

# Research, community, opportunity

the role played by the Movement of Researcher Students  
(Kutató Diákok Mozgalma) in helping students with  
outstanding abilities

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## **Content**

<b>Introduction.....</b>	<b>- 3 -</b>
<b>A brief overview of the social and educational situation in Hungary .....</b>	<b>- 4 -</b>
<b>Description of the National Association of Researcher Students as ‘best practice’ in talent promotion.....</b>	<b>- 8 -</b>
<b>The organisational structure of the Movement of Researcher Students; the roles and impact of individual units .....</b>	<b>- 8 -</b>
<b>Motivation.....</b>	<b>- 9 -</b>
<b>Benefits of self-organisation .....</b>	<b>- 11 -</b>
<b>Section work .....</b>	<b>- 12 -</b>
<b>Interim programmes from September to July .....</b>	<b>- 14 -</b>
<b>Examples of domestic and international co-operations by the movement .....</b>	<b>- 20 -</b>
<b>The influence of the National Association of Researcher Students among the students participating in the movement.....</b>	<b>- 21 -</b>
<b>The impact of the Movement of Researcher Students on the career choices and later career paths of students.....</b>	<b>- 22 -</b>
<b>Impacts on later career paths – Flow in KutDiák.....</b>	<b>- 22 -</b>
<b>The impact of the National Association of Researcher Students on the career paths of students.....</b>	<b>- 23 -</b>
<b>Social and educational aspects of the significance of extra-curricular activities and the Movement of Researcher Students.....</b>	<b>- 25 -</b>
<b>Summary.....</b>	<b>- 27 -</b>

**Literature** ..... - 28 -

**Annexes** ..... - 29 -

**Research, community, opportunity**  
**– the role played by the Movement of Researcher Students in helping**  
**students with outstanding abilities**

**Introduction**

Talent management, traditionally driven by teacher and student excellence, has a long history in Hungary. The decades before the change of the political regime constituted a break in the involvement of the abilities of outstanding students.

After 1989, a number of new initiatives were launched in an attempt to make up for the decades lost. One of these is the Movement of Researcher Students (Kutató Diákok Mozgalma, often abbreviated as KutDiák).

This paper attempts to present the operation of this movement and its impact on the participating students. Thanks to the extensive mentor network associated with KutDiák and the organisation activities of students, each participant has different experiences and joining the movement has unique consequences for each of them; therefore, the factors at play were investigated via conversations and interviews. In addition, a questionnaire survey was conducted with fifty respondents during the 13<sup>th</sup> National Conference of Scientific Student Groups, the results of which can be found in the Annex to the paper.

### **A brief overview of the social and educational situation in Hungary**

Hungary is one of Europe's oldest states having established itself as a state. The highest population of the country located in the Carpathian Basin was 9.937 million (figure from the 2011 census), which has decreased as a result of natural decrease, although the number of immigrants entering Hungary has countered this shrinking to some extent. In parallel, the country's population is ageing. (HCSO, 2011)

As little as 6.5% of the population consists of various ethnic groups (Bulgarian, Roma, Greek, Croatian, Polish, German, Armenian, Romanian, Ruthenian, Serbian, Slovak, Slovenian, Ukrainian), the remaining 93.5% is made up of Hungarians. Realigning disadvantaged youngsters from ethnic groups, unveiling their qualities and combating the barriers raised by prejudice constitute substantial tasks for teachers engaged in ensuring their development and nurturing their talents. The various ethnic nationalities have an opportunity to operate ethnic schools as well as to use and cultivate their mother tongue – in addition to the official Hungarian language – by way of their minority self-governments as well. There are regular ethnic programmes on public television.

The three large historical churches in Hungary are the Roman Catholic church with 3.872 million followers; the Reformed church with 1.153 million and the Evangelic church with 215,000. Some churches take part in education, maintaining their own educational institutions at all levels.

In Hungary, the general obligation to study has its roots in the royal decree of 22 August 1777 (*Ratio Educationis totiusque Rei Literariae per Regnum Hungariae et Provincias eidem adnexas, - The principles of education for the Kingdom of Hungary and the provinces annexed to it*). In line with the new ideas of enlightenment, Maria Theresia set the objective of educating citizens who are useful for the state (see the preamble to the decree) (*Britannia Hungarica Lexicon*). Although ensuring compliance had its problems, the idea was a

progressive one. Act XXXVIII of 1868, associated with the name of József Eötvös, had an even greater impact on education by making studying a legal obligation. (Ferge, 1984) Currently, it is mandatory for students to study until they reach the age of sixteen. [http://www.noefon.hu/public/files/NEFMI%3%A1II%3%A1sfoglal%3%A1s%3%A1a%3%B6telezetts%3%A9gr%3A5%91I\(1\).pdf](http://www.noefon.hu/public/files/NEFMI%3%A1II%3%A1sfoglal%3%A1s%3%A1a%3%B6telezetts%3%A9gr%3A5%91I(1).pdf) Pupils may choose among some 3,500 elementary schools. According to the 2004 figures, there is one teacher per eleven pupils on average in elementary education, which fits in with the Western European and Scandinavian trends. (World Education Encyclopedia, 2002.)

After completing eight-grade elementary school, pupils may embark on secondary studies. Several types of institutions are available, from grammar schools (traditionally offering a higher proportion of theoretical education) through vocational secondary schools (offering both theoretical and practical education) to specialist schools (practical education). The prerequisite for entering higher education is graduation from secondary school. During the acceptance procedure, additional points may be scored by the results of secondary studies, language certificates as well as other scientific<sup>1</sup>, sport and academic achievements.

A significant change was brought about in Hungary's education policy by accession to the European Union and the pre-accession process preceding that. Hungary has participated in the Bologna process aimed at facilitating transparency between institutions of higher education since 2004. Education and education policy have been (and continue to be) re-arranged as the dialogue evolved with the various international organisations. (Kozma 2013) Hungary is a member of the Organisation for Economic Co-operation and Development (OECD), the participants of which are the venue of the *Programme for International Student Assessment* (PISA) every three years. PISA assessments look at the competences of 15-year-old students in three areas: mathematics, sciences and reading comprehension. The statistics prepared on the basis of the assessment are indicators of the educational situation in each Member State. In terms of overall PISA results, Hungary has fluctuated between thirteenth and twenty-second place over recent years. Albeit not a bad result when considering all participating states, this still constitutes a great lag behind the top country, i.e. Finland. (PISA 2009 summary report)

Traditionally high-standard public education in Hungary could be the starting point for a number of successful scientific careers (think about our Nobel Prize winners). This was to no small measure due to the highly educated teachers and the ('*élite* trainer') institutions which, ahead of their time, recognised the importance of addressing pupils having special abilities and awakening their interest (such as Budapest-Fasori Evangélikus Grammar School).

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<sup>1</sup> The current educational system provides 30 or 20 additional points for grand prize winners and first prize winners, respectively, of the National Conference of Scientific Student Groups organised by the Movement of Researcher Students presented in this paper.

During the Socialist era, these institutions have lost their weight and, as an outcome of the misinterpretation of the notion of education offering equal opportunities, real talent promotion has declined in public education. (cf. Ferge, 1984) Granting equal opportunities to students does not mean that everybody should be taught the same things the same way; rather, it means that everyone should be provided with the conditions required for unfolding their own abilities and skills. (Gordon Győri, 2012) In an ideal world, this way everybody would find employment in the field where they can put their abilities to the best use (be it science, art or some blue-collar profession), thereby contributing to the maximum utilisation of the state's human resources.

The utilisation of a state's human resources is an important strategic aspect in social as well as economic respects. This is well-demonstrated by the intentions formulated in the *Ratio Educationis*, the education policy of today's Israel or the small tigers in Asia.

