IMPACT ASSESSMENT OF

THE TELERIK ACADEMY SCHOOL PROGRAM

2021

I. EXECUTIVE SUMMARY

The main objective of the Telerik Academy School (TAS) is to provide free training to children from an early age to build the necessary skills and knowledge for a future career in the digital field. The TAS has identified the need to train children in technology, to spark their curiosity and love for education, to prepare them for the professions of the future, to foster their interest in learning, and to help them become digital leaders, sought-after professionals, and active citizens of tomorrow.

The purpose of the evaluation is to determine whether the Telerik Academy School (TAS) has had the intended impact on its target groups. The assessment is based on qualitative and quantitative research methods for collecting data from TAS alumni, their parents, and teachers, as well as analyses of data from surveys conducted earlier by TAS among teachers and students before and after their participation in the Academy courses.

For the purpose of this study, the participants were split into three groups: 1/ juniors (TAS alumni who are currently in the grade 4th -7th); 2/ seniors (TAS alumni who are currently in the grade 8th -12th); and 3/ 18+ TAS alumni (former participants who were 18 years or older at the time of the assessment).

The empirical data and the collected evidence allowed us to draw the following main conclusions:

→ **Program Implementation** – The program has achieved its main goals to develop and implement a training program that provides free digital education for children throughout Bulgaria.

Since 2011, the TAS program has reached out to 14,357 unique students. 5,553 (39%) of these were trained in the past three school years with ABF support. The cost of a TAS student was BGN 350, of which BGN 198 was ABF contribution. During the 2020/2021 school year alone, the number of TAS participants constitute 0.4% of the total number of 4th-12th grade students in the country.

ABF involvement has changed the profile of participating students. Before 2017, the senior students prevailed (71% to 91% in different years). After 2017, the share of junior students varied between 66% and 79%.

ABF support allowed the program to reach more communities (since 2011, the program has been offered in 41 settlements, 19 added after 2018 with ABF support)) and changed the ratio between the type of settlements where TAS was active. Sofia is no longer the leading city and

accounts for 35%-40% of the students, down from 90% in the early years. The share of students in regional cities grew from some 10% to 55% in the past three years. The share of participant from small towns grew from less than 1% to 10% in the same period, in line with the new program objectives.

→ **Reasons for enrollment in TAS courses:** The main reasons for participation in the program were related to the development of programing skills, desire for learning, interest in new technologies, and communication with good software professionals. Other reasons for participation in TAS included the positive image of TAS and individual plans for the future.
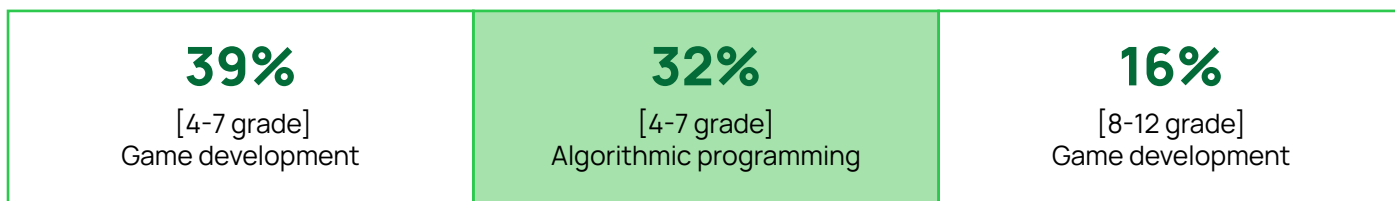
Figure 01: Why did you choose the programs of the TAS?
(Top 5 answers)

77%	I want to learn to program.	**52%**	I want to be in an environment of good software professionals
56%	I want to fill my free time with useful and developing activities.	**51%**	I am convinced that I want to work in the field of technology.
53%	New technologies are very interesting to me.		

Source: "Welcome in TAS survey", TAS 2018-2019 and 2019/2020 school year

→ **Typical Students' Journeys:** Most of the students (65%) attended one course. The remaining 35% participated in two or more courses and only 10% attended five and more courses. Game development and algorithmic programming were the most attended courses.

