	4	5	4	4	5	5	4	4	4	4.47
embryology (2)	0.44%	4	5	4	5	3	4	3	4	3	4	5	5	5	5	4.27
dermatology (3)	0.66%	3	5	4	4	4	4	4	4	4	4	5	5	5	5	4.33
ethics (9)	1.98%	5	3	4	3	4	5	5	5	5	5	4	4	4	4	4.27
inquiry (3)	0.66%	4	5	5	4	4	4	4	4	4	4	4	5	4	5	4.33
diseases (1)	0.22%	4	4	4	4	4	4	4	4	4	4	4	4	5	5	4.27
mental health (3)	0.66%	2	4	3	4	5	5	3	2	4	5	3	4	3	4	3.73
fetal medicine (1)	0.22%	5	3	3	3	3	3	3	3	4	2	2	4	4	5	3.47
genetics (10)	2.20%	5	4	2	3	3	4	4	4	4	4	5	3	4	3	3.67
genomics (2)	0.44%	3	3	3	3	2	3	2	3	3	3	2	2	3	5	3.00
healthcare (2)	0.44%	4	3	3	3	2	2	2	1	1	1	4	4	4	5	2.93
preventive medicine (9)	1.98%	2	4	4	4	4	4	5	5	4	3	3	3	3	3	3.60
digestion system(1)	0.22%	4	4	4	4	4	4	4	4	4	3	3	3	2	4	3.73
hygiene (1)	0.22%	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.07
integrative (2)	0.44%	1	5	4	4	4	4	4	4	4	3	3	3	4	4	3.67
pathophysiology (6)	1.32%	5	4	3	3	4	3	3	3	3	3	3	3	3	3	3.27
anesthesiology (1)	0.22%	1	3	3	3	3	4	4	2	2	2	3	3	4	4	3.00
anthropometry (1)	0.22%	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1.20
bioethics (1)	0.22%	3	1	1	2	2	2	2	2	2	2	1	1	2	2	1.87
bioinformatics (1)	0.22%	1	2	1	1	2	2	2	2	3	3	3	3	3	3	2.27
biopharmaceutics (1)	0.22%	1	1	2	2	2	1	1	1	1	1	1	1	2	2	1.40
biophysics (1)	0.22%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.00
biostatistics (2)	0.44%	3	2	1	2	1	2	1	2	3	3	2	2	3	3	2.20
dentistry (2)	0.44%	4	4	4	4	4	4	4	4	4	4	4	3	3	4	3.87
economics (5)	1.10%	3	2	2	3	3	3	2	1	1	2	2	1	1	3	2.20
emergency care(2)	0.44%	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3.93
epidemiology (7)	1.54%	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3.93
forensic medicine (3)	0.66%	3	3	2	1	3	2	1	2	2	2	2	2	3	3	2.27
geriatrics (1)	0.22%	4	2	2	2	2	3	3	3	2	2	1	1	4	4	2.67
health studies (12)	2.64%	2	4	3	4	3	3	3	3	3	3	2	1	2	1	2.53
Law(6)	1.32%	3	3	1	1	2	3	4	3	4	4	3	3	3	3	2.87
metabolism (5)	1.10%	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3.20
nutrition (4)	0.88%	3	3	3	3	3	4	4	4	3	3	3	4	4	3	3.33

palliative (3)	0.66%	3	3	3	3	3	3	2	2	2	4	3	2	1	3	2	2.60
physics (9)	1.98%	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	3.47
psychology (5)	1.10%	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.07
radiology (7)	1.54%	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	3.40
sociology (7)	1.54%	2	2	2	2	2	1	1	1	1	1	2	2	2	1	1	1.53
statistics (3)	0.66%	3	3	4	3	3	3	2	3	4	3	4	3	3	3	3	3.13
transfusion medicine (2)	0.44%	1	3	3	3	3	3	2	2	2	2	2	3	3	3	4	2.60
communication	14.14%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
problem-solving	22.00%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
analytical skills	8.08%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
research skills	7.77%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
communication skills	7.25%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
clerkship	6.22%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
clinical rotations hands-on experience	5.70%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
teamwork	2.59%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.00
leadership skills	2.02%	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	4.93
computer skills	5.05%	4	4	5	5	5	4	3	5	5	5	5	5	5	5	5	4.67
observership experience	3.03%	4	4	5	5	5	5	5	5	5	5	4	4	4	5	5	4.67
international experience	3.63%	5	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4.67
laboratory experience	3.11%	5	5	4	4	4	4	4	4	4	5	5	5	5	5	5	4.53
English skills	2.07%	4	4	5	5	4	4	4	4	4	4	5	5	5	5	5	4.47
laboratory sciences (4)	12.00%	4	4	3	4	3	4	3	4	3	5	5	5	5	5	5	4.13
interpersonal skills	0.88%	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4.13
community care	7.07%	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.00
	1.01%	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.00

Table 5. Collected responses from Delphi team per each item, mean score and weighted average

These responses are essential for calculating the strength score for each item from the list above.

Strength Score= The sum of weighted frequencies, (total points) resulting from multiplying the number of participants selecting a rating (frequency of occurrence) by the Value of the rating from the Likert-type scale (strength score definition was adopted from the research of (Mitzman, 2017).

Topic and nominations	Mean	Strength Score	Weighted Percentage
anatomy (14)	5.00	75	3.08%
cardiology (2)	5.00	75	0.44%
cardiovascular system (6)	5.00	75	1.32%
chemistry (12)	5.00	75	2.64%
gastroenterology (4)	5.00	75	0.88%
medicine (38)	5.00	75	8.35%
neuroscience (6)	5.00	75	1.32%
oncology (2)	5.00	75	0.44%
pharmacology (15)	5.00	75	3.30%
surgery (11)	5.00	75	2.42%
therapeutics (2)	5.00	75	0.44%

endocrinology (5)	4.93	74	1.10%
hematology (6)	4.93	74	1.32%
Latin (2)	4.93	74	0.44%
pathology (10)	4.93	74	2.20%
pediatrics (6)	4.93	74	1.32%
psychology	4.93	74	1.01%
biology (17)	4.87	73	3.74%
ophthalmology (3)	4.87	73	0.66%
diagnostics (5)	4.80	72	1.10%
gynecology (7)	4.80	72	1.54%
histology (3)	4.80	72	0.66%
cell biology (3)	4.73	71	0.66%
immunology (12)	4.67	70	2.64%
physiology (12)	4.67	70	2.64%
psychiatry (4)	4.67	70	0.88%
obstetrics (7)	4.60	69	1.54%
psychopathology (3)	4.60	69	0.66%
microbiology (10)	4.53	68	2.20%
parasitology (2)	4.47	67	0.44%
reproductive medicine (3)	4.53	68	0.66%
biochemistry (5)	4.47	67	1.10%
embryology (2)	4.27	64	0.44%
dermatology (3)	4.33	65	0.66%
ethics (9)	4.27	64	1.98%
inquiry (3)	4.33	65	0.66%
diseases (1)	4.27	64	0.22%
mental health (3)	3.73	56	0.66%
fetal medicine (1)	3.47	52	0.22%
genetics (10)	3.67	55	2.20%
genomics (2)	3.00	45	0.44%
healthcare (2)	2.93	44	0.44%
preventive medicine (9)	3.60	54	1.98%
digestion system(1)	3.73	56	0.22%
hygiene (1)	4.07	61	0.22%
integrative (2)	3.67	55	0.44%
pathophysiology (6)	3.27	49	1.32%
anesthesiology (1)	3.00	45	0.22%
anthropometry (1)	1.20	18	0.22%
bioethics (1)	1.87	28	0.22%
bioinformatics (1)	2.27	34	0.22%
biopharmaceutics (1)	1.40	21	0.22%
biophysics (1)	1.00	15	0.22%
biostatistics (2)	2.20	33	0.44%
dentistry (2)	3.87	58	0.44%
economics (5)	2.20	33	1.10%
emergency care(2)	3.93	59	0.44%
epidemiology (7)	3.93	59	1.54%
forensic medicine (3)	2.27	34	0.66%
geriatrics (1)	2.67	40	0.22%
health studies (12)	2.53	38	2.64%
Law(6)	2.87	43	1.32%
metabolism (5)	3.20	48	1.10%
nutrition (4)	3.33	50	0.88%