In addition to modernising public education, it is important that instead of being lost for the community, students with special abilities should be able to unfold their talents in the manner most appropriate for them, thereby contributing their outstanding achievements – with proper support – to the values of the given country.

Society may promote the values of pupils entering the schooling system in diverse ways. There are serious discussions underway in scientific circles in education as to how and by whom this assistance should be provided. (cf. Ziegler, 2013) One of the most widespread ways for helping talent evolve is the organisation of extra-curricular programmes for children. These initiatives gain importance in secondary school when children reach a stage of psychological development in which they become open to developing their special skills. (Balogh, 2007) When making the selection of such extra-curricular activities, the important thing is that pupils should make their own choice instead of opting for some activity as a result of parental pressure; nevertheless, this does not mean that there is no need for appropriate parental guidance.

The Movement of Researcher Students offers a possibility to secondary school students with an interest in sciences and scientific research to spend out-of-school hours usefully.



## **Description of the National Association of Researcher Students as ‘best practice’ in talent promotion**

The changes in Hungary’s public education system in the wake of the political regime change have slowly approximated the trends customary in Western European countries, while the civil initiatives associated with such trends have remained far below their Western counterparts. The emerging education system paid little heed to the importance of helping students with outstanding abilities.

In this environment, in his capacity as secretary of the cellular biology department of the Hungarian Biology Association, Péter Csermely came up with an initiative that was unique worldwide. In 1995, the Professor – who is currently the Chairman of the European Talent Council in addition to his other positions and education activities – brought to life the Movement of Researcher Students. This extraordinary idea of relying on the independent scientific work done and responsibility assumed by secondary school students has reached over five thousand students by now. The achievements of the students having joined the Movement of Researcher Students go to show that the Professor’s idea has worked out. The movement has undergone several transformations over the eighteen years of its operation, and the Association’s membership has multiplied. Once existing on the top of an office desk, KutDiák has emerged as one of Hungary’s largest talent promotion organisations. The movement’s success can be attributed to the fortunate co-existence of a number of factors forged together by devoted volunteer work and innovative ideas.

## **The organisational structure of the Movement of Researcher Students; the roles and impact of individual units**

The Movement of Researcher Students practically comprises two organisations: the National Association of Researcher Students and the Foundation for Researcher Students. The work of the Foundation supplements the work of the Association and vice versa; any separation of their work is pointless. The Foundation has the task of raising funds, without which the various programmes would be impossible to implement.

## Motivation

The National Association of Researcher Students (the Hungarian name of which is often abbreviated to KutDiák) is a student association the members of which embark on scientific research in some field selected by them during their high school years. The movement offers various scientific, cultural and leisure possibilities for them, and it may be joined by registering on [www.kutdiak.hu](http://www.kutdiak.hu) or taking part in some scientific test organised by the movement. Students absolutely need higher-than-average motivation to make use of the opportunities offered by the movement beyond mere joining. Students who join may be said to have increased interest in one field of science. The movement offers a possibility for them to study in more depth the topic picked by them.

Applicants are often motivated to join first by the encouragement given by their high school teachers. (This also goes to show the important role that secondary school teachers play in embracing students with outstanding abilities.) The outcome of the questionnaire survey conducted at the 2013 National Conference of Scientific Student Groups also demonstrates the important role played by teachers in guiding students towards scientific research. Another factor not to be neglected is peer influence.

The respondents' answers given to the question 'What was your motivation for attending the National Conference of Scientific Student Groups (by the Hungarian abbreviation: TUDOK)?' were distributed at a proportion indicated by the chart; it was possible to select more than one answer (see annex no. 1/3).

The possibility of securing additional points for the acceptance process to start higher education may also constitute considerable motivation. The secondary school students targeted by the movement are typically motivated for learning by their own expectations regarding themselves. (Kerekes, 2013)

For a part of the youngsters joining the movement, their peers at school are not sympathetic to their engagement in extra-curricular scientific activities and to their interests that depart from the average.<sup>2</sup>

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<sup>2</sup> This point was raised by the discussion held at the 17<sup>th</sup> National Student Conference where several of the students reported having experienced this kind of situation.

They are unable to share their thoughts and problems which, given their special field of interest, differ from those customary in today's secondary schools. (Naturally, the perception varies depending on the composition of the student's classroom, the role assumed by the school attended by the student in education, the emphasis given to assisting students having outstanding abilities.) A rigid school atmosphere often fails to afford the possibility for students open to scientific research to unfold their capabilities, because their abilities and stronger-than-average creativity do not fit the other students. If the school does not have a talent promotion programme properly integrated into education, these students can often be seen to be bored during classes. As they are unable to share their thoughts – made special by their outstanding qualities – with their peers, and to develop their skills, students who 'stick out' this way tend to neglect activities they might use to develop their abilities, but which are not customary among peers, in order to be able to blend in. Teachers play a key role in this process; they should set new challenges and present opportunities that are open to these students. In the absence of an appropriate programme, students having outstanding abilities are unable to emerge as promising talents. One of the objectives set by the Movement of Researcher Students – as indicated by the motto '...where you fit in' – is to provide their members a community in addition to scientific research possibilities. This has manifold roles. On the one hand, students join peers with similar interests, allowing them to relax more readily and to develop their abilities. This creative atmosphere contributes to enhancing student performance while they have a pleasant time (cf. section Impact on later career – flow in KutDiák).

In summary, the student network set up by the movement provides students who join (and make use of the possibilities offered by) the movement with a modified social domain in which independent scientific work and its achievements play a greater role than usual in the expectations set by peers. In the meantime, special expectations are coupled with greater support due to the assistance given by the students to each other in addition to the support granted by mentors. This peer assistance often takes the form of friendly support offered in overcoming challenges rather than giving professional assistance (which is up to the mentors). The particular characteristic of the movement is that it puts great emphasis on interpersonal relations. KutDiák wishes to offer a possibility for budding researchers to progress in scientific life while (hopefully) establishing relationship with their future colleagues.

Performing research work focused on a single field for several months or even a year may be a great load on secondary school students. In addition to the high standard of the work done by them, the magnitude of their commitment is proven by the fact that projects often discuss the same topic over the course of several events, possibly spanning a number of years, in more and more depth and greater and greater achievements. This goes to show how movement members strive to reach perfection as early as in their secondary school years.

### **Benefits of self-organisation**

The organisational background underlying the movement relies on self-government. The trust put into students has clearly paid off. The students who take part in the movement's management are democratically elected at the KutDiák conference held in Káptalanfüred. Section leaders and their deputies are elected by each section separately, while the three members of the presidency (one president and two vice presidents) heading the movement are elected by the general assembly of the National Association of Researcher Students by secret ballot. (If necessary, the presidency may include a chairman as well.) All this goes to show that students elect their management from among themselves following a discussion of the decision, offering everyone a chance to speak up. According to Kurt Lewin's research on group psychology, there is a better atmosphere in such groups and they are often capable of better performance than systems running on an authoritative basis. (Pléh, 1992) Another positive outcome of this kind of election is that instead of having merely an overview of the situation, leaders have an exact picture on what it is like to take part in the movement as a researcher student. The presidency and section leaders have hands-on experience with the problems arising in the course of KutDiák's operation and their impact on the joining students, as a result of which they are able to help in resolving these problems the most efficiently. The election repeated at the general assembly held at Káptalanfüred every year ensures that relations with students are renewed and the hands-on perspective is preserved. The continuous fluctuation of leaders in this manner might endanger balance within the Movement of Researcher Students and the handing down of principles. This is prevented by the permanent staff of the Foundation for Researcher Students, who help the newly elected management become familiar with the tasks involved in management.