Figure 02: The interest in the program is high
(2,000 and more participants per year):

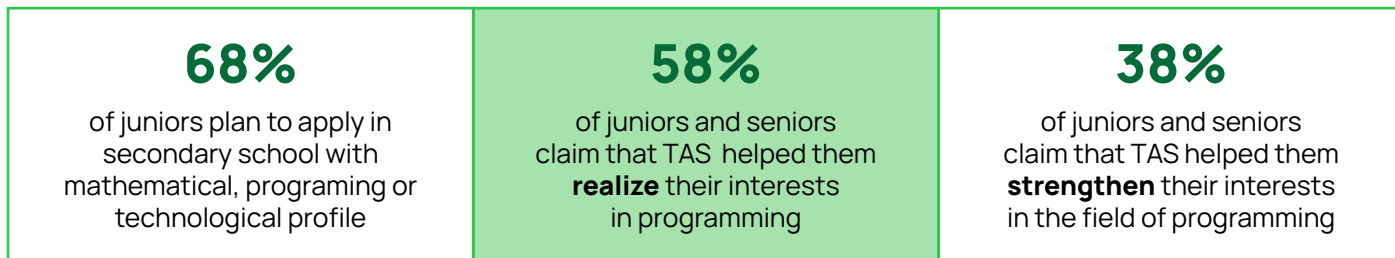| **39%**	**32%**	**16%**
[4-7 grade] Game development	[4-7 grade] Algorithmic programming	[8-12 grade] Game development

→ **Developing Sustainable Interest in IT:** The TAS Program has contributed to a large extent to the development of participants' interest in programming and technology. According to 83% of the 18+ TAS alumni the program helped them realize their interest in IT and reinforced it for the other 17%. The results were similar for the 4th-12th grade students, though at a different ratio: the program helped 58% of them to realize their interests in IT and deepened it for 38%. The number of TAS participants who continue their secondary or university education in IT-related studies confirm the sustainable interest of the TAS participants in IT.

Participation of TAS students in Olympiads and competitions further reveals their interest in mathematics and IT. One-third of the TAS trainees took part in Olympiads and competitions in coding. Participation in Olympiads in mathematics varied depending on the age group: 79% for juniors and 64% for seniors. 85% of the juniors and 67% of the seniors stated that attend-

ing TAS has helped them perform better at competitions. In the last two academic years, TAS participants received 39 of the 64 award medals at national competitions. TAS trainees constituted 61% of the Bulgarian participants at the six international competitions in the past three years for which data was available.

Figure 03: The program is successful in developing sustainable interest in the IT field among students

68%	**58%**	**38%**
of juniors plan to apply in secondary school with mathematical, programing or technological profile	of juniors and seniors claim that TAS helped them **realize** their interests in programming	of juniors and seniors claim that TAS helped them **strengthen** their interests in the field of programming