palliative (3)	2.60	39	0.66%
physics (9)	3.47	52	1.98%
psychology (5)	3.07	46	1.10%
radiology (7)	3.40	51	1.54%
sociology (7)	1.53	23	1.54%
statistics (3)	3.13	47	0.66%
transfusion medicine (2)	2.60	39	0.44%
communication	5.00	75	14.14%
problem-solving	5.00	75	22.00%
analytical skills	5.00	75	8.08%
research skills	5.00	75	7.77%
communication skills	5.00	75	7.25%
clerkship	5.00	75	6.22%
clinical rotations	5.00	75	5.70%
hands-on experience	5.00	75	2.59%
teamwork	4.93	74	2.02%
leadership skills	4.67	70	5.05%
computer skills	4.67	70	3.03%
observership experience	4.67	70	3.63%
international experience	4.53	68	3.11%
laboratory experience	4.47	67	2.07%
English skills	4.13	62	12.00%
laboratory sciences (4)	4.13	62	0.88%
interpersonal skills	4.00	60	7.07%
community care	4.00	60	1.01%

Table 6. Collected responses from Delphi team per each item, mean score, strength score and weighted average

Based on the responses above, frequency percentage per category of Likert scale was calculated

Frequency (in %) per category					
Topic and nominations	5	4	3	2	1
anatomy (14)	100%	0%	0%	0%	0%
cardiology (2)	100%	0%	0%	0%	0%
cardiovascular system (6)	100%	0%	0%	0%	0%
chemistry (12)	100%	0%	0%	0%	0%
gastroenterology (4)	100%	0%	0%	0%	0%
medicine (38)	100%	0%	0%	0%	0%
neuroscience (6)	100%	0%	0%	0%	0%
oncology (2)	100%	0%	0%	0%	0%
pharmacology (15)	100%	0%	0%	0%	0%
surgery (11)	100%	0%	0%	0%	0%
therapeutics (2)	100%	0%	0%	0%	0%
endocrinology (5)	93%	7%	0%	0%	0%
hematology (6)	93%	7%	0%	0%	0%
Latin (2)	93%	7%	0%	0%	0%
pathology (10)	93%	7%	0%	0%	0%

pediatrics (6)	93%	7%	0%	0%	0%
psychology	93%	7%	0%	0%	0%
biology (17)	87%	13%	0%	0%	0%
ophthalmology (3)	87%	13%	0%	0%	0%
diagnostics (5)	80%	20%	0%	0%	0%
gynecology (7)	80%	20%	0%	0%	0%
histology (3)	87%	7%	7%	0%	0%
cell biology (3)	73%	27%	0%	0%	0%
immunology (12)	73%	20%	7%	0%	0%
physiology (12)	73%	20%	7%	0%	0%
psychiatry (4)	67%	33%	0%	0%	0%
obstetrics (7)	60%	40%	0%	0%	0%
psychopathology (3)	60%	40%	0%	0%	0%
microbiology (10)	53%	47%	0%	0%	0%
parasitology (2)	53%	40%	7%	0%	0%
reproductive medicine (3)	60%	33%	7%	0%	0%
biochemistry (5)	47%	53%	0%	0%	0%
embryology (2)	47%	33%	20%	0%	0%
dermatology (3)	40%	53%	7%	0%	0%
ethics (9)	40%	47%	13%	0%	0%
inquiry (3)	33%	67%	0%	0%	0%
diseases (1)	27%	73%	0%	0%	0%
mental health (3)	27%	33%	27%	13%	0%
fetal medicine (1)	20%	20%	47%	13%	0%
genetics (10)	13%	47%	33%	7%	0%
genomics (2)	13%	0%	60%	27%	0%
healthcare (2)	13%	27%	20%	20%	20%
preventive medicine (9)	13%	40%	40%	7%	0%
digestion system(1)	7%	67%	20%	7%	0%
hygiene (1)	7%	93%	0%	0%	0%
integrative (2)	7%	67%	20%	0%	7%
pathophysiology (6)	7%	13%	80%	0%	0%
anesthesiology (1)	0%	33%	40%	20%	7%
anthropometry (1)	0%	0%	0%	20%	80%
bioethics (1)	0%	0%	13%	60%	27%
bioinformatics (1)	0%	0%	47%	33%	20%
biopharmaceutics (1)	0%	0%	0%	40%	60%
biophysics (1)	0%	0%	0%	0%	100%
biostatistics (2)	0%	0%	40%	40%	20%
dentistry (2)	0%	87%	13%	0%	0%
economics (5)	0%	7%	33%	33%	27%
emergency care(2)	0%	93%	7%	0%	0%
epidemiology (7)	0%	93%	7%	0%	0%
forensic medicine (3)	0%	0%	40%	47%	13%
geriatrics (1)	0%	27%	20%	40%	13%
health studies (12)	0%	13%	47%	20%	20%
Law(6)	0%	20%	60%	7%	13%
metabolism (5)	0%	20%	80%	0%	0%
nutrition (4)	0%	33%	67%	0%	0%
palliative (3)	0%	7%	53%	33%	7%
physics (9)	0%	73%	0%	27%	0%
psychology (5)	0%	7%	93%	0%	0%
radiology (7)	0%	40%	60%	0%	0%

sociology (7)	0%	0%	0%	53%	47%
statistics (3)	0%	20%	73%	7%	0%
transfusion medicine (2)	0%	7%	53%	33%	7%
communication	100%	0%	0%	0%	0%
problem-solving	100%	0%	0%	0%	0%
analytical skills	100%	0%	0%	0%	0%
research skills	100%	0%	0%	0%	0%
communication skills	100%	0%	0%	0%	0%
clerkship	100%	0%	0%	0%	0%
clinical rotations	100%	0%	0%	0%	0%
hands-on experience	100%	0%	0%	0%	0%
teamwork	93%	7%	0%	0%	0%
leadership skills	73%	20%	7%	0%	0%
computer skills	67%	33%	0%	0%	0%
observership experience	67%	33%	0%	0%	0%
international experience	53%	47%	0%	0%	0%
laboratory experience	47%	53%	0%	0%	0%
English skills	40%	33%	27%	0%	0%
laboratory sciences (4)	13%	87%	0%	0%	0%
interpersonal skills	0%	100%	0%	0%	0%
community care	0%	100%	0%	0%	0%
Average	47%	26%	15%	7%	5%

Table 7. Collected responses from Delphi team per each item, Likert scale frequency (in %) analysis results with average indicators

Then Percent endorsed was calculated:

Pct. Endorsed= The percentage of panelists out of 15 from Round 2 who endorsed the item by selecting the highest rating: "Very important" from Round 2 (percentage endorsed as definition was adopted from the research of (Mitzman, 2017).

