

Dalberg

TUMO Impact Evaluation

Final report

JULY 2023

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TUMO has become a global player with significant success in providing digital skills training for youth across Armenia and several international markets.

Now is a critical time to look back, reflect and identify the path forward

Recap: To achieve this, we looked to answer three key questions

Priority for this evaluation

1

How effective has TUMO been in achieving its intended educational, career, and civic outcomes?

2

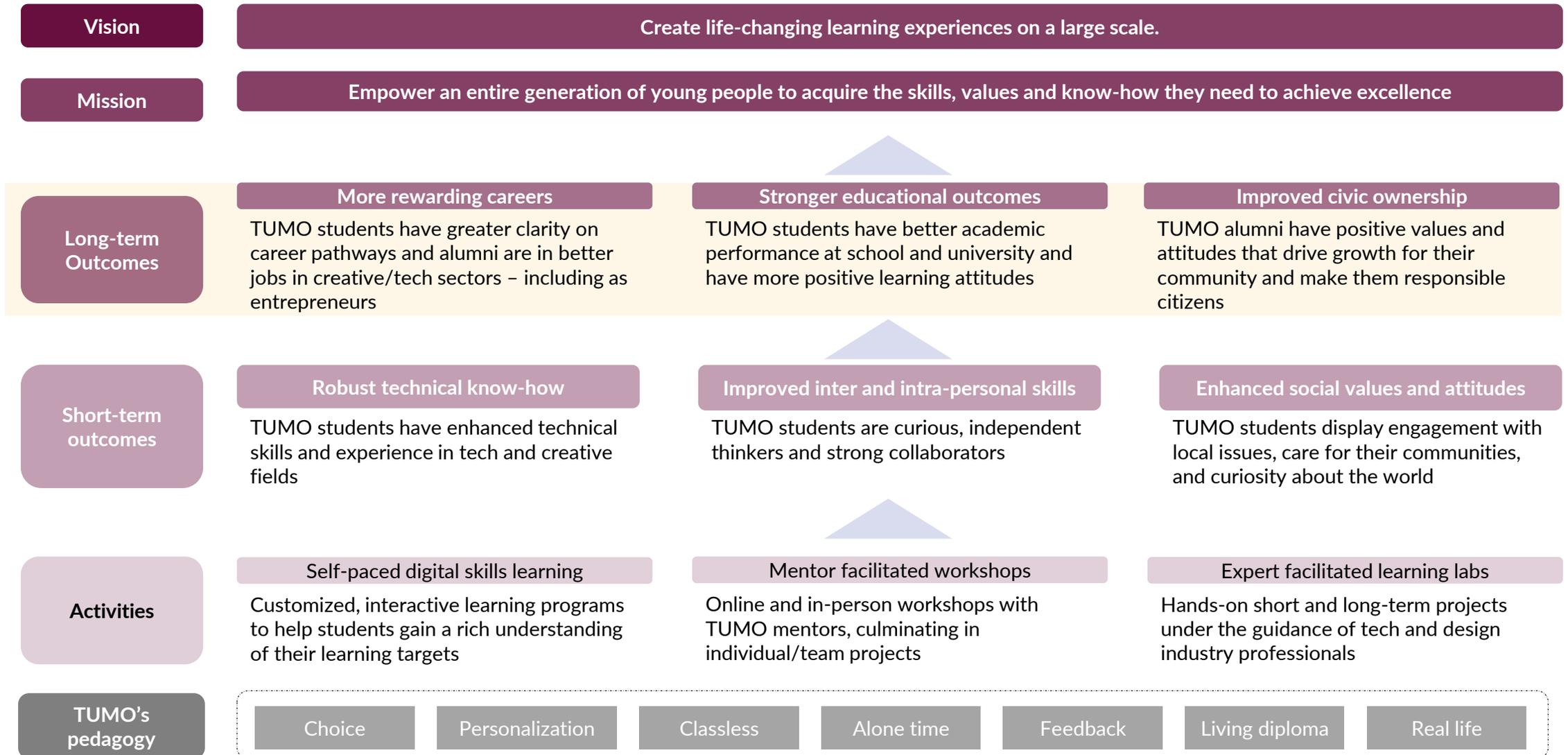
How do key external stakeholders¹ perceive the TUMO brand, its program, and its impacts on learners?