The National Association of Researcher Students is officially represented by the three-member presidency. The two vice presidents and one president have the task of co-ordinating the work of scientific sections (with the help of the section co-ordinators), of administering the Association's official business (court filings, applications, etc.), and of acting as liaison between the Movement of Researcher Students and the supporting institutions and sponsors. As presidency members are in the same age bracket as that targeted by the Movement of Researcher Students, these tasks are totally new to them. Resolving the problems that arise is a task that is similar to the tasks that will arise in later stages of their career, in management positions. That is when they will be able to make use of the knowledge gained by having become familiar with various management technique problems in the course of heading the Association. This kind of knowledge cannot be acquired within a school framework, but will definitely prove to be an advantage for students in management positions.

### **Section work**

There are three sections in the National Association of Researcher Students: the Section for Humanities and Social Studies, the Section for Life and Natural Sciences, and the Section for Technical and Real Sciences.<sup>3</sup> The flexibility, characteristic of KutDiák the same as of any well-functioning civil association, is well demonstrated by the fact that the section names and, more importantly, the underlying structural background were transformed in as little as a year, thanks to the changes that have occurred in scientific life.<sup>4</sup> The changes taking place in the academic sphere were very shortly reflected by restructuring the Association.

In recent times, material studies, various other inanimate natural sciences and related research have come into the limelight. As the Association creates a bridge between academic groups and secondary school students, the events in academic life have a nearly immediate impact on students, including the increased popularity of these fields. (Members of the Association's mentoring network are all renowned researchers; students select a mentor from this group, so the field where the selected mentor works also determines the student's interest.) The number of applications prepared in these fields and associated areas increased as focus has shifted to

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<sup>3</sup> Former designations: Section of Humanities and Social Sciences, Section of Natural Sciences and Technology Section.

<sup>4</sup> A new data base was created to record student data; the application interfaces for conferences were renewed along with the kutdiak.hu web site.

these fields. This increase in the number of applications (and of the students preparing such applications) allowed students dealing with topics related to inanimate natural sciences to test their knowledge on each other in a separate section. In parallel with this, it became possible to set up professional evaluation boards with more experience in these fields in order to ensure better quality assurance.

All this goes to prove that the civil sector and the talent support programme associated with the civil sector is capable of responding to changes in economy and academic life nearly immediately, due to the fact that the community of the sector comes from the same domains. This is in contrast with the programmes associated with the state education system which, although capable of quick and radical changes, have much weaker links with the demands of the labour market.

Students in KutDiák tend to undertake in-depth research in a smaller field of speciality that interests them more, as opposed to the projects seen in previous years, which were more comprehensive and less penetrating. The evaluation boards of regional events of the National Conferences of Scientific Student Groups (Hungarian abbreviation: TUDOK) indicated that presentations prepared with this degree of thoroughness was cumbersome as they were difficult to compare. This problem was also resolved last year when the movement changed to a system of specialised conferences from the former regional system.<sup>5</sup> This means that TUDOK was preceded by three specialised conferences.<sup>6</sup> Each conference was held after preparations by the relevant section, and institutions associated with academic life had a greater role in carrying out each conference; for instance, the Conference Specialised on Life and Natural Sciences was hosted by the Biology Centre of Szeged.

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<sup>5</sup> In previous years, TUDOK was preceded by regional conferences corresponding to regions within and outside the borders of Hungary; this system was replaced by events organised according to field of specialty.

<sup>6</sup> In 2012, the Conference for Humanities and Social Sciences was held at the Ciszterci Rend Nagy Lajos Grammar School of Pécs; the Conference for Life and Natural Sciences was held at the Biology Centre of Szeged; the Conference for Technical and Real Sciences was held in Sopron's Széchenyi István Grammar School.

## **Interim programmes from September to July**

### *Section meetings*

Building interpersonal relations is of primary importance in the Association. The community built up in the course of various events is part of KutDiák's special nature. Section meetings organised by the respective sections offer opportunities for informal networking. These events organised for a smaller number of members offer a venue for talent promotion programmes merged with networking. (See Annex no. 3.) In addition to the permanent programmes (conferences, award ceremonies) organised every year, meeting in less formal settings is an important issue for members of the Kutdiák community.

Each section organises one meeting in the course of an academic year. Anybody may enroll for the events announced on the [www.kutdiak.hu](http://www.kutdiak.hu) web site and community sites regardless of whether they wish to join the movement. Section meetings are usually organised on Friday afternoons or Saturday mornings. KutDiák's partner ELTE Eötvös József Collegium (Dormitory) provides accommodation for participants. Organisers strive to come up with a programme that corresponds to the given section's profile. Participants have the opportunity to acquire knowledge that goes beyond the curriculum. One means for doing so is the professional lectures delivered by invited speakers; another is to visit various institutes and research sites where participants may obtain new knowledge even in an interactive way. Students always have an opportunity to discuss newly acquired experience after each item on the programme. Such informal discussions and debates provide an occasion to exchange the different ideas, to everybody's benefit.

A further advantage of these meetings is that participants are not limited to the students who fit in with the given section's directions, thereby enabling students to have a broader perspective on things. This is of particular importance for young researchers, shaping their evolving attitude to research.

Leisure time spent with team building or playful tasks allows emotional processes and social relations to develop along with the social networks of students. The entire programme aims to give an insight into the Movement of Researcher Students' life while giving an experience to students to encourage them to undertake scientific work in the future.

### Researchers' night

The presidency organises a meeting along similar topics to the session meetings every year: this is the KutDiák meeting organised in the framework of the Researchers' Night. The difference compared to session meetings lies in the number of participants and the nature of the scientific programme. The programme, organised early in the academic year, is aimed primarily at increasing awareness, to present the students in the movement to as many people as possible while allowing as many students as possible to realise the opportunities available to them by way of KutDiák. The attending students may encounter countless scientific fields in one event and may meet the researcher students dealing with the given area. It is possible to ask questions in person, in an atmosphere that is much more relaxed than a presentation held in a lecture hall. (This is the first event in the year when the new presidency elected in the July general assembly may meet movement members in person.)

### Regional conferences beyond borders

Since 2002, the regional events of the National Conference of Scientific Student Groups have been organised in November and December in three regions of the Movement of Researcher Students that are beyond the borders: in Transylvania, Slovakia and Voivodina. These copy the regional conferences held in Hungary prior to 2012. The shift to thematic conferences has not affected these regions due to organisation problems and geographic distances. Anybody may enroll to these conferences with a ten-minute presentation prepared about independent research conducted on some scientific issue. Local organisers classify applicants into sections – based on the presentation's topic – where students can present their research. Presentations are followed by five minutes of discussion when the evaluation board asks its questions and the audience (generally composed of the presenting students) can consult the presenter. As a result, the presenter gets immediate feedback on his presentation, to be used in later work. (If his presentation is escalated, such feedback may be incorporated into the presentation to be delivered to TUDOK.) The conferences are hosted by various secondary schools of cities with a native speaker Hungarian population that varies each year. These events play an outstanding role in preserving the Hungarian language and Hungarian academic life for Hungarians living as a minority.

### Thematic conferences

As already mentioned, thematic conferences appeared as successors to the regional conferences in



Hungary in the wake of the changes made in 2012. Similarly to the regional conferences beyond the borders, students may enroll with a presentation prepared about any independent research, from anywhere in the country. The difference lies in the distribution of the students arriving to each conference. While conferences held outside the borders are governed by regional distribution, the presentations and presenters of the conferences held in Hungary are distributed according to the disciplines included in the three sections. Students who succeed in the conference based on the professional evaluation boards – comprised of three members – assigned to each section qualify themselves to the National Conference of Scientific Student Groups.