Topic and nominations	Pct. Endorsed
anatomy (14)	100%
cardiology (2)	100%
cardiovascular system (6)	100%
chemistry (12)	100%
gastroenterology (4)	100%
medicine (38)	100%
neuroscience (6)	100%
oncology (2)	100%
pharmacology (15)	100%
surgery (11)	100%
therapeutics (2)	100%
endocrinology (5)	93%
hematology (6)	93%
Latin (2)	93%
pathology (10)	93%

pediatrics (6)	93%
psychology	93%
biology (17)	87%
ophthalmology (3)	87%
diagnostics (5)	80%
gynecology (7)	80%
histology (3)	80%
cell biology (3)	73%
immunology (12)	73%
physiology (12)	73%
psychiatry (4)	67%
obstetrics (7)	60%
psychopathology (3)	60%
microbiology (10)	53%
parasitology (2)	53%
reproductive medicine (3)	53%
biochemistry (5)	47%
embryology (2)	47%
dermatology (3)	40%
ethics (9)	40%
inquiry (3)	33%
diseases (1)	27%
mental health (3)	27%
fetal medicine (1)	20%
genetics (10)	13%
genomics (2)	13%
healthcare (2)	13%
preventive medicine (9)	13%
digestion system(1)	7%
hygiene (1)	7%
integrative (2)	7%
pathophysiology (6)	7%
anesthesiology (1)	0%
anthropometry (1)	0%
bioethics (1)	0%
bioinformatics (1)	0%
biopharmaceutics (1)	0%
biophysics (1)	0%
biostatistics (2)	0%
dentistry (2)	0%
economics (5)	0%
emergency care(2)	0%
epidemiology (7)	0%
forensic medicine (3)	0%
geriatrics (1)	0%
health studies (12)	0%
Law(6)	0%
metabolism (5)	0%
nutrition (4)	0%
palliative (3)	0%
physics (9)	0%
psychology (5)	0%
radiology (7)	0%

sociology (7)	0%
statistics (3)	0%
transfusion medicine (2)	0%
communication	100%
problem-solving	100%
analytical skills	100%
research skills	100%
communication skills	100%
clerkship	100%
clinical rotations	100%
hands-on experience	100%
teamwork	93%
leadership skills	73%
computer skills	67%
observership experience	67%
international experience	53%
laboratory experience	47%
English skills	40%
laboratory sciences (4)	13%
interpersonal skills	0%
community care	0%

Table 8. Collected responses from Delphi team per each item, percent endorsed calculations

Round 2 Findings:

After calculating mean score, strength score, pct. endorsed, frequency (in %) per category of Likert scale all items were ranked and categorized into Recommended (Must teach), Optional (Electives) and Not required. In addition, panelists recommended skills and experiences they think are crucial to gain the required knowledge from the BMD program. Although the final list of courses, skills and experiences did not reach the final consensus.

Topic and nominations	N (of respondents/panel ists)	Pct. Endorse d	Mean	Strength Score	Weighted Percentage
anatomy (14)	15	100%	5.00	75	3.08%
cardiology (2)	15	100%	5.00	75	0.44%
cardiovascular system (6)	15	100%	5.00	75	1.32%
chemistry (12)	15	100%	5.00	75	2.64%
gastroenterology (4)	15	100%	5.00	75	0.88%
medicine (38)	15	100%	5.00	75	8.35%
neuroscience (6)	15	100%	5.00	75	1.32%
oncology (2)	15	100%	5.00	75	0.44%
pharmacology (15)	15	100%	5.00	75	3.30%
surgery (11)	15	100%	5.00	75	2.42%
therapeutics (2)	15	100%	5.00	75	0.44%
endocrinology (5)	15	93%	4.93	74	1.10%
hematology (6)	15	93%	4.93	74	1.32%
Latin (2)	15	93%	4.93	74	0.44%
pathology (10)	15	93%	4.93	74	2.20%
pediatrics (6)	15	93%	4.93	74	1.32%
psychology	15	93%	4.93	74	1.01%
biology (17)	15	87%	4.87	73	3.74%
ophthalmology (3)	15	87%	4.87	73	0.66%
diagnostics (5)	15	80%	4.80	72	1.10%
gynecology (7)	15	80%	4.80	72	1.54%
histology (3)	15	80%	4.80	72	0.66%
cell biology (3)	15	73%	4.73	71	0.66%
immunology (12)	15	73%	4.67	70	2.64%
physiology (12)	15	73%	4.67	70	2.64%
psychiatry (4)	15	67%	4.67	70	0.88%
obstetrics (7)	15	60%	4.60	69	1.54%
psychopathology (3)	15	60%	4.60	69	0.66%
microbiology (10)	15	53%	4.53	68	2.20%
parasitology (2)	15	53%	4.47	67	0.44%
reproductive medicine (3)	15	53%	4.53	68	0.66%
biochemistry (5)	15	47%	4.47	67	1.10%
embryology (2)	15	47%	4.27	64	0.44%
dermatology (3)	15	40%	4.33	65	0.66%
ethics (9)	15	40%	4.27	64	1.98%
inquiry (3)	15	33%	4.33	65	0.66%
diseases (1)	15	27%	4.27	64	0.22%
mental health (3)	15	27%	3.73	56	0.66%
fetal medicine (1)	15	20%	3.47	52	0.22%
genetics (10)	15	13%	3.67	55	2.20%
genomics (2)	15	13%	3.00	45	0.44%

healthcare (2)	15	13%	2.93	44	0.44%
preventive medicine (9)	15	13%	3.60	54	1.98%
digestion system(1)	15	7%	3.73	56	0.22%
hygiene (1)	15	7%	4.07	61	0.22%
integrative (2)	15	7%	3.67	55	0.44%
pathophysiology (6)	15	7%	3.27	49	1.32%
anesthesiology (1)	15	0%	3.00	45	0.22%
anthropometry (1)	15	0%	1.20	18	0.22%
bioethics (1)	15	0%	1.87	28	0.22%
bioinformatics (1)	15	0%	2.27	34	0.22%
biopharmaceutics (1)	15	0%	1.40	21	0.22%
biophysics (1)	15	0%	1.00	15	0.22%
biostatistics (2)	15	0%	2.20	33	0.44%
dentistry (2)	15	0%	3.87	58	0.44%
economics (5)	15	0%	2.20	33	1.10%
emergency care(2)	15	0%	3.93	59	0.44%
epidemiology (7)	15	0%	3.93	59	1.54%
forensic medicine (3)	15	0%	2.27	34	0.66%
geriatrics (1)	15	0%	2.67	40	0.22%
health studies (12)	15	0%	2.53	38	2.64%
Law(6)	15	0%	2.87	43	1.32%
metabolism (5)	15	0%	3.20	48	1.10%
nutrition (4)	15	0%	3.33	50	0.88%
palliative (3)	15	0%	2.60	39	0.66%
physics (9)	15	0%	3.47	52	1.98%
psychology (5)	15	0%	3.07	46	1.10%
radiology (7)	15	0%	3.40	51	1.54%
sociology (7)	15	0%	1.53	23	1.54%
statistics (3)	15	0%	3.13	47	0.66%
transfusion medicine (2)	15	0%	2.60	39	0.44%
communication	15	100%	5.00	75	14.14%
problem-solving	15	100%	5.00	75	22.00%
analytical skills	15	100%	5.00	75	8.08%
research skills	15	100%	5.00	75	7.77%
communication skills	15	100%	5.00	75	7.25%
clerkship	15	100%	5.00	75	6.22%
clinical rotations	15	100%	5.00	75	5.70%
hands-on experience	15	100%	5.00	75	2.59%
teamwork	15	93%	4.93	74	2.02%
leadership skills	15	73%	4.67	70	5.05%
computer skills	15	67%	4.67	70	3.03%
observership experience	15	67%	4.67	70	3.63%
international experience	15	53%	4.53	68	3.11%
laboratory experience	15	47%	4.47	67	2.07%
English skills	15	40%	4.13	62	12.00%
laboratory sciences (4)	15	13%	4.13	62	0.88%
interpersonal skills	15	0%	4.00	60	7.07%
community care	15	0%	4.00	60	1.01%

Table 9. Collected responses from Delphi team per each selected item, percent endorsed, weighted averages, mean scores, number of respondents and strength score

Final Categorization

After ranking all the subjects by priority, Delphi panelists were given the list of top courses and asked to sort them into 3 categories.