3

What is working and what is not working? How can it be improved?

Note: (1) External stakeholder include parents, teachers, professors, and employers

Recap: This evaluation was anchored in TUMO's intended long-term outcomes, as articulated in its Theory of Change



Recap: These outcomes were further broken down to arrive at an evaluation framework that captures areas of greatest interest to TUMO (1/2)

Outcome	Metric	Hypotheses tested through evaluation
 <p>More rewarding careers</p>	Career clarity	TUMO students have greater awareness and clarity around the career and educational pathways they want to pursue and align efforts toward the same
		TUMO students are more ambitious/have higher career aspirations
	Pathway	Compared to the control group, more TUMO alumni were in employment, whether it is self-employment or wage-based.
		TUMO alumni are more likely be employed in industries/roles in technology/creative sectors (e.g., Programming, web-design, filmmaking)
		TUMO alumni are more likely to be entrepreneurs or express entrepreneurial ambitions (especially in creative/tech fields)
	Quality & Satisfaction	TUMO students are more likely to have higher earning , and express greater satisfaction with their career and growth
Growth	TUMO students are more likely to experience consistent and accelerated career growth	

Recap: These outcomes were further broken down to arrive at an evaluation framework that captures areas of greatest interest to TUMO (2/2)

Outcome	Metric	Hypotheses tested through evaluation
 <p>Stronger educational outcomes</p>	Performance	TUMO students display better academic performance and are more active at school and university
		TUMO students are more likely to be enrolled in prestigious and rigorous higher education institutes and disciplines
		TUMO students have higher graduation rates (from school and university)
	Attitude & behaviors	TUMO students are more eager and motivated to learn and have higher educational aspirations
 <p>Improved civic ownership</p>	Awareness & engagement	TUMO students are more aware and engaged with social, political and environmental issues
	Values and Attitudes	TUMO students are more likely to value giving back to their communities/country
		TUMO students are more global citizens , displaying higher engagement with global issues and having a higher desire to learn from global practices
Action	TUMO students are more likely to undertake responsible actions to address social, political, environmental issues	

Recap: The evaluation further assessed TUMO's impact on key short-term outcomes to create a stronger evidence base for its ToC

Short-term outcomes	Hypotheses tested through evaluation
Improved inter and intra-personal skills	TUMO students develop stronger learning and innovation skills (e.g., Creativity, Communication and Collaboration, Critical thinking)
	TUMO students develop stronger life skills (e.g., Independence, Initiative taking, leadership)
	TUMO students develop greater self-confidence and faith in themselves
Enhanced social values and attitudes	TUMO students feel that attending TUMO helped them become more aware and engaged with local and global issues

The evaluation also gauged the satisfaction of current students and alumni with the TUMO program and collated their feedback and reflections, as well as observations from other stakeholders¹

Recap: We utilized a quasi-experimental design to assess TUMO's impact on students and alumni (1/2)

We looked to determine the impact of TUMO on its students and alumni by comparing them with a sample of similar individuals that had not enrolled in TUMO, or had enrolled but not yet started the program

Comparison
for current
TUMO
Students
(12-17 yrs)

Current students (at TUMO for > 1 yr) were compared with incoming students that were waitlisted or have minimal exposure (less than 3 months) to TUMO's program.

- Since all TUMO students are being enrolled through the same registration process and subjected to the same enrolment criteria, this pool of waitlisted and incoming students can be assumed to be similar in terms of characteristics as the current students at TUMO
- We also ensured that the comparison was similar to current students with regards to gender, age and region

Comparison
for TUMO
Alumni
(18-30 yrs)

Alumni (at TUMO for 2-3 yrs) have been compared with a randomly selected sample individuals, representative of the Armenian population, who could have theoretically enrolled in TUMO classes but did not^{1,2}.