The Association strives to enhance the dialogue between evaluation board members and presenters in order to make sure that instead of leaving with a negative experience, those who are not escalated to TUDOK receive advice to help them improve their work and perhaps utilise this advice by the next KutDiák event. A great benefit of the distribution by discipline is that presentations can be delivered to a more homogeneous professional audience, which contributes to increasing the professional standard.

In addition to the professional work done, the representatives of the National Association of Researcher Students try to give more in-depth information to participants about the movement as well as to organise them into a community. With their help, students soon realise that they should see each other primarily as partners in scientific disputes rather than competitors. Students may profit more from this type of relationships by extending their social network later on.

#### *The National Conference of Scientific Student Groups (TUDOK)*

The scientific student conference held every year since 2000 is one of its kind. The presentations evaluated by regional and thematic conferences are delivered at the TUDOK. Presentations are made in the various sections before an evaluation panel of three, as already explained.

Organisers encourage everyone to broaden their perspective by attending presentations of researchers working in other fields as well during the several days of the event. Programmes held late afternoon or in the evening are usually group development programmes or cultural events, with the purpose of strengthening the notion of a community among participating students. Generally speaking, this is the point where students realise how much more KutDiák wishes to give them than merely a study contest.

Most of the students who get to go to TUDOK have already tried themselves at some academic event. Their answers given to the questionnaire reveal that the vast majority (63%)

of respondents have the possibility to attend some talent support or skill development session in the education institution they attend.

76 per cent of the respondents answered 'yes' to the question aimed at the future plans of students<sup>7</sup>. The explanations reveal that many of them have started scientific research already before becoming aware of KutDiák so that, in their case, interest in science was not awakened by the movement; however, they stressed that TUDOK and the preparation for TUDOK helped them in and provided motivation for research. (See Annex no. 1/5) Those who said they have been motivated to select a scientific career for the future by the National Association of Researcher Students were motivated by the community and the programmes. The recognition of the National Conference of Scientific Student Groups enjoyed in Hungary is highlighted by the fact that grand prize and first prize winners of the Conference score extra points in the university acceptance process.

#### *KutDiák Scientific Essay Contest*

A problem arose in the course of the movement's operation, namely that students with outstanding scientific achievements for their age who have somewhat poor presentation skills had difficulties in presenting their work at TUDOK in the form of a speech. In order to eliminate this obstacle and in line with the movement's goal of familiarising students with all types of scientific publication possibilities, the management of the student association decided to create additional application possibilities. In these events, in addition to oral presentations of their work, researcher students may summarise their work in writing or present it in a scientific poster (see the Scientific Poster Contest mentioned later).

Applicants to the KutDiák Scientific Essay Contest have to prepare a scientific paper of no less than five but no more than twenty pages. The requirements applicable to contents are that the paper shall rely on independent scientific research and contain references to sources. The papers received are evaluated by a professional evaluation board. For a long time, the event consisted merely of submitting the essays, evaluating the essays and a brief evaluation session held in Budapest. In 2011, a change was made to expand the programme for the essay evaluation (such as scientific lectures, report on the awarding of the Nobel Prize). The movement received substantial assistance from the Library of the Hungarian Academy of Sciences, which hosted (and continues to host) the event. The purpose of these modifications was to give insight to students who have not enrolled to any other programme organised by the Association into the life of KutDiák, as well as to enable them to attend an event offering community relations and extra knowledge (lectures, Library

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<sup>7</sup> Do you plan to find employment in a scientific/academic field in the future?

presentations), rather than ‘just’ taking part in a contest.

This alteration of the prize ceremony for the essay application had its desired results. Not only did the high-class ceremony offer a more enhanced experience to students, there was an elevation of the professional standard of essays submitted in the following years.

### *KutDiák Scientific Poster Contest*

The KutDiák Scientific Poster Contest is the youngest event organised by the Movement of Researcher Students. The contest had been held as an independent event on five occasions and then, in May 2013, it was integrated into the award ceremony of the essay contest.

Cost efficiency was a primary factor in the integration of the essay contest and the poster contest,<sup>8</sup> and as feedbacks indicate, the change was received positively. So, as a result, the 1<sup>st</sup> KutDiák Scientific Weekend was held in perfect harmony with the intentions to reform the award ceremony of the KutDiák Scientific Essay Competition. Thanks to the enthusiastic work of the organisers, the closing event of the essay competition ceased to be just an award ceremony and turned into an outstanding event in the scientific life of secondary schools<sup>9</sup> (see Annex3/c).

Applicants to the poster contest are expected to prepare A1 format scientific posters presenting their independent research (as usual). Each poster presentation includes a five-minute lecture and a five-minute debate. In each section, a professional jury of three evaluates the works against set criteria and makes a consensus-based decision about the students to be nominated for the award.

### *National Student Conference, Káptalanfüred*

The National Student Conference as the end-of-school-year event of the Movement of Researcher Students is held every year in July Káptalanfüred by the Lake Balaton. For the eighteenth time this year, the programmes are attended by students who were among the finalists of the National Conference of Scientific Student Groups, the KutDiák Scientific Essay Contest or the KutDiák Scientific Poster Contest organised by the Movement of Researcher Students during the respective school year. In addition, the award winners of the Science and Innovation Youth Talent Contest are also invited to participate. The conference is actually a one-week camp where, beside participating in team-building programmes,

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<sup>8</sup> The economic recession following 2008 has not spared Hungarian civil society either. It reflects the flexibility of the social organisations initiated by civil society that they are able to find such solutions and they even turn such forced solutions into advantages.

<sup>9</sup> The name of the programme resulting from the integration of the two events became 1<sup>st</sup> KutDiák Scientific Weekend.

students can have discussions with the most prominent actors of Hungarian scientific and public life. Such guests included, among others, Csaba Böjte, Péter Esterházy, András Kepes, Éva Kondorosi, László Lovász, Zsigmond Ritoók, Ernő Rubik, László Sólyom, Tamás Vitray and many others. Among the guests invited by the organisers, students have already had the opportunity to welcome a former researcher student ‘colleague’, Dániel Rátai,<sup>10</sup>. The primary aim of the presence of guests is not to present their own fields of research, but to transfer their researcher attitudes during the discussions and to give directions to the students to find their way in the scientific world. The typical message conveyed by those discussions is that scientific work should be loved for itself and one should keep finding new challenges.

Between the sessions with the invited presenters, students can choose from various activities aiming to develop social relations, as the most important objective of the Káptalanfüred camp is building a community. The research works performed by the students coming to Káptalanfüred have all been evaluated by evaluation boards in advance. In their respective fields of interest they all have achievements above secondary school average. The questions and problems occupying their thoughts are more akin to each other than the ones they can discuss with other school mates. The relatively homogeneous group of students with similar interests quickly builds into a community. That process is supported in the camp not only by the organisers, but also by psychologists.

The camp provides a relaxed atmosphere for the students to make acquaintances and to improve their social contacts. Their future work is inspired by the ideas expressed during the discussions with invited guests, but also by the example of their peers. Belonging to a community like this, under formation, gives new motivations for the students who (concerning the events organised by KutDiák) have successfully completed the school year to start new research projects. Many of them are registering to one of the programmes for the next school year to be able to come to the Káptalanfüred camp again.

An important event of the closing day of the camp is the general assembly convened to elect new officers. Here, following an evaluation of the activities of the year, students elect from among themselves the new management of the National Association of Researcher Students for the coming year.

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<sup>10</sup> Inventor of the virtual reality hardware-software integration Lenar3Do and a founder of the Leonar3Do International Plc.