→ **Continuing Studies at IT Related Schools or Universities:** The program had a different level of impact on the participants' decision to continue their secondary or university education in IT related studies and mathematics. The effect is the strongest on the junior students and 75% of them confirm that TAS has influenced their decision in what school to apply after 7th grade. In addition, 68% of the junior TAS students are interested in continuing their secondary education in IT and mathematics.
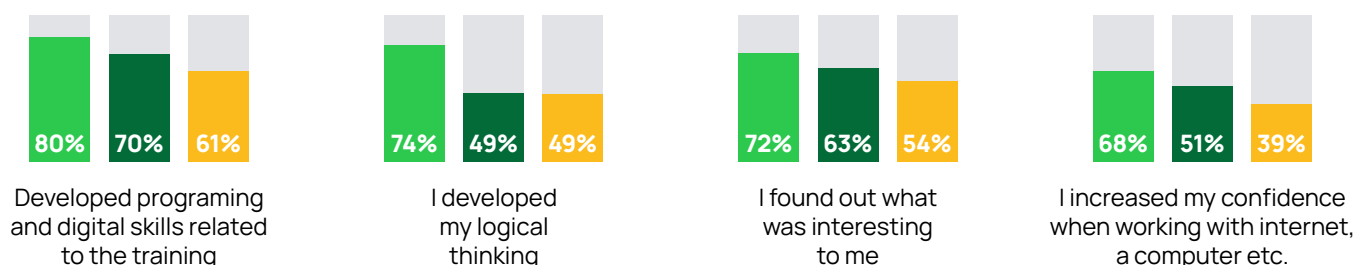
Forty-three percent of the senior students who attended TAS before 7th grade say that the program has influenced their decision in what school to apply after 7th grade. Nevertheless, 66% of them currently study in secondary schools with a profile in mathematics or IT. Further, 65% of the senior students stated that they would choose IT-related studies for their university education.
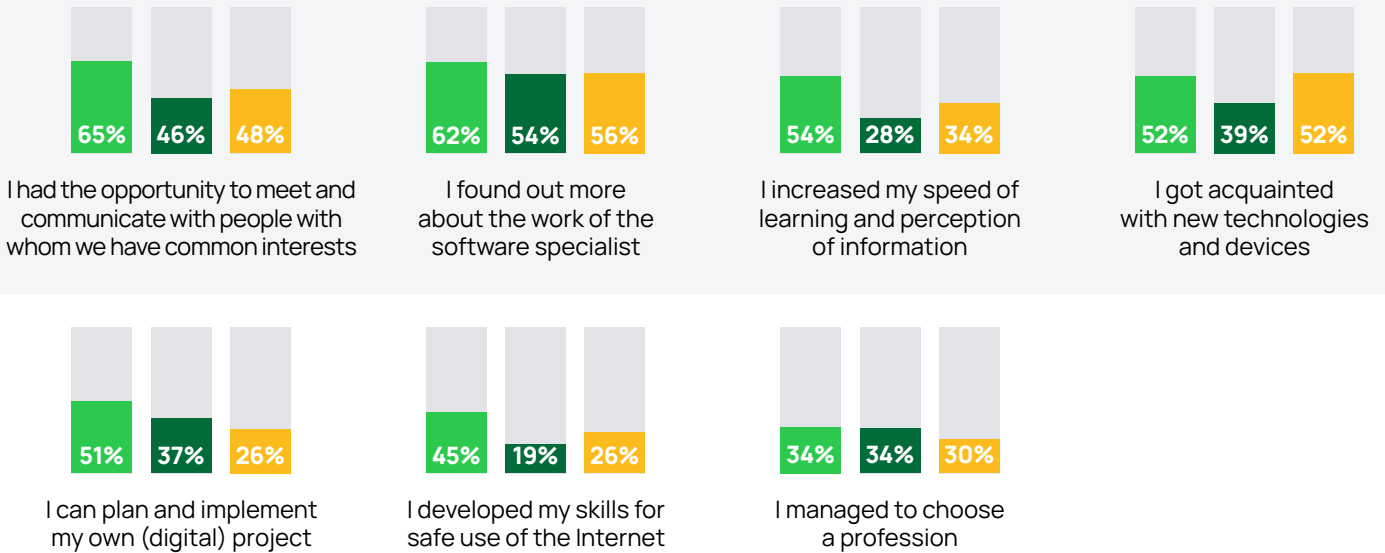
While 77% of the 18+ TAS alumni currently study IT related majors at university, a smaller number of participants in this group (41%) claim that the TAS program influenced the decision where to continue their higher education.

→ **Skills development:** TAS Program helped its trainees develop a wide range of skills. Junior students self-reported the highest number of acquired skills, probably because they entered the program at an early age when the influence of other factors on the development of their interests in the field of computers and technologies was still limited. This trend was valid for both participants in the junior age group and the TAS alumni who attended TAS courses when they were in the junior age group.

Figure 04: Which of the following things did you manage to achieve as a result of your attendance/participation in TAS?

● Base: juniors, N=146;   ● Base: seniors, N=151;   ● Base: 18+ TAS alumni, N=123

80% 70% 61%	74% 49% 49%	72% 63% 54%	68% 51% 39%
Developed programing and digital skills related to the training	I developed my logical thinking	I found out what was interesting to me	I increased my confidence when working with internet, a computer etc.