Question: Sort each curriculum topic into 3 categories: 3) Highly recommended 2) Partially recommended 1) Not recommended

Word	Mean	Count	Strength Score	Weighted Percentage	Pct. Endorsed	A	R	R	G	G	G	Ph	P	P	P	P	S	S	U	U
						D	1	2	1	2	3	1	2	3	4	5	1	2	P	P
medicine	3.00	38	45	8.35%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
pharmacology	3.00	15	45	3.30%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
anatomy	3.00	14	45	3.08%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
chemistry	3.00	12	45	2.64%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
surgery	3.00	11	45	2.42%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
cardiovascular	3.00	6	45	1.32%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
neuroscience	3.00	6	45	1.32%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
gastroenterology	3.00	4	45	0.88%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
cardiology	3.00	2	45	0.44%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
oncology	3.00	2	45	0.44%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
therapeutics	3.00	2	45	0.44%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
pathology	3.00	10	45	2.20%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
hematology	3.00	6	45	1.32%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
pediatrics	3.00	6	45	1.32%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
endocrinology	3.00	5	45	1.10%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Latin	3.00	2	45	0.44%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
biology	3.00	17	45	3.74%	87%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
ophthalmology	3.00	3	45	0.66%	87%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
gynecology	3.00	7	45	1.54%	80%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
diagnostics	3.00	5	45	1.10%	80%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
histology	3.00	3	45	0.66%	80%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
cell biology	3.00	3	45	0.66%	73%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
immunology	3.00	12	45	2.64%	73%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
physiology	3.00	12	45	2.64%	73%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
psychiatry	3.00	4	45	0.88%	67%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
obstetrics	3.00	7	45	1.54%	60%	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

psychopathology	3.00	3	45	0.66%	60%	3	3	3	3	3	3	3	3	3	3	3	3	3
microbiology	3.00	10	45	2.20%	53%	3	3	3	3	3	3	3	3	3	3	3	3	3
reproductive medicine	3.00	3	45	0.66%	53%	3	3	3	3	3	3	3	3	3	3	3	3	3
biochemistry	3.00	5	45	1.10%	47%	3	3	3	3	3	3	3	3	3	3	3	3	3
parasitology	3.00	2	45	0.44%	53%	3	3	3	3	3	3	3	3	3	3	3	3	3
basics of diagnosis	3.00	1	45	0.22%	47%	3	3	3	3	3	3	3	3	3	3	3	3	3
dermatology	3.00	3	45	0.66%	40%	3	3	3	3	3	3	3	3	3	3	3	3	3
ethics	3.00	9	45	1.98%	40%	3	3	3	3	3	3	3	3	3	3	3	3	3
embryology	3.00	2	45	0.44%	47%	3	3	3	3	3	3	3	3	3	3	3	3	3
diseases	3.00	1	45	0.22%	27%	3	3	3	3	3	3	3	3	3	3	3	3	3
hygiene	3.00	1	45	0.22%	7%	3	3	3	3	3	3	3	3	3	3	3	3	3
epidemiology	2.00	7	30	1.54%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
emergency care	2.00	2	30	0.44%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
dentistry	2.00	2	30	0.44%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
mental health	2.00	3	30	0.66%	27%	2	2	2	2	2	2	2	2	2	2	2	2	2
digestion system	2.00	1	30	0.22%	7%	2	2	2	2	2	2	2	2	2	2	2	2	2
genetics	2.00	10	30	2.20%	13%	2	2	2	2	2	2	2	2	2	2	2	2	2
integrative medicine	2.00	2	30	0.44%	7%	2	2	2	2	2	2	2	2	2	2	2	2	2
preventive care	2.00	9	30	1.98%	13%	2	2	2	2	2	2	2	2	2	2	2	2	2
physics	2.00	9	30	1.98%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
fetal medicine	2.00	1	30	0.22%	20%	2	2	2	2	2	2	2	2	2	2	2	2	2
radiology	2.00	7	30	1.54%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
nutrition	2.00	4	30	0.88%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
pathophysiology	2.00	6	30	1.32%	7%	2	2	2	2	2	2	2	2	2	2	2	2	2
metabolism	2.00	5	30	1.10%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
statistics	2.00	3	30	0.66%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
psychology	2.00	5	30	1.10%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
genomics	2.00	2	30	0.44%	13%	2	2	2	2	2	2	2	2	2	2	2	2	2
anesthesiology	2.00	1	30	0.22%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
healthcare	2.00	2	30	0.44%	13%	2	2	2	2	2	2	2	2	2	2	2	2	2
legal medicine	2.00	6	30	1.32%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2

law	2.00	3	30	0.66%	0%	2	2	2	2	2	2	2	2	2	2	2	2	2
geriatrics	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
palliative medicine	1.00	3	15	0.66%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
transfusion medicine	1.00	2	15	0.44%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
health studies	1.00	12	15	2.64%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
forensic medicine	1.00	3	15	0.66%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
bioinformatics	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
economics	1.00	5	15	1.10%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
biostatistics	1.00	2	15	0.44%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
bioethics	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
sociology	1.00	7	15	1.54%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
biopharmaceutics	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
anthropometry	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
biophysics	1.00	1	15	0.22%	0%	1	1	1	1	1	1	1	1	1	1	1	1	1
Skills																		
communication	3.00	14	45	14.14%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
problem-solving	3.00	22	45	22.00%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
analytical	3.00	8	45	8.08%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
English	3.00	12	45	12.00%	40%	3	3	3	3	3	3	3	3	3	3	3	3	3
interpersonal	3.00	7	45	7.07%	0%	3	3	3	3	3	3	3	3	3	3	3	3	3
leadership	3.00	5	45	5.05%	73%	3	3	3	3	3	3	3	3	3	3	3	3	3
research	3.00	4	45	4.04%	40%	3	3	3	3	3	3	3	3	3	3	3	3	3
computer	3.00	3	45	3.03%	67%	3	3	3	3	3	3	3	3	3	3	3	3	3
teamwork	3.00	2	45	2.02%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3
community care	3.00	1	45	1.01%	0%	3	3	3	3	3	3	3	3	3	3	3	3	3
psychology	3.00	1	45	1.01%	93%	3	3	3	3	3	3	3	3	3	3	3	3	3
Experience																		
research	3.00	15	45	7.77%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
communication	3.00	14	45	7.25%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
clerkship	3.00	12	45	6.22%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
rotations	3.00	11	45	5.70%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3
observership	3.00	7	45	3.63%	67%	3	3	3	3	3	3	3	3	3	3	3	3	3
international	3.00	6	45	3.11%	53%	3	3	3	3	3	3	3	3	3	3	3	3	3

hands-on	3.00	5	45	2.59%	100%	3	3	3	3	3	3	3	3	3	3	3	3	3	3
laboratory	3.00	4	45	2.07%	47%	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Table 10. Collected responses from Delphi team per each top scored item, all results of ranking

As in the Round 2, Percent endorsed and strength scores were calculated

Pct. Endorsed = The percentage of panelists out of 15 from Round 2 who endorsed the item by selecting the highest rating: “Very important” from Round 2 (percentage endorsed as definition was adopted from the research of (Mitzman, 2017).

Strength Score = The sum of weighted frequencies, (total points) resulting from multiplying the number of participants selecting a rating (frequency of occurrence) by the Value of the rating from the Likert-type scale (strength score definition was adopted from the research of (Mitzman, 2017).