- The approach differed from current students because TUMO does not disallow any eligible applicants to enroll (for example because of capacity constraints) – thus study could not leverage a pool of TUMO applicants who did not enroll based on a random selection process
- The comparison was selected after stratifying the data-base by gender, age (between 18 – 30 in line with the distribution of alumni we had access to) and region to ensure comparability

To control for income distribution across both groups, we compared treatment and comparison by the rental zone of their address, which acted as a proxy for socio economic status of the respondent - as rent is typically correlated with income and other determinants of socio-economic status. Post survey analysis showed that treatment and comparison group were aligned in terms of distribution across rental zones

Recap: Recap: We utilized a quasi-experimental design to assess TUMO's impact on students and alumni (1/2)

Surveys with responses from 724 TUMO students and alumni and 731 control group participants

	Treatment Group			Comparison Group		
	Current TUMO students (12-17 years)	TUMO alumni (18-22 years)	TUMO alumni (23+ years)	Waitlisted TUMO students (12-17 years)	Non-TUMO students (18-22 years)	Non-TUMO students (23+ years)
Yerevan*	162	140	141	124	161	168
Gyumri*	64	57	38	49	43	62
Dilijan*	18	23	13	1	12	13
Stepanakert*	18	26	18	9	17	23
Other	N/A	5	1	N/A	34	15



Aim for 50:50 gender split with minimum 40% quota for both sexes



Best possible matching of socio-economic backgrounds of comparison and treatment

* Besides the capital Yerevan, TUMO has learning centers in Gyumri, Dilijan and Stepanakert. This impact evaluation is concerned with Armenia only

Recap: We also leveraged statistical matching to reduce biases in our study and tease out TUMO's true impact

When the treatment (in this case TUMO education) is not randomly assigned to the study participants, it is recommended to reduce the bias for the estimated treatment effect through statistical matching.

- **Why did we match?** - Because a different outcome for TUMO students compared to non-TUMO students could be caused by confounding factors (such as gender/region etc,) matching is applied to control for such confounding factors. This helps isolate the differences between both groups on the basis of a single key variable (in this case, enrollment in TUMO)
- **How did we match?** - A matching algorithm was created to construct a matched sample with the use of weights. Through this, we were able to identify candidates in the comparison group whose observable characteristics are close or like their counterparts in the treatment group, creating two groups that are similar in every aspect but the variable being tested for.
 - We used one of the most popular matching approach in recent literature is propensity score matching, or PSM ([Rosenbaum & Rubin, 1983](#))¹. The PSM approach uses regression to perform the following, (i) predict group membership, (ii) assigning propensity scores to individual participants, (iii) match those participants across membership groups using the propensity scores.
 - Propensity Scores (Link) are calculated per respondent, and scores that are closer to each other are considered to match using Mahalanobis Distance (MD)
- **What did we match for?** The key variables used for matching were:
 - Age of respondent
 - Gender of respondent
 - Region of respondent

Recap: We also gathered qualitative data from students, alumni and other stakeholders

9 Focus Group Discussions (FGDs) and 30 Key Informant Interviews (KIIs) with key stakeholders across Yerevan, Gyumri and Dilijan

TUMO students	Current students	<ul style="list-style-type: none">• 2 FGDs in Yerevan• 1 FGD in Gyumri	<ul style="list-style-type: none">• 50:50 gender split• Mix of disciplines and time at TUMO
	Alumni	<ul style="list-style-type: none">• 1 FGDs in Yerevan	<ul style="list-style-type: none">• 50:50 gender split• Mix of disciplines and time at TUMO• Mix of those in workforce, University and NEET
Other stakeholders	Parents	<ul style="list-style-type: none">• 1 FGD in Yerevan• 1 FGD in Gyumri	<ul style="list-style-type: none">• 50:50 gender split in participants and students they represent
	Teachers	<ul style="list-style-type: none">• 6 KIIs in Yerevan• 4 KIIs each in Gyumri and Dilijan	<ul style="list-style-type: none">• 50:50 gender split in participants and students they represent• Mix of public and pvt. schools• Mix of subjects and grades
	Professors	<ul style="list-style-type: none">• 6 KIIs in Yerevan• 4 KIIs each in Gyumri and Dilijan	<ul style="list-style-type: none">• 50:50 gender split in participants and students they represent• Mix of public and pvt. universities• Mix of disciplines
	Employers	<ul style="list-style-type: none">• 10 KIIs in Yerevan	<ul style="list-style-type: none">• 50:50 gender split in participants and students they represent• Mix of sectors and firm sizes