65% **46%** **48%**
I had the opportunity to meet and communicate with people with whom we have common interests

62% **54%** **56%**
I found out more about the work of the software specialist

54% **28%** **34%**
I increased my speed of learning and perception of information

52% **39%** **52%**
I got acquainted with new technologies and devices

51% **37%** **26%**
I can plan and implement my own (digital) project

45% **19%** **26%**
I developed my skills for safe use of the Internet

34% **34%** **30%**
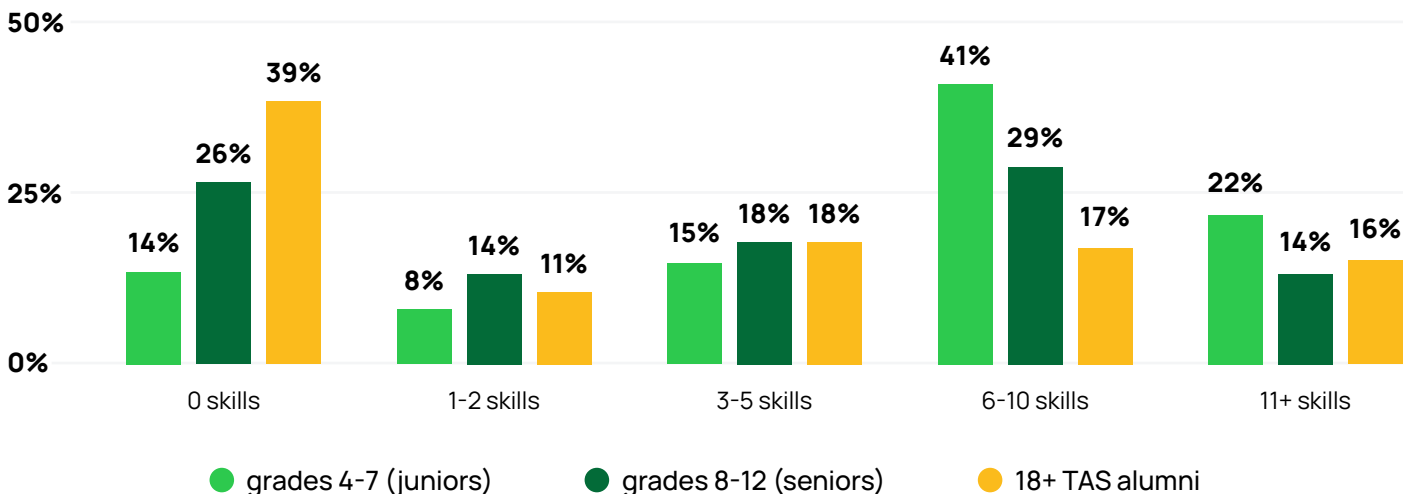I managed to choose a profession

Source: Survey among TAS students and alumni

Share of respondents who score 5 and 4 on a scale from 1 to 5, where 1 is a very small extent, and 5 - very high extent

Naturally, the share of respondents indicating individual skills was directly linked to the courses offered in each academic year and their educational content, which also changed throughout the years. The skills which junior trainees reported most frequently were: development of logical thinking (74%), programming skills (63%), game-making skills (55%), and increased speed of learning and processing information (54%). Simultaneously, students discovered their interest in the field of computer technologies (72%), increased their confidence when using computers and the Internet (68%), and took advantage of opportunities to communicate with their peers who have similar interests (65%). As part of the orientation to the world of technologies, trainees reported that during their training on the TAS Program they learned more about the work of software experts (62%) and acquainted themselves with new technologies and devices (52%). The answers provided by the other two groups were similar, but they indicated lower numbers of skills obtained.

Figure 05: Number of skills pointed out as obtained as a result of attendance/participation in TAS

● grades 4-7 (juniors)   ● grades 8-12 (seniors)   ● 18+ TAS alumni
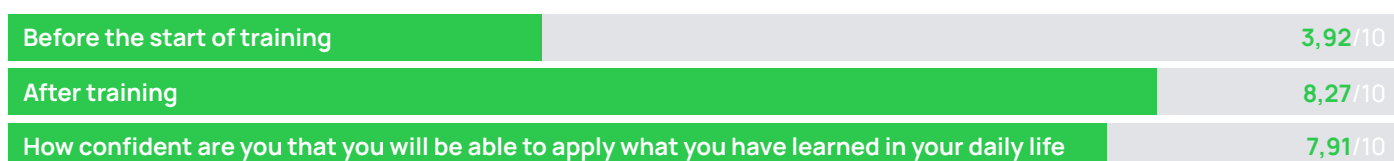
Source: Survey among TAS students and alumni