## **Examples of domestic and international co-operations by the movement**

### *Library of the Hungarian Academy of Sciences (MTAK)*

This co-operation that started in 2011 with the introduction of the library at the annual meeting of the Section for Humanities and Social Studies. Thanks to the openness on behalf of MTAK, the award ceremony of the KutDiák Scientific Essay Contest was held in the assembly hall of the library and this will remain the site of the coming award ceremonies, too. The quality environment and infrastructure ensured by the library greatly contributed to the re-organisation of the ceremony in the previously described manner.

### *ELTE Eötvös József Collegium (EJC)*

The National Association of Researcher Students has been co-operating successfully for years with the oldest specialised college of Hungary. The Collegium mainly provides accommodation for KutDiák students during different section meetings. In addition, EJC and KutDiák had a joint event in the series of events called Researchers' Night in 2013.

### *Network of Youth Excellence (NYEX)*

NYEX, based in Germany, is a network of organisations where students performing scientific work are assisted in various ways (e.g. by summer research camps, programmes during the school year, etc.). Concerning its self-organising nature and structure, KutDiák is quite unique among the member organisations.

### *Hungarian Innovation Association*

Thanks to the long and fruitful relationship with the Hungarian Innovation Association, every year a Kutdiák student can travel to Stockholm to the Nobel Prize Award Ceremony. As mentioned before, the Movement of Researcher Students offers the opportunity for students achieving good results in the Science and Innovation Youth Talent Contest to participate in the National Student Conference held in Káptalanfüred.

### *Sustainable Energy International Youth Competition and Conference*

Each year the Hungarian representative at the student conference held in Israel is delegated by the National Association of Researcher Students. In Israel, the Hungarian student concerned can test his/her abilities against those arriving from other countries through various assignments requiring creativity and a sense for innovation. The aim of the event is to

demonstrate to the participants the significance of using renewable energy sources through assignments requiring creativity and knowledge of engineering and natural sciences.

### Summer School of Science (S3)

Through the National Association of Researcher Students, Hungarian students may also register to this natural science oriented summer camp held in Croatia. (In recent years, Hungary was represented by two KutDiák students in each camp.) Participants of the one-week-long English-language camp are chosen through a preliminary selection process. In the camp they work on projects in groups of three, and present their results at the end of the week. In addition to working on projects, they also listen to scientific lectures.

### AMGEN and the National Association of Resercher Teachers

Last year a project launched by AMGEN Pharmaceuticals to promote natural sciences was implemented jointly by the Hungarian Association of Biologists, the National Association of Researcher Teachers and the Movement of Researcher Students. In the student camp organised in Ráckeve as part of the project, former and current members of the National Association of Researcher Students were assisting the work of the National Association of Researcher Teachers.

## **The influence of the National Association of Researcher Students among the students participating in the movement**

Interpersonal relations have a special priority in the life of the movement. The leaders of the movement put great emphasis on such relations and on organising various community-building exercises in the hope of making a permanent impact on the life of the students by ensuring the necessary background for their future work through the community network formulating within the movement. Their success is demonstrated by the output of the questionnaire survey conducted among the students participating in TUDOK (see Annex 2). The answers of the students reveal how much a community experience like this one means to them. Personal interviews with former researcher students emphasised the importance of the Káptalanfüred camp, too. The desire to belong to such an established community was a special motivator for them to carry on with their research work.

There are two distinct groups in terms of the impact of the movement on the students' career paths: one includes the students who got acquainted with KutDiákot from "outside" as participants in different events; and the other includes the ones who were present as organisers. Section leaders and presidency members obviously experience the period spent in the association rather differently. For them the community becomes extremely important.

While solving technical and human resource problems associated with organisation tasks, they obtain practical knowledge and skills as well. Basically, the experience they encounter there prepares them for working in management position in the future.

### **The impact of the Movement of Researcher Students on the career choices and later career paths of students**

The primary objective of the Movement of Researcher Students is to ensure research opportunities for secondary school students. Applying students choose their mentors from the list of mentors provided by the movement and establish a work relationship with them. The co-operation thus formulated often accompanies them through their entire scientific career, although the majority leave their mentors at some point (while they maintain their good relationship) and start an independent research.

### **Impacts on later career paths – Flow in KutDiák**

Many of the students joining the movement have already made a decision to follow a career in science in the future. For them KutDiák brings reassurance concerning such a decision. Within the movement they can experience the challenges they will face as scientists in the future. The operation of KutDiák is quite similar to an ‘incubator for young researchers’. Secondary school students can take their first steps as researchers in an accepting and inclusive community, while the professional jury helps them correct their mistakes. The risk of losing motivation can be reduced by minimising or compensating their sense of failure.

For those who start their research activities in the Movement of Researcher Students, this is the place where they first experience what it means to do research. In most cases it is a liberating feeling for them and the majority of the students actually experience flow.<sup>11</sup> in scientific research. Then they want to relive this feeling over and over and that is exactly what the movement offers them and that is what they will be looking for later, when they leave the movement and enter the world of science as young researchers. (Csíkszentmihályi, 2010)

Both the interviews and other experience show that the things experienced here are motivating the students to return later and support the movement (as mentors, lecturers, members of the Foundation, management, etc.). All the above reinforces the self-organising

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<sup>11</sup> That is what the questionnaire answered by the students participating in the 1<sup>st</sup> KutDiák Scientific Weekend and the interviews conducted with them revealed. (Questionnaire on flow experience: Csíkszentmihályi, 2010.)

nature of the movement as the membership increases and there will be more and more ‘ex-KutDiák’ students outside the movement.

Later on, when they try to find employment in the scientific world, the contacts built in KutDiák may just grow more important and friendships with students active in the same field may turn into professional bonds between colleagues. It is a great benefit of the programmes modelling the world of science (such as TUDOK, essay contests, poster contests) that by participating in them young people become familiar with various publishing methods.

### **The impact of the National Association of Researcher Students on the career paths of students**

The students joining the movement come from various family, school and community backgrounds; therefore, the impact that participation has on their lives is also very specific. In the following I will present the impacts of the Movement of Researcher Students by case studies based on interviews with three young people who are active in different fields.

The first case is about a twenty-four year old university student who is active in humanities. His talent has been acknowledged by several prestigious Hungarian talent support organisations. He also has a number of Hungarian and foreign language publications in his field of research.<sup>12</sup>

He started researching at a very early age while he was still in elementary school (Grade 6). He found his mentor from the list of mentors provided by the Movement of Researcher Students. His motivation to research came from the wish to get deeper into the topics he was interested in and for him the best way to do that was through scientific research.

Members of the association typically select a subject matter for their research linked to their own living environment or the community they live, in and their mentors also support such choices (as these sources are more easily accessible to secondary school students.)

The work performed under the guidance and supervision of his mentor let him obtain ample knowledge on his chosen subject matter. Compared to his peers, his advantage is not limited to the extra information gathered: he also acquired presentation skills and learnt the rules of scientific writing.

In the second year of his research he won first prize at the National Conference of Scientific Student Groups with his research results and thus an invitation to participate in the

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<sup>12</sup> In Hungarian: three books, two chapters in book, two studies and he also edited a book and published a study and an article in German.



Káptalanfüred camp. According to his account, the relaxed atmosphere of the camp was another motivating factor in his later work. His answers indicate that the acquaintances made in KutDiák with students and also with the researchers supporting the work of the movement had a long-term impact on his career.