Based on the collected responses the list of items were identified as per below:

Topic and nomination	n	Mean	Curriculum Recommendations
anatomy (14)	15	5.0	Must teach/Core courses
biology (17)	15	4.9	Must teach/Core courses
cardiology (2)	15	5.0	Must teach/Core courses
cardiovascular system (6)	15	5.0	Must teach/Core courses
cell biology (3)	15	4.7	Must teach/Core courses
chemistry (12)	15	5.0	Must teach/Core courses
dentistry (2)	15	3.9	Must teach/Core courses
diagnostics (5)	15	4.8	Must teach/Core courses
embryology (2)	15	4.3	Must teach/Core courses
emergency (2)	15	3.9	Must teach/Core courses
endocrinology (5)	15	4.9	Must teach/Core courses
epidemiology (7)	15	3.9	Must teach/Core courses
gastroenterology (4)	15	5.0	Must teach/Core courses
gynecology (7)	15	4.8	Must teach/Core courses
hematology (6)	15	4.9	Must teach/Core courses
histology (3)	15	4.8	Must teach/Core courses
immunology (12)	15	4.7	Must teach/Core courses
Latin (2)	15	4.9	Must teach/Core courses
Introduction to medicine (38)	15	5.0	Must teach/Core courses
microbiology (10)	15	4.5	Must teach/Core courses
neuroscience (6)	15	5.0	Must teach/Core courses
obstetrics (7)	15	4.6	Must teach/Core courses
oncology (2)	15	5.0	Must teach/Core courses
ophthalmology (3)	15	4.9	Must teach/Core courses
parasitology (2)	15	4.5	Must teach/Core courses
pathology (10)	15	4.9	Must teach/Core courses
pediatrics (6)	15	4.9	Must teach/Core courses
pharmacology (15)	15	5.0	Must teach/Core courses
physiology (12)	15	4.7	Must teach/Core courses
psychiatry (4)	15	4.7	Must teach/Core courses
psychopathology (3)	15	4.6	Must teach/Core courses

reproductive medicine (3)	15	4.5	Must teach/Core courses
surgery (11)	15	5.0	Must teach/Core courses
therapeutics (2)	15	5.0	Must teach/Core courses
anesthesiology (1)	15	3.0	Optional/Elective
biochemistry (5)	15	4.5	Optional/Elective
dermatology (3)	15	4.3	Optional/Elective
digestion system(1)	15	3.7	Optional/Elective
diseases (1)	15	4.3	Optional/Elective
ethics (9)	15	4.3	Optional/Elective
fetal medicine (1)	15	3.5	Optional/Elective
genetics (10)	15	3.7	Optional/Elective
genomics (2)	15	3.0	Optional/Elective
health studies (12)	15	2.5	Optional/Elective
healthcare (2)	15	2.9	Optional/Elective
hygiene (1)	15	4.1	Optional/Elective
integrative medicine (2)	15	3.7	Optional/Elective
laboratory classes	15	4.5	Optional/Elective
law (3)	15	2.7	Optional/Elective
mental health (3)	15	3.7	Optional/Elective
metabolism (5)	15	3.2	Optional/Elective
nutrition (4)	15	3.3	Optional/Elective
palliative medicine (3)	15	2.6	Optional/Elective
pathophysiology (6)	15	3.3	Optional/Elective
physics (9)	15	3.5	Optional/Elective
preventive medicine (9)	15	3.6	Optional/Elective
psychology (5)	15	3.1	Optional/Elective
radiology (7)	15	3.4	Optional/Elective
statistics (3)	15	3.1	Optional/Elective
transfusion medicine (2)	15	2.6	Optional/Elective
Skills			
communication skills	15	5.0	Must teach/Core courses
problem-solving skills	15	5.0	Must teach/Core courses
analytical skills	15	5.0	Must teach/Core courses
research skills	15	5.0	Must teach/Core courses
computer skills	15	4.7	Must teach/Core courses
English language skills	15	4.1	Must teach/Core courses
interpersonal skills	15	4.0	Must teach/Core courses
Experiences			
clerkship experience	15	5.0	Must teach/Core courses
rotations experience	15	5.0	Must teach/Core courses
hands-on experience	15	5.0	Must teach/Core courses
observership program	15	4.7	Must teach/Core courses
research project (9)	15	4.5	Must teach/Core courses
international experience	15	4.5	Must teach/Core courses
community care	15	4.0	Must teach/Core courses
laboratory sciences (4)	15	4.1	Optional/Elective
Not important			
geriatrics (1)	15	2.7	Not important
bioinformatics (1)	15	2.3	Not important
forensic medicine (3)	15	2.3	Not important
biostatistics (2)	15	2.2	Not important
economics (5)	15	2.2	Not important
bioethics (1)	15	1.9	Not important

sociology (7)	15	1.5	Not important
biopharmaceutics (1)	15	1.4	Not important
anthropometry (1)	15	1.2	Not important
biophysics (1)	15	1.0	Not important

Table 11. Collected responses from Delphi team per each top scored item, all listed top knowledge subjects, skills, experiences

Round 3 Findings

34 subject knowledge/core courses, 7 skills and 7 experiences were categorized as Must teach/Highly recommended

26 subject knowledge/core courses and 1 experience were categorized as Optional/Partially recommended

10 items were categorized as not important and eliminated from the final list.

Therefore, only 75 items were selected for the proposed curriculum of BMD program at ADA University School of Medicine (60 core courses, 7 experiences, 8 skills).

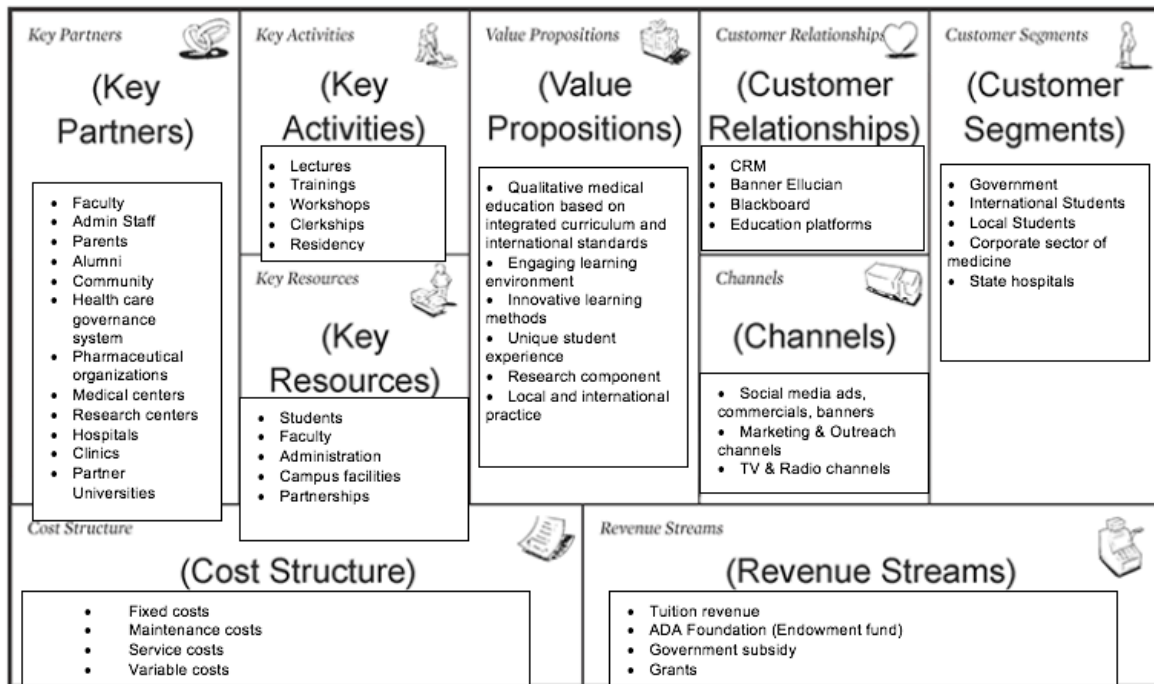
#	Topic and nomination	Curriculum	Recommendations
1	anatomy (14)	Core course	Must teach/Core courses
2	biology (17)	Core course	Must teach/Core courses
3	cardiology (2)	Core course	Must teach/Core courses
4	cardiovascular system (6)	Core course	Must teach/Core courses
5	cell biology (3)	Core course	Must teach/Core courses
6	chemistry (12)	Core course	Must teach/Core courses
7	dentistry (2)	Core course	Must teach/Core courses
8	diagnostics (5)	Core course	Must teach/Core courses
9	embryology (2)	Core course	Must teach/Core courses
10	emergency (2)	Core course	Must teach/Core courses
11	endocrinology (5)	Core course	Must teach/Core courses
12	epidemiology (7)	Core course	Must teach/Core courses
13	gastroenterology (4)	Core course	Must teach/Core courses
14	gynecology (7)	Core course	Must teach/Core courses
15	hematology (6)	Core course	Must teach/Core courses
16	histology (3)	Core course	Must teach/Core courses
17	immunology (12)	Core course	Must teach/Core courses
18	Latin (2)	Core course	Must teach/Core courses
19	Introduction to medicine (38)	Core course	Must teach/Core courses
20	microbiology (10)	Core course	Must teach/Core courses
21	neuroscience (6)	Core course	Must teach/Core courses
22	obstetrics (7)	Core course	Must teach/Core courses
23	oncology (2)	Core course	Must teach/Core courses
24	ophthalmology (3)	Core course	Must teach/Core courses
25	parasitology (2)	Core course	Must teach/Core courses
26	pathology (10)	Core course	Must teach/Core courses
27	pediatrics (6)	Core course	Must teach/Core courses
28	pharmacology (15)	Core course	Must teach/Core courses
29	physiology (12)	Core course	Must teach/Core courses
30	psychiatry (4)	Core course	Must teach/Core courses
31	psychopathology (3)	Core course	Must teach/Core courses
32	reproductive medicine (3)	Core course	Must teach/Core courses
33	surgery (11)	Core course	Must teach/Core courses
34	therapeutics (2)	Core course	Must teach/Core courses
35	anesthesiology (1)	Elective	Optional/Elective
36	biochemistry (5)	Elective	Optional/Elective
37	dermatology (3)	Elective	Optional/Elective
38	digestion system(1)	Elective	Optional/Elective
39	diseases (1)	Elective	Optional/Elective
40	ethics (9)	Elective	Optional/Elective