Share of respondents who score respective number of skills obtained with 5 and 4 on a scale from 1 to 5, where 1 is a very small extent, and 5 - very high extent

The program achieved more significant results with the younger age groups in terms of development of interests, skills, and orientation as a whole, whereas it acted as a complementary training for the elder age groups. The finding can be explained by the fact that this is the age when key skills are formed and the change is more tangible. Besides, this time is the tipping point in growing personal interest in IT as a basis for the future development of IT-related skills.

Participation in the program had a direct impact on the trainees' self-assessment of their skills: by the end of the training their rating increased by 4.35 points (on the scale from 1 to 10) with regards to programming skills and knowledge. Confidence in applying skills obtained in TAS course on a daily basis was also high (average score 7.91 on the scale from 1 to 10).

Figure 06: Self-Assessment of skills and knowledge before and after the program
On a scale of 1 to 10

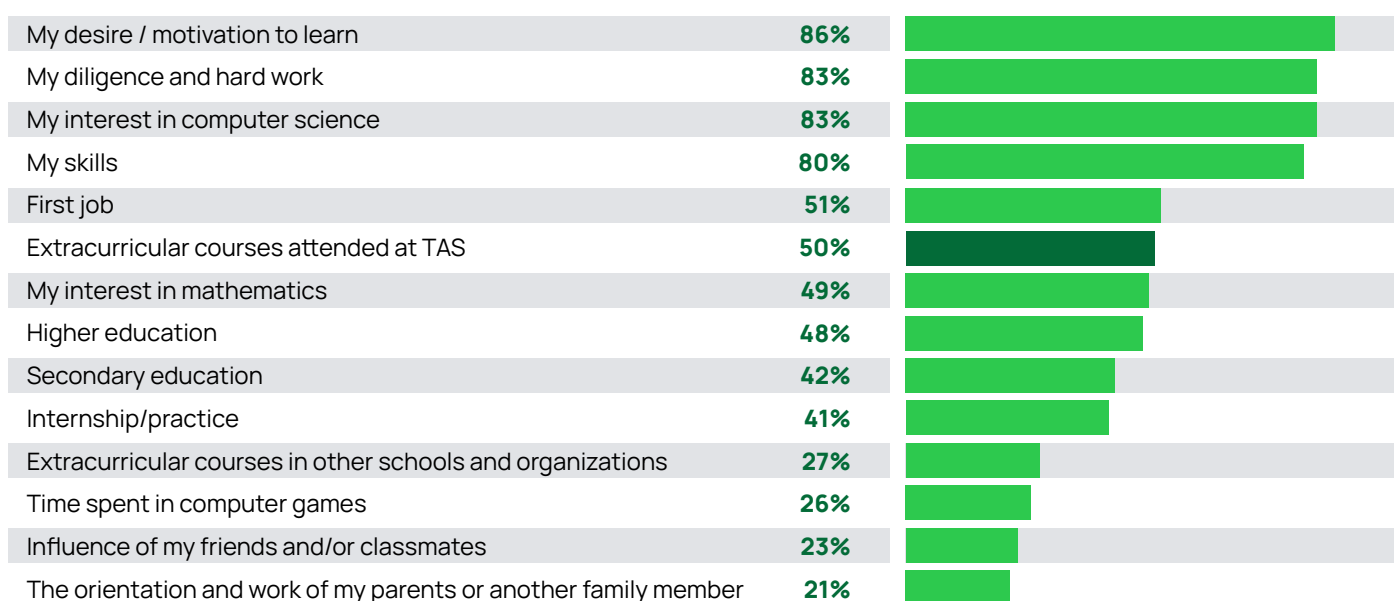|	
Before the start of training	**3,92**/10
After training	**8,27**/10
How confident are you that you will be able to apply what you have learned in your daily life	**7,91**/10

Source: Survey among participants in 2017/2018, 2018/2019 and 2019/2020 school years

→ **Factors That Influence the Career Development of the 18+ TAS Alumni:** TAS is in the middle range of the factors that influenced the career development of the TAS students. The top four factors, each rated as highly significant for more than 80% of the students[1], were personal skills, efforts, and interest in computer science (motivation, desire, diligence, and hard work, etc.). The second group of factors mentioned were in the 50% range(See Figure 07). These included first job, TAS courses, interest in mathematics, higher education, secondary education, and internships. It means that next to personal factors, TAS courses were very important.