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TUMO students tend to outperform their peers at school, and enter university with a strong foundation of technical and soft skills

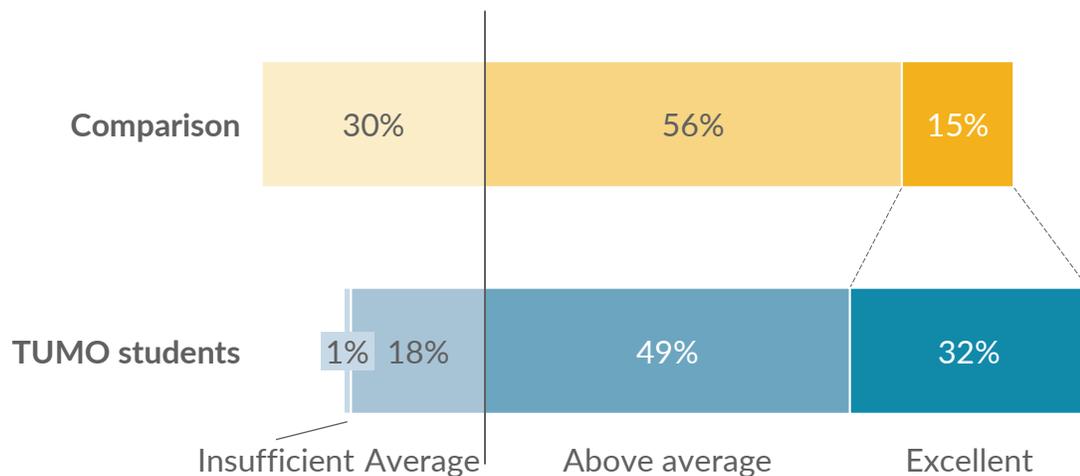


TUMO students reported excellent scores twice as often as comparison group; in fact, performance was correlated with time spent at TUMO

On average, TUMO students reported better academic grades and especially felt that they performed best at Math

% of respondents falling in different grade brackets (self-reported based on grades received in last academic year)^{1,2,3}

Treatment, 12-17 yrs (N=262), Comparison (N=183)