41	fetal medicine (1)	Elective	Optional/Elective
42	genetics (10)	Elective	Optional/Elective
43	genomics (2)	Elective	Optional/Elective
44	health studies (12)	Elective	Optional/Elective
45	healthcare (2)	Elective	Optional/Elective
46	hygiene (1)	Elective	Optional/Elective
47	integrative medicine (2)	Elective	Optional/Elective
48	laboratory classes	Elective	Optional/Elective
49	law (3)	Elective	Optional/Elective
50	mental health (3)	Elective	Optional/Elective
51	metabolism (5)	Elective	Optional/Elective
52	nutrition (4)	Elective	Optional/Elective
53	palliative medicine (3)	Elective	Optional/Elective
54	pathophysiology (6)	Elective	Optional/Elective
55	physics (9)	Elective	Optional/Elective
56	preventive medicine (9)	Elective	Optional/Elective
57	psychology (5)	Elective	Optional/Elective
58	radiology (7)	Elective	Optional/Elective
59	statistics (3)	Elective	Optional/Elective
60	transfusion medicine (2)	Elective	Optional/Elective
61	laboratory experience (4)	Elective	Optional/Elective
62	clerkship experience	Core course	Must teach/Core courses
63	rotations experience	Core course	Must teach/Core courses
64	hands-on experience	Core course	Must teach/Core courses
65	observership program	Core course	Must teach/Core courses
66	research project (9)	Core course	Must teach/Core courses
67	international experience	Core course	Must teach/Core courses
68	community care	Core course	Must teach/Core courses
69	communication skills	Core course	Must teach/Core courses
70	problem-solving skills	Core course	Must teach/Core courses
71	analytical skills	Core course	Must teach/Core courses
72	research skills	Core course	Must teach/Core courses
73	computer skills	Core course	Must teach/Core courses
74	English language skills	Core course	Must teach/Core courses
75	interpersonal skills	Core course	Must teach/Core courses

Table 12. Final list of top core knowledge subjects, essential skills and experiences that need to be incorporated in the integrated curriculum of new BMD program

Appendix D

Business Model Canvas for ADA University School of Medicine



Source: Developed by the author

Appendix E

Number of physicians per 10 000 population

Main indicators of health care (at the beginning of the year)	2015	2016	2017	2018	2019
per 10 000 population	34.6	33.9	33.2	32.6	31.3

Table 13. Number of physicians per 10 000 population
Source: State Statistical Committee, 2019

Appendix F

Estimated market potential for BMD program at ADA University School of Medicine based on statistical data (source: State Statistics committee)



Chart 6. Estimated market potential for BMD program

Appendix G

Tuition projection model for BMD program (adopted from the real model of ADA University)

ADA University School of Medicine																		
	Year 0			Year 1			Year 2			Year 3			Year 4			Year 5		
	Number of Students	Annual Tuition fee per student	Total	Number of Students	Annual Tuition fee per student	Total	Number of Students	Annual Tuition fee per student	Total	Number of Students	Annual Tuition fee per student	Total	Number of Students	Annual Tuition fee per student	Total	Number of Students	Annual Tuition fee per student	Total
Full-time resident tuition	200	9,000	1,800,000	200	9,450	1,890,000	220	9,923	2,182,950	240	10,419	2,500,470	260	10,940	2,844,285	280	11,487	3,216,230
Full-time non-resident tuition	-	-	-	20	18,000	360,000	20	18,900	378,000	20	19,845	396,900	20	20,837	416,745	20	21,879	437,582
Total	200		1,800,000	220		2,250,000	240		2,560,950	260		2,897,370	280		3,261,030	300		3,653,812
Note * Increase rate (in%)	5%																	

Appendix H

Operating expenses of School of Medicine (adopted from ADA University operating budget)

Operating revenues	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Tuition revenues	1,800,000	2,250,000	2,560,950	2,897,370	3,261,030	3,653,812
State budget	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000
Endowment funds	3,000,000	3,100,000	3,200,000	3,300,000	3,400,000	3,500,000
ADA University Alumni Foundation	300,000	350,000	400,000	450,000	500,000	550,000
Grants	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Total revenues, gains and other support	9,600,000	10,200,000	10,660,950	11,147,370	11,661,030	12,203,812
Operating expenses						
<i>Functional classification of operating expenses</i>						
Academic staff	3,000,000	3,150,000	3,307,500	3,472,875	3,646,519	3,828,845
Academic support	163,200	171,360	179,928	188,924	198,371	208,289
Research	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000
Auxiliary enterprises and student servies	125,780	137,780	149,780	161,780	173,780	185,780
Operations and maintenance of the plant	750,000	850,000	950,000	1,050,000	1,150,000	1,250,000
Institutional support	350,000	352,500	355,000	357,500	360,000	362,500
Student services	12,000	13,200	14,400	15,600	16,800	18,000
Total expenses	5,400,980	5,774,840	6,156,608	6,546,679	6,945,469	7,353,414
Excess of operating revenues over operating expenses	4,199,020	4,425,160	4,504,342	4,600,691	4,715,560	4,850,398
Inflation rate	5%					

Appendix I

Salaries (figures adopted from other ADA Schools)