According to his answers, getting absorbed in the activities of the National Association of Researcher Students greatly facilitated his scientific work. His research focuses on a special area and being in the movement allowed him to learn, with the help of his mentor, the basics of the methodology required. Furthermore, the movement and the professional environment it offered contributed to the recognition of his scientific work – resulting from the hobby research he was involved in as a child – and that was a great advantage during his university studies, too. KutDiák had a significant impact on his achievements and his publications, in particular, although the latter would have probably been published, anyway, but with a smaller weight. He described it as an enormous opportunity that he received help to be able to do that in the movement when he was younger.

The second student to be introduced has outstanding achievements in natural sciences. She got into contact with the National Association of Researcher Students at a later age than the previous student, i.e. only in the last year of her secondary school studies. By that time there were researcher students at her school and thus her teachers were already familiar with the movement and recommended her.

She had made up her mind to do scientific research even before she started secondary school. The movement helped her in her career choice by allowing her to try herself out in this area. After obtaining practice in the daily laboratory routine she still maintained her decision and started her further studies in that direction. At university, she joined the local talent support system through the opportunities provided by specialised colleges.

She managed to develop a particularly close relationship with her mentor who assisted her secondary school research work and also helped her during her university studies.

She described the event when she gave a presentation in front of her schoolmates at the regional conference held in her secondary school as a key experience. Among the long-term impacts of KutDiák she mentioned the opportunity to publish in an international journal much earlier (in 3<sup>rd</sup> year) than her peers and that the scientific work started at such a young age brought her several grants and participations in competitions contributing to her acceptance for doctoral studies.

The third student has achievements in engineering and in various fields of informatics innovation technologies.

The focus of his interest differs from the usual areas of scientific research and, therefore, the influence of KutDiák in his career also differs from the other two cases. His first challenge came from outside the scope of the events organised by the National Association of Researcher Students. It was only later that he discovered the movement via the Internet and joined it. He emphasises solidarity among the students as an advantage of this movement as compared to other organisations.

He started his innovation activities at an early age to fill in the free time he had besides studying at secondary school. The community offered by the Association of Researcher Students also contributed to the progress he made in his career. Within his own school he could not find anyone to share his thought with or who could have been a source of inspiration to him. Joining the Movement of Researcher Students filled this gap. The influence of the movement on realising his plans was not a direct, one but rather a reassurance given by the power of the community. (It helped him not to give up.)

During his university studies, he made use of the knowledge he obtained in KutDiák (approach, professional qualities). He remembers the first Káptalanfüred camp as a major event in his life where he felt he had found his place.

### **Social and educational aspects of the significance of extra-curricular activities and the Movement of Researcher Students**

The information society of the 21<sup>st</sup> century imposes new challenges for education and talent support. In order to meet such challenges, innovative programmes capable of combining the various talent support efforts are needed.

Competitiveness of the knowledge obtained by the students is becoming increasingly important even at secondary school level. A solution to this problem might be if young people with excellent qualities were helped in developing their talents by NGOs with direct links with the economy, enabling them to change the portfolio they offer in a dynamic interplay with the changes in the market.

It is in the interest of the society as a whole and the state itself that young people find employment in areas where they can utilise their talents the most. (That is how they can increase the human resources of the state most efficiently.) In order to achieve this goal, programmes ensuring the development of the students in their own – and frequently quite special – areas of interest are required. A major advantage of performing such activities

outside the school is that students are not forced to take an immature decision in choosing a specific line of education and they are allowed to select from different subjects or combine and supplement them.

It is important even for the secondary school generation to realise the significance of each scientific area. If the students are not aware of the purpose of studying certain school subjects and they do not know why it is good for them personally, their motivation to learn the given subject is bound to weaken. (Ferge, 1984) Starting scientific research early may help understanding those connections even if students do not choose a scientific career later on. Thus it is quite useful to follow international tendencies and build on the natural creativity and exploratory drive of the students and encourage them to get involved in scientific research.

The Movement of Researcher Students offers extra-curricular programmes to students where they can participate according to their personal motivations and implement their own ideas in the scientific field of their choice, while the examples of their peers help them enlarge their horizons by realising the importance of other scientific areas.

## **Summary**

The Movement of Researcher Students offers an opportunity for students to perform scientific work even before starting their university studies. They are supported by a well-established mentor network and professional programmes as well.

In addition to their independent scientific work, students may also participate in the movement and its various events where they can present their research projects and tailor them even more to their needs.

KutDiák is a good example of the performance young people with outstanding talents are capable of if they are trusted with responsibility and treated as equal. (Csermely 2013)

## Literature

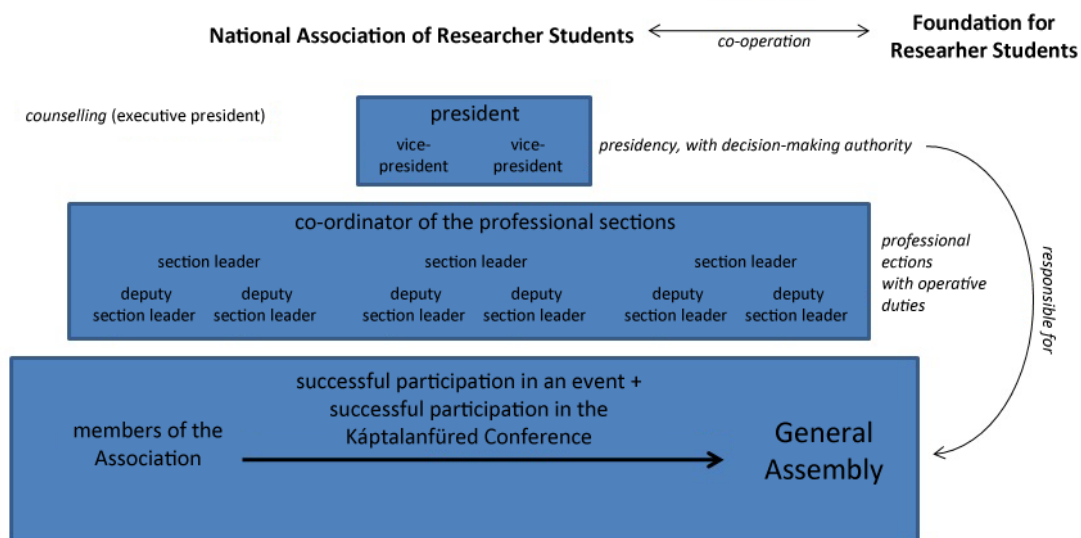
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- **INFORMANTS:**
  - Prof. Péter Csermely (founder of the Movement of Researcher Students)

- Dr. Emília Madarász (member of the Foundation for Researcher Students)
- Viktória Szeifert (president of the National Association of Researcher Students)
- Eszter Czeglédi
- Ádám Lipécz
- Tamás Révész
- former and present members of the National Association of Researcher Students

## Annexes

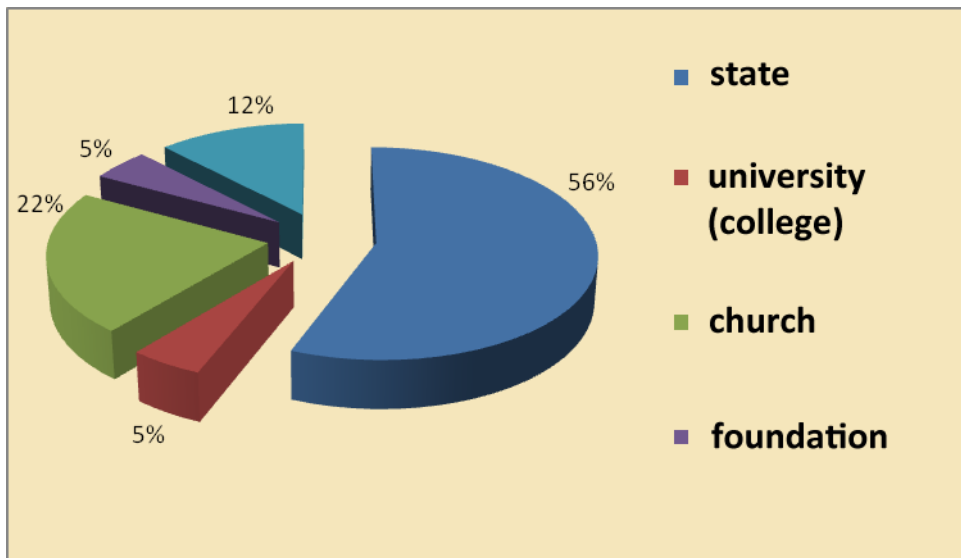
### 1. Organisational structure of the movement and responsibilities by units