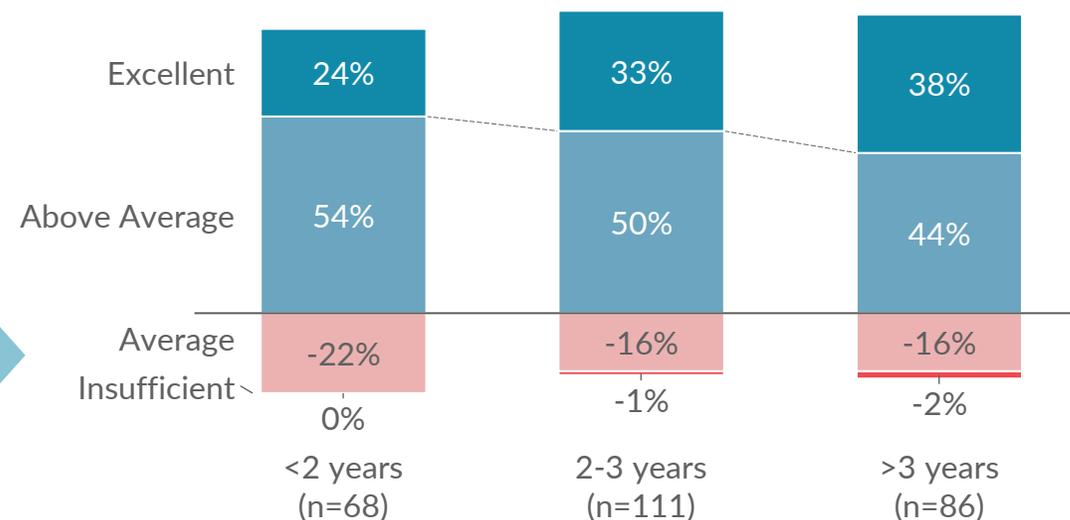


36% of TUMO students felt that they performed best at Math compared to 22% of the comparison group.³ Few students reported that programming courses particularly helped them with math at school.^{4,5}

Performance appears to be correlated to the time spent at TUMO, however attribution can be challenging

% of respondents falling in different grade brackets by time spent at TUMO (self-reported based on grades received in last academic year)^{1,2,3}

Treatment, 12-17 yrs (N=262)



Attribution can be challenging: E.g., it may simply be that naturally diligent students tend to stay at TUMO longer or it may be that children age, they gain more motivation and a greater variety of tools to help them do better academically,

Notes: (1) In response to the question "What was your overall score in the last academic year?"; (2) Students in school are put into performance brackets based on the scores they receive: Insufficient (1-2-3), Average (4-5-6), Above average (7-8), Excellent (9-10); (3) After matching for similar characteristics (including time spent in tuitions), differences in grades are statistically significant for both the average and excellent categories at the 95% confidence interval. TUMO students were more likely to have excellent performance in the last year (~2.7 times), while other students were likely to have average grades (~2 times) in the last academic year. (4) In response to the question "What subject do you perform best at?"; (5) After matching for similar characteristics, difference is statistically significant at the 95% confidence interval.



Teachers also highlighted that TUMO students were more diligent, confident, and independent

“**TUMO students are confident**, they know exactly what they are fighting for, and what they want from life. They **participate freely in the discussions**. They understand the task more easily and perform it more clearly.”

– Armenian literature teacher, Dilijan

“They [TUMO Students] are **more active, more developed children...and are generally more informed**. They are also dutiful and **fulfill their assignments on time and are more independent**. It is easier for them to do the lessons without help.”

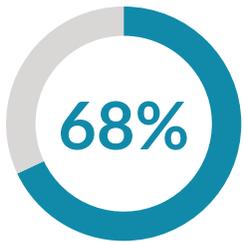
– Russian Teacher, Yerevan

“**For science subjects, the children who go to TUMO provide their thoughts freely and they always have good suggestions**. They give suggestions that even teachers do not think about. They always ask very interesting questions.” - Physics teacher, Gyumri



Students themselves felt attending TUMO helped them become more active and independent, positively impacting their performance at school

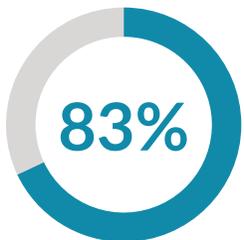
4 out of 5 students felt that TUMO had helped improve their performance at school over time^{1, 5}



of students felt that TUMO had made them more active and participatory²



of students felt that TUMO had improved their time management and academic independence³



of students felt that attending TUMO made it easier for them to work in groups⁴

“

“TUMO helped me be more active. Personally, I am an introvert, and I don't communicate with many people, but **thanks to the workshops I have been more active - both in TUMO and outside of TUMO.**”

- Current student, Yerevan

“

“TUMO helps you to understand that you can do a lot by self-studying **first**. At school, you think that you can't learn from anywhere else but the teacher, but in TUMO you understand that the main thing is things can work out if you do it yourself.”

- Current student, Yerevan

“

“At TUMO, you make new friends and work in groups. **Lots of our projects require group management.** That is what I like the most about TUMO.”

-Current student, Yerevan