Instruction/Academic staff						
dean	120,000	126,000	132,300	138,915	145,861	153,154
FTE faculty	2,520,000	2,646,000	2,778,300	2,917,215	3,063,076	3,216,230
PTE faculty	360,000	378,000	396,900	416,745	437,582	459,461
	3,000,000	3,150,000	3,307,500	3,472,875	3,646,519	3,828,845
Academic Support staff						
Program advisor	36,000	37,800	39,690	41,675	43,758	45,946
Dean Assistant	12,000	12,600	13,230	13,892	14,586	15,315
Coordinator	7,200	7,560	7,938	8,335	8,752	9,189
Program Recruiter	18,000	18,900	19,845	20,837	21,879	22,973
Admission Officer	18,000	18,900	19,845	20,837	21,879	22,973
Career Advisor	18,000	18,900	19,845	20,837	21,879	22,973
IT support team	18,000	18,900	19,845	20,837	21,879	22,973
Registrar Officer	18,000	18,900	19,845	20,837	21,879	22,973
Bursar Officer	18,000	18,900	19,845	20,837	21,879	22,973
Subtotal	163,200	171,360	179,928	188,924	198,371	208,289
Total	3,326,400	3,492,720	3,667,356	3,850,724	4,043,260	4,245,423
Inflation rate	5%					

Funding

Financial stability is essential to maintain sustainability of any program. While there is a great deal of comparative literature on how higher education systems fund themselves, there is virtually no comparative literature on institutional funding and, in particular, internationally comparative literature on institutional

expenditures. This makes it difficult to evaluate claims made with respect to the benefits of greater levels of institutional funding (Usher & Ramos, 2018). According to the Strategic plan of ADA University (ADA University: Strategic plan, 2015) and developed roadmap – “ADA 2025: 10-year strategic plan” main funding options are government budget, tuition fees, endowment fund and grants (Pic. 9).

Therefore, to maintain financial stability of ADA University School of Medicine, the following funding sources are suggested:

1. State budget. Being a public University, ADA University benefits from state budget allocated to university. Public budget for this year was around 17 million AZN. But in future, once ADA University has established School of Medicine, it can increase state budget resources, justifying this increase by the organic growth of university for fostering research in medicine and training physicians to meet the shortage in the country. Moreover, other state entities can also contribute financially, due to the large network of collaborations and partnerships of ADA University School of Medicine. Considering the fact, that School of Medicine will collaborate with teaching hospitals and clinics, that are under government funding, ADA University can save from the partnership of existing medical centers.
2. Endowment revenue accumulates in ADA Foundation, this year ADA University endowment fund could raise more than 2 million AZN. However, with the increase in programs and launching School of Medicine, ADA Foundation can wider the community of donors willing to invest in medical institute establishment, contributing to the health care of the country.
3. Tuition fees. ADA University enroll around 500 students every year to undergraduate and 150 students to its graduate programs, with the average annual tuition of 6500 AZN, University makes around 4.3 million (AZN) in sales revenue. With the new BMD program, enrollment can increase from 650 to 850 local students (total student body), with the annual tuition of 9000 AZN. As a result, ADA University can increase tuition revenue stream with the School of Medicine establishment.
4. Research grants. Many newly established medical universities receives grants and funds from pharmaceutical companies around the globe to test the new drugs, outsourcing research and development (R&D) to teaching universities, hospitals and clinics, providing with the all necessary equipment. In the USA, universities drug trials raise around 100 million (USD) that universities and colleges re-invest into research development. WHO (World Health Organization) also provides grants and financial support to developing countries for establishment medical schools and colleges.
5. Alumni network can be one of the potential sources of future revenue once the school produces several cohorts of Medical School Alumni

Appendix J

Characteristics of a World-Class University (WCU). Alignment of Key Factors x (Salmi, J., 2009)



Pic.9 Characteristics of a World-Class University
Source: www.ada.edu.az/home

Appendix K

Curriculum of Bachelor in Medicine program at Azerbaijan Medical University (source: data obtained from RSP 1 during the interview and website of Azerbaijan Medical University)

MEDICAL PROGRAMME STRUCTURE (DURATION 6 YEARS):

1st Year, 1st Semester (Autumn)			
Course	ECTS	Hours	Assessment
General and Bioorganic Chemistry	6	90	Exam
Latin Language	4	60	Exam
History of Medicine	2	30	Exam
Human Anatomy I	6	90	Exam
Medical biology and Genetics I	5	75	Exam
Informatics	2	30	Exam
Foreign languages	2	30	Exam
Azeri (Russian) Language	4	60	Exam
Physical training	2	30	Pass/Fail
1st year 2nd Semestr (Spring)			
Course	ECTS	Hours	Assessment
Medical biology and Genetics II	3	45	Exam
Human anatomy II	5	75	Exam
Human Histology, Embryology, Cytology	6	90	Exam
History of Azerbaijan	6	90	Exam
Medical and biological physics	6	90	Exam
Foreign languages	4	60	Exam
History of Medicine	2	30	Exam
Azeri (Russian) Language	2	30	Exam
Physical training	2	30	Pass/Fail
2nd Year, 3rd Semester (Autumn)			
Course	ECTS	Hours	Assessment
Human anatomy III	5	75	Exam
Histology	5	75	Exam
Normal Physiology I	5	75	Exam
Biochemistry I	4	60	Exam
Biophysics	2	30	Exam
Foreign language	4	60	Exam
Civil defence	3	45	Exam
Elective subjects:			
1. Philosophy 2. Economics 1. Medical Ethics 2. Basics of Law	6	90	Exam
Physical training	2	30	Pass/Fail

2 nd Year, 4 th Semester (Spring)			
Course	ECTS	Hours	Assessment
Normal Physiology II	5	75	Exam
Biochemistry II	5	75	Exam
Microbiology	6	90	Exam
Common hygiene	3	45	Exam
Operative surgery	4	60	Exam
Elective subjects			
1. Philosophy 2. Economics 1. Medical Ethics 2. Basics of Law	6	90	Exam
Physical training	2	30	Pass/Fail
3rd Year, 5 th Semester (Autumn)			
Course	ECTS	Hours	Assessment
Pathological physiology	4	60	Exam
Pharmacology	4	60	Exam
Microbiology	4	60	Exam
Operative surgery	3	45	Exam
General surgery	4	60	Exam
Propaedeutics of Internal Diseases	6	90	Exam
Pathological Anatomy	4	60	Exam
Common hygiene	3	45	Exam
Military hygiene	1	15	
Immunology	2	30	Exam
3rd Year, 6th Semester (Spring)			
Course	ECTS	Hours	Assessment
Pathological physiology	5	75	Exam
Pharmacology	4	60	Exam
General Surgery	4	60	Exam
Radiodiagnosics	3	45	Exam
Propaedeutics of Internal Diseases	6	90	Exam
Pathological Anatomy	4	60	Exam
Dermatovenereological diseases	3	45	Exam
Neurology	3	45	Exam
Public Health	3	45	Exam

4th Year, 7th Semester (Autumn)			
Course	ECTS	Hours	Assessment
Internal Medicine	4	60	Exam
Endocrinology	3	45	Exam
Surgical Diseases	3	45	Exam
Radiodiagnostics	3	45	Exam
Dermatovenereological diseases	2	30	Exam
Public Health	3	45	Exam
Neurology	4	60	Exam
Pulmonology	5	75	Exam
Obstetrics	4	60	Exam
Infective diseases	3	45	Exam
Neurosurgery	3	45	Exam
4th Year, 8th Semester (Spring)			
Course	ECTS	Hours	Assessment
Internal Medicine	3	45	Exam
Physiotherapy	2	45	Exam
Surgical Diseases	3	45	Exam
Pediatrics	5	75	Exam
Traumatology	3	45	Exam
Ophthalmology	4	60	Exam
Obstetrics	4	60	Exam
Infective diseases	4	60	Exam
Neurosurgery	3	45	Exam
Psychiatry	3	45	Exam