Figure 07: Which of the following do you think helped you to succeed?
Those who completed 12th grade and work in the field related to computer technologies, N=54

My desire / motivation to learn	**86%**
My diligence and hard work	**83%**
My interest in computer science	**83%**
My skills	**80%**
First job	**51%**
Extracurricular courses attended at TAS	**50%**
My interest in mathematics	**49%**
Higher education	**48%**
Secondary education	**42%**
Internship/practice	**41%**
Extracurricular courses in other schools and organizations	**27%**
Time spent in computer games	**26%**
Influence of my friends and/or classmates	**23%**
The orientation and work of my parents or another family member	**21%**

Source: Survey among TAS students and alumni

Share of respondents who score 5 and 4 on a scale from 1 to 5, where 1 is a very small extent, and 5 - very high extent

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[1] Those who score 5 and 4 on a scale from 1 to 5, where 1 is a very small extent, and 5 is very high extent.

→ **TAS and the Labor Market:** TAS has a significant impact on the labor market in Bulgaria: In 2020, 93% of the estimated 1,850 18+ TAS alumni who had IT-related jobs worked in Bulgaria. This is equal to approximately 4,5% of the total number of people employed in the IT sector in Bulgaria, estimated at 38,000 in 2020[2]. This is a huge contribution of a single program that has been operating for ten years.

Even though the 18+ TAS alumni are young and most of them are still university students, their remuneration is competitive. For approximately 30% of them the monthly salary was above the average for Sofia for the Q2 of 2021 (BGN 2,072). 13% of the 18+ TAS alumni already earned net monthly salaries that were higher than the net monthly average salary in the IT sector in the country (BGN 3,344 in 2020). Most of them (68%) are junior experts or experts.

Figure 08: 18+ TAS alumni work in IT field

59% currently study at university.	**77%** study or graduated from an IT-related major.
57% of those who graduated secondary education were working	**14%** who already graduated higher education obtained their diploma abroad.
78% of those who worked had a job related to computer technology and programming.	**13%** of 18+ TAS alumni already receive net monthly salary that is higher than the net monthly average salary for IT sector in the country **For 2020 — 3,344 BGN per month**

Occupation of alumni (18+)

30% junior experts
38% experts
13% senior experts
6% team leads
6% managers
2% directors

Source: Survey among TAS students and alumni

[2] BASSCOM, Annual status report of the software sector in Bulgaria, p.7

→ Impact on the Teachers and Their Practices: Teachers considered their participation in the TAS as beneficial both for their contribution to the development of children's IT-related skills and knowledge and for the development of their own skills as teachers. A total of 91% of the Academy teachers indicated that they had improved their teaching methods by upgrading already known or learning new approaches. 94% of them applied what they learned in TAS in their regular practice: 38% of teachers applied them to a "very large extent" and 49% "to a large extent". Most of the teachers (87%) assessed the acquired and mastered methods as effective.

In a survey conducted during the academic period 2017-2019, 93% of the surveyed teachers responded that the influence of TAS on their teaching methods was very positive. 86% of the teachers said that they would recommend the training to a friend. The most valuable knowledge and skills that teachers developed during their training were related to different child-centered teaching approaches.

Both the quantitative and qualitative results showed that the teachers used the gamification approach in their work outside the Academy more often than other methods. The main modules offered at the Digital science program: "Accelerated learning" and "Digital literacy" were also often used outside the Academy.

Over 88% of the teachers supported the claims that participation in the TAS program created learning skills in students, increased their motivation, and offered knowledge that served as a basis for their next level of education. The same percentage of teachers also supported the statements that the trainings provided a successful start in participants' careers and in general for their choice of a professional field.