#### The organisational chart of the Movement of Researcher Students

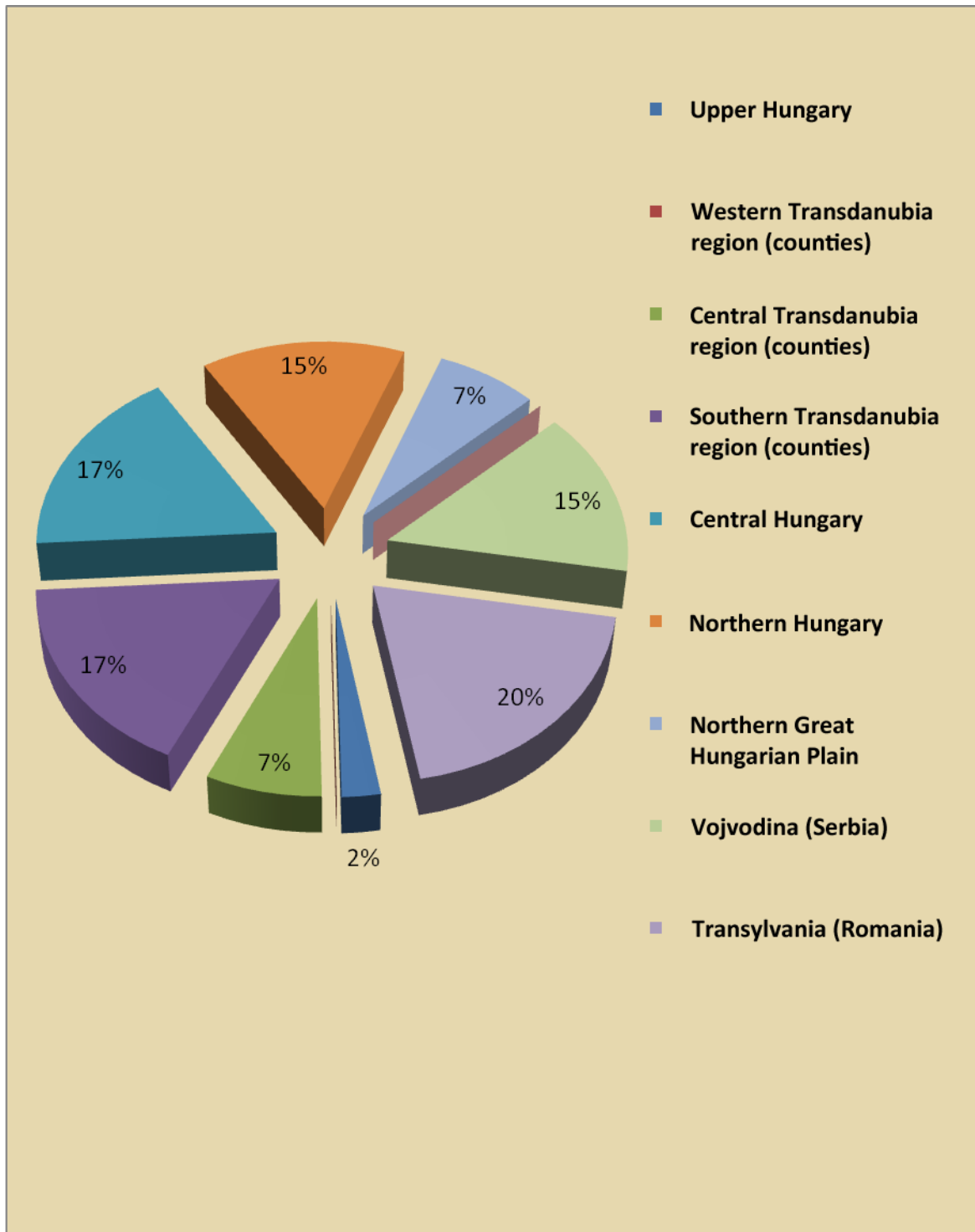


**2. Results of the questionnaire survey conducted at the 13<sup>th</sup> Conference of Scientific Student Groups (2013)**

a. Distribution of the educational institutions attended by students answering the questionnaire (by operators):



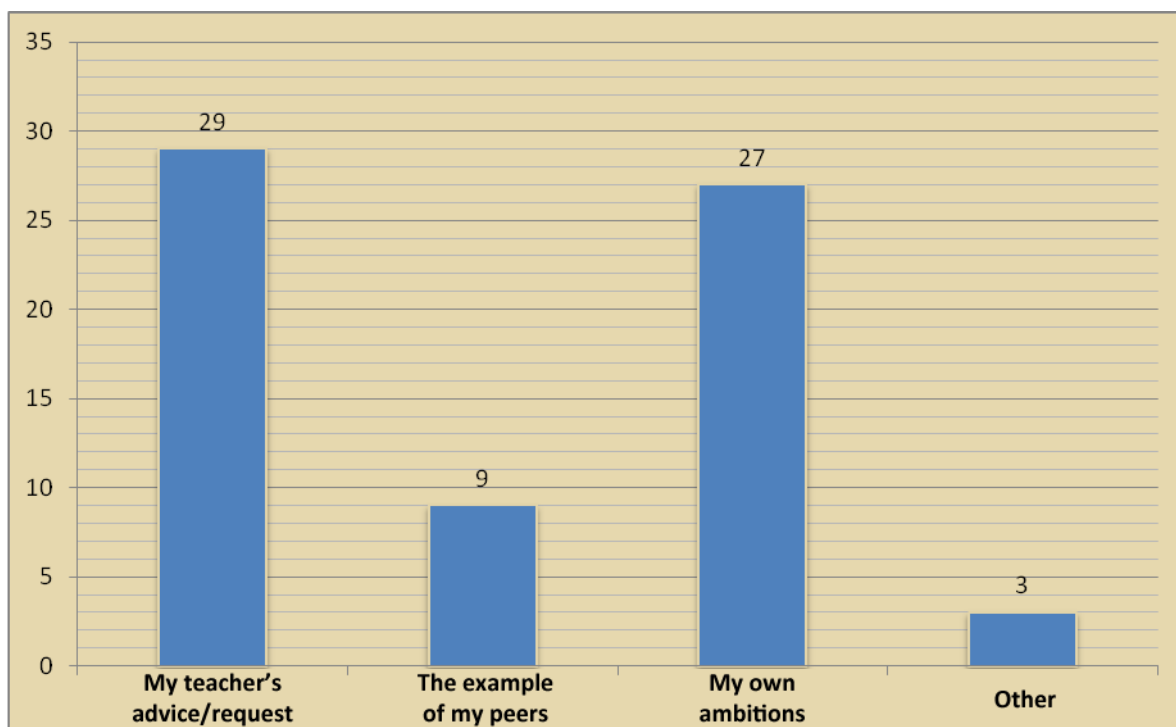
b. Geographic distribution of students responding the questionnaire:



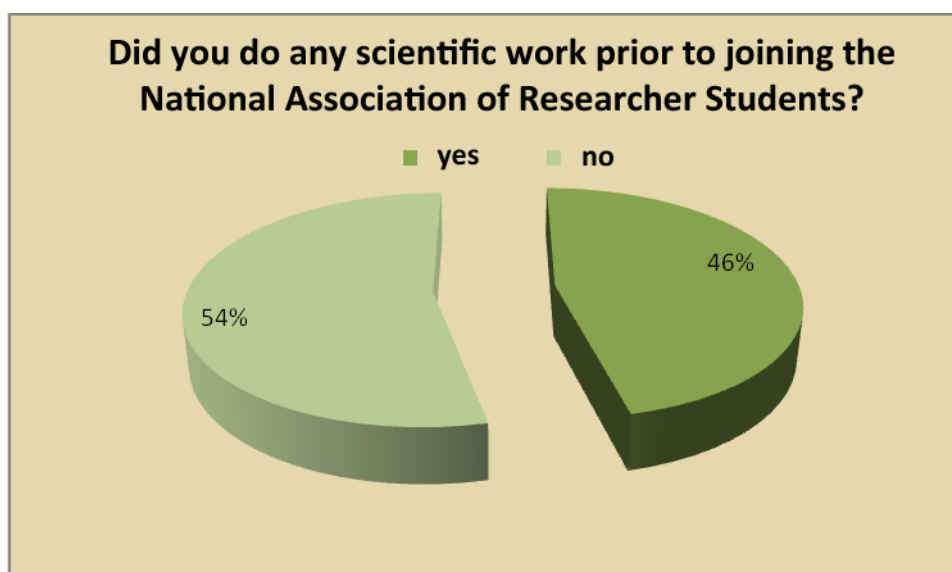


c. Examining the motivation of the students:

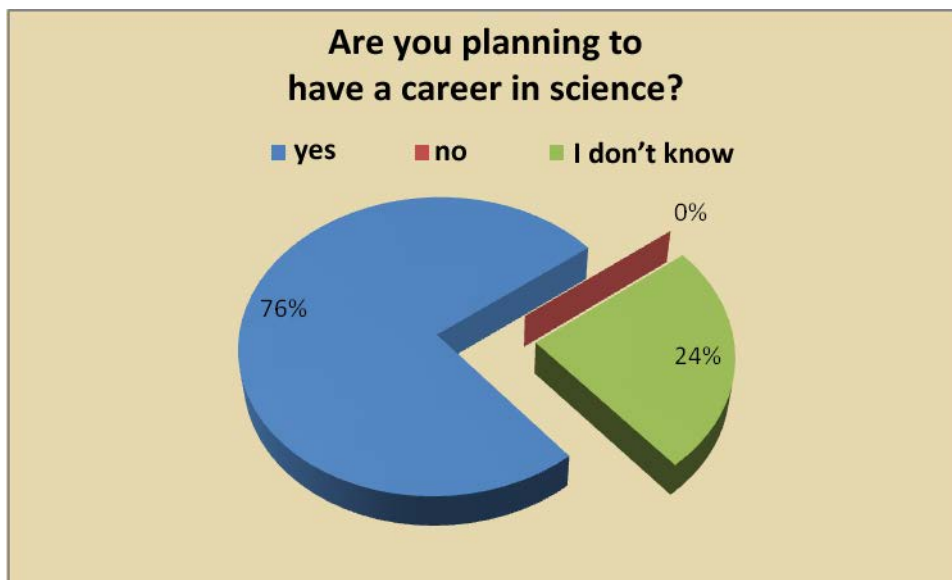
Number of students responding to the question: 'What is your motivation for participating in the National Conference of Scientific Student Groups (TUDOK)? (multiple answers allowed!)



d. Question concerning the professional background of the participating students:



e. Question about the career choice of students participating in the conference:<sup>13</sup>



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<sup>13</sup> The questionnaires were returned by the students on the second day on the conference.

### **3. Community building programmes of the National Association of Researcher Students**

- a. Programme of the Convention Meeting of the Arts and Social Science Section

#### **Draft Programme**

##### **May 18, 2012 (Friday)**

- 14:00-15:00 arriving at the hostel (Eötvös József Collegium)
- 15:00-16:00 walk in the city
- 16:45 returning to the hostel
- 18:00 lecture by Noémi Bánszky (former KutDiák) on dog-assisted therapy
- 19:00 dinner
- 20:00 sight-seeing
- 23:00 returning to the hostel – optional movie
- 24:00 going to bed

##### **May 19, 2012 (Saturday)**

- 7:30 breakfast
- 8:00 leaving the hostel
- 8:30 visiting the mosque on Fehérvári Street
- 10:00 taking a walk downtown (by the Danube) – traveling home
- 12:00 programme closing

b. Report on the convention written by one of the participating students

**Dear KutDiák students!**

As you certainly know, the convention of the Arts and Social Science Section was held this weekend (May 18-19, 2012.) and I – the novice researcher – was asked to write a brief review of the event. We arrived on Friday afternoon at the Eötvös József Collegium (the site of many previous scientific meetings as we later found out). I expected a somewhat bigger crowd: there were only about 15-20 people attending the meeting. After registration, we went for a short walk to see some nearby attractions of Budapest. We even got a tour guiding from András Szenczi much to the delight of those from out of town. We took a few pictures and went back to the hostel.

Later we had a chance to talk and get to know each other. For me this was very important as I barely knew any of them before. This was followed by a very informative lecture that was held by a special education graduate student, Noémi Bánszky who is specialised in addictology dealing with various addictions and their treatments. She frequently relies on the help of her dog as she uses dog therapy in working with addicts. Noémi talked about the illnesses, the difficulties she faces in her job, the sense of achievement and the different forms of healing both from the human and the scientific side. After this came the “chilling” part of the program. Then we returned to our rooms and everyone went to sleep.

The next day we got up quite early and visited the Budapest Mosque on Fehérvári Street where we were welcomed by Zoltán Sulok, the president of the Organization of Muslims in Hungary. He gave a presentation on Islam that answered a lot of my questions. It was really interesting and dissolved many doubts. The common programme was actually finished here and the members of the group could either go home or back to the hostel. I enjoyed the programme very much despite the fact that I barely knew anyone at the beginning. There are lots of valuable and intelligent people in this organization and I made some fantastic new friends. I am looking forward to the next convention and the summer camp, of course!

**I would like to use this occasion to thank the organizers for this outstanding programme!**

In Nagymaros, May 22, 2012

c. Programme of the 1<sup>st</sup> KutDiák Scientific Weekend (2013)

location: Library of the Hungarian Academy of Sciences, Budapest

date: May 25, 2013 (Saturday)

10:00 registration, hanging the poster

11:00 opening

*music played by Orsolya Elekes, violin*

- welcome speech by Nora Szegedi (MTAK)
- lecture by Ignác Romsics: Assessing the 20<sup>th</sup> century Hungary (30 minutes)
- Report: participation in the Nobel Award Ceremony, Gábor Galgóczi

12:00 break

12:15 presenting the posters

- humanities
- ecology-environmental protection
- biology-biochemistry
- chemistry-physics-informatics

13:45 break

14:15 lecture by László Mátyus on the organisation of cell surface proteins (30 minutes)

14:45 announcement of the results

*music played by Orsolya Elekes, violin*

- welcome speech by László Horváth (ELTE EJC)
- presenting of the certificates of the 9<sup>th</sup> KutDiák Essay Competition
- presenting of the certificates of the 6<sup>th</sup> KutDiák Poster Contest
- Viktória Szeifert evaluates the essay competition and the poster contest and welcomes the winners

13:45 closing