5th Year, 9th Semester (Autumn)			
Course	ECTS	Hours	Assessment
Internal Medicine	3	45	Exam
Occupational diseases			
Surgical diseases	2	30	Exam
Military surgery	2	30	
Oncology	4	60	Exam
Urology	2	30	Exam
Narcology	4	60	Exam
Stomatology	2	30	Exam
Military medicine	2	30	Exam
Pediatric surgery	3	45	Exam
Otorhinolaryngology	4	60	Exam
Therapeutic physical training	2	30	Exam
Pediatrics	4	60	Exam
Clinical pharmacology	3	30	Exam
5th Year, 10th Semester (Spring)			
Course	ECTS	Hours	Assessment
Internal Medicine	5	75	Exam
Occupational diseases			
Surgical Diseases	5	75	Exam
Resuscitation and Intensive Therapy	2	30	Exam
Family Medicine	3	45	Exam
Oncology	5	75	Exam
Epidemiology	3	45	Exam
Military epidemiology	1	15	
Gynecology	3	45	Exam
Forensic Medicine	4	60	Exam
Infective diseases	4	60	Exam

Appendix L

Reliability Test: Cronbach's alfa coefficient

Statistical formula to calculate reliability is:

$[k/(k-1)] * [1 - (\text{sum of item variances} / \text{total scale variance})$

Where k = number of items and ranges between 0 and 1

$$\alpha = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum_{i=1}^k \sigma_{y_i}^2}{\sigma_x^2} \right)$$

Criteria for assessment is:

0.7 - 0.8 = adequate reliability for group comparisons

#items/questions	92
sum of the item variances =SUM(C17:CP17)	23
variance of total scores =VAR.P(:)	78.5
Cronbach's Alfa =(E20/(E20-1)) *(1-E21/E22)	0.712

Participants	AD	R1	R2	G1	G2	G3	Ph1	Ph2	Ph3	Ph4	Ph5	S1	S2	UP1	UP2	Variances =VAR.P(:)
Total variances	375	375	362	366	366	372	362	366	368	371	369	366	378	387	395	78.5
anatomy (14)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
cardiology (2)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
cardiovascular system (6)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
chemistry (12)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
gastroenterology (4)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
medicine (38)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
neuroscience (6)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
oncology (2)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
pharmacology (15)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
surgery (11)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
therapeutics (2)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
communication	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
problem-solving	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
analytical	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
research	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
communication	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
clerkship	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
rotations	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
hands-on	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
endocrinology (5)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
hematology (6)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
Latin (2)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
pathology (10)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
pediatrics (6)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000

teamwork	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	0.0622
psychology	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0.0000
biology (17)	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5	0.1156
ophthalmology (3)	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	0.1156
diagnostics (5)	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	0.1156
gynecology (7)	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	0.1156
histology (3)	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	0.0622
cell biology (3)	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	0.2222
immunology (12)	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	0.1956
physiology (12)	4	4	4	5	5	5	5	5	5	5	5	5	5	4	5	0.1956
leadership	4	4	5	5	5	4	3	5	5	5	5	5	5	5	5	0.3556
psychiatry (4)	5	5	4	5	4	5	4	5	4	5	4	5	5	5	5	0.2222
research (9)	5	5	5	5	3	3	3	4	5	5	5	5	5	5	4	0.6489
computer	4	4	5	5	5	5	5	5	5	5	4	4	4	5	5	0.2222
observership	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	0.2400
obstetrics (7)	4	4	5	4	5	4	4	5	4	5	5	5	5	5	5	0.2400
psychopathology (3)	5	5	5	5	5	5	4	4	4	4	4	4	5	5	5	0.2400
microbiology (10)	4	4	5	4	5	4	5	4	5	4	5	4	5	4	5	0.2489
parasitology (2)	5	5	4	5	4	5	4	5	5	5	4	4	4	5	5	0.2400
reproductive medicine (3)	5	5	4	4	4	4	4	5	5	5	5	5	5	5	5	0.2222
international	5	5	4	4	4	4	4	4	4	5	5	5	5	5	5	0.2489
biochemistry (5)	5	5	4	4	5	4	5	4	4	5	5	4	4	4	5	0.2489
embryology (2)	5	5	4	5	3	4	3	4	3	4	5	5	5	5	5	0.6222
laboratory	4	4	5	5	4	4	4	4	4	4	5	5	5	5	5	0.2489
dermatology (3)	5	5	4	4	4	4	4	4	4	4	5	5	5	5	5	0.2489
ethics (9)	3	3	4	3	4	5	5	5	5	5	4	4	4	4	4	0.5156
English	4	4	3	4	3	4	3	4	3	5	5	5	5	5	5	0.6489
research	4	4	5	5	4	4	4	4	4	4	4	4	5	5	5	0.2222

inquiry (3)	5	5	5	4	4	4	4	4	4	4	4	5	4	5	5	0.2400
diseases (1)	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	0.1956
mental health (3)	4	4	3	4	5	5	3	2	4	5	3	4	3	4	5	0.7822
fetal medicine (1)	3	3	3	3	3	3	3	3	4	2	2	4	4	5	5	0.7556
genetics (10)	4	4	2	3	3	4	4	4	4	4	5	3	4	3	3	0.5067
genomics (2)	3	3	3	3	2	3	2	3	3	3	2	2	3	5	5	0.8000
healthcare (2)	3	3	3	3	2	2	2	1	1	1	4	4	4	5	5	1.7156
laboratory sciences (4)	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	0.1156
preventive medicine (9)	4	4	4	4	4	4	5	5	4	3	3	3	3	3	3	0.4622
digestion system(1)	4	4	4	4	4	4	4	4	4	3	3	3	2	4	5	0.4622
hygiene (1)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	0.0622
integrative (2)	5	5	4	4	4	4	4	4	4	3	3	3	4	4	4	0.3289
pathophysiology (6)	4	4	3	3	4	3	3	3	3	3	3	3	3	3	3	0.1600
anesthesiology (1)	3	3	3	3	3	4	4	2	2	2	3	3	4	4	4	0.5156
anthropometry (1)	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	0.1956
bioethics (1)	1	1	1	2	2	2	2	2	2	2	1	1	2	2	3	0.3289
bioinformatics (1)	2	2	1	1	2	2	2	2	3	3	3	3	3	3	3	0.4889
biopharmaceutics (1)	1	1	2	2	2	1	1	1	1	1	1	1	2	2	2	0.2400
biophysics (1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.0000
biostatistics (2)	2	2	1	2	1	2	1	2	3	3	2	2	3	3	3	0.5156
dentistry (2)	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	0.1156
economics (5)	2	2	2	3	3	3	2	1	1	2	2	1	1	3	4	0.7822
emergency (2)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.0000
epidemiology (7)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.0000
forensic medicine (3)	3	3	2	1	3	2	1	2	2	2	2	2	3	3	3	0.4622
geriatrics (1)	2	2	2	2	2	3	3	3	2	2	1	1	4	4	4	0.9156
health studies (12)	4	4	3	4	3	3	3	3	3	3	2	1	2	1	1	1.0222
law (3)	2	2	3	2	2	3	3	3	2	2	4	4	3	3	3	0.4622

legal (6)	3	3	1	1	2	3	4	3	4	4	3	3	3	3	3	0.7822
metabolism (5)	4	4	3	3	3	3	3	3	3	3	3	3	3	3	4	0.1600
nutrition (4)	3	3	3	3	3	4	4	4	3	3	3	4	4	3	3	0.2222
palliative (3)	3	3	3	3	3	3	2	2	2	4	3	2	1	3	2	0.5067
physics (9)	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	0.7822
psychology (5)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0.0000
radiology (7)	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	0.2400
sociology (7)	2	2	2	2	2	1	1	1	1	1	2	2	2	1	1	0.2489
statistics (3)	3	3	4	3	3	3	2	3	4	3	4	3	3	3	3	0.2489
transfusion medicine (2)	3	3	3	3	3	3	2	2	2	2	2	3	3	3	4	0.3289
interpersonal skills	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.0000
community care	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.0000