STRENGTHS AND WEAKNESSES

Several TAS values and challenges are outlined in the table below.

STRENGTHS

• The program contributed in many areas of skill formation, career orientation, and personal development of trainees. It strengthened their desire to continue in higher education in the field of programming and technology.

• The program was especially valuable for the junior students, for whom the program provides the basic skills needed for programming and development in the field of computer technology.

• Students shared that they had fun while learning, appreciated the skills they acquired and the opportunity to communicate with other peers who have similar interests. The majority of students participated with pleasure in TAS trainings, demonstrated high motivation for learning, and did their homework readily.

• A cumulative share of 72% of teachers supported the claim that the program had a great or very positive impact on the local teachers who were part of the program. Attitudes towards the positive impact on the local community were similar.

WEAKNESSES

• The complexity of the study material, as well as the speed of teaching was reported as a weakness by some students.

• There was a lack of mechanisms for giving feedback to parents of young students.

• Many students were looking for opportunities to upgrade but did not always know which courses were right for them and in what combination it was appropriate to take them. It would be good if teachers took some time to describe their courses (and those that they do not lead personally but are led by their colleagues).

LESSONS LEARNED

The TAS program is an example of a successful investment in human capital, which contributes not only to the individual development of participants, but also to the development of the local economic environment in small towns and regions. It also provides support for the sector with the highest added value in Bulgaria—IT. The coherent theory of change, together with appropriate resources (suitable teachers, effective trainings for them, and appropriate learning environments) and the quality of the courses for students give very positive results for all key target groups - students and teachers. Positive opinions were also reported by parents.

One of the biggest achievements of the program in the past three years is its outreach to smaller towns in the country where opportunities for developing the IT knowledge and skills of children are limited or even missing, or the financial barrier for doing it is high for the parents. TAS successfully combats these factors by offering free training at local level, thus creating the conditions for students in smaller settlements to learn and develop skills necessary for their future careers. This geographic expansion of the program should continue.

It is important to continue working with both, junior and senior students, as the training seems to develop different knowledge and skills in them, while solidifying the interest in IT in both groups. According to the teachers, the Academy successfully motivates students and encourages their further interests in information technologies in a friendly environment and using well-adapted approaches.

Another gap that TAS fills in is the early IT education of children. The Academy offers more advanced courses for juniors, while this happens at a later stage of education within the state educational system and with a limited scope. This helps the kids to gain knowledge and skills applicable in the future, regardless of the chosen professional track.

TAS SUSTAINABILITY PROSPECTS

The TAS model for future development is characterized by structure and logical consistency. It demonstrates the confidence and clarity with which the program team presents and plans its development in perspective.

The program team developed detailed plan for scaling operations and impact which envisage to double the number of students by 2024.

Figure 09: Plan for scaling operations

2017-2020 SY'17/18 — SY'19/20 (3 school years)	Planned for 2020-2024 SY'20/21 — SY'23/24 (4 school years)
Total cohorts — 222	Total cohorts — 628
Total students — 6,024	Total students — 12,820

Source: TAS Planning for the future

In quantitative terms, the business plan incorporates a variety of reasonable potential sources of support. To finance the growth TAS developed 15 revenue sources with the goal of achieving sustainability by 2024: local supporters, general business, partners network, schools, parents, alumni, foundations, philanthropists, friends & family.

The variety of revenue sources guarantees that all possibilities will be explored and growth will continue, despite the continuing negative effects of COVID-19. This gives flexibility and different options for future development.

The planned scale for the number of trainings and trainees, as well as their territorial distribution are reasonable, proven to be realistic and well thought out, including the scope of regional cities and other settlements in the country.

Figure 11: Planned and actual number of students

	SY'17/18	SY'18/19	SY'19/20	TOTAL
Planned number of students	1,375	1,850	2,375	5,600
Actual number of students	1,648	1,996	2,179	5,823
	+19.9%	+7.9%		+4.0%

Source: TAS Planning for the future

Having in mind that the actual number of students from the previous period exceeds the pre-planned number by about 14% for the pre-COVID period (SY'17/18 and SY'18/19), we can conclude that TAS plans for the future are attainable and with high probability we can expect that the team will reach the goals for 2021-2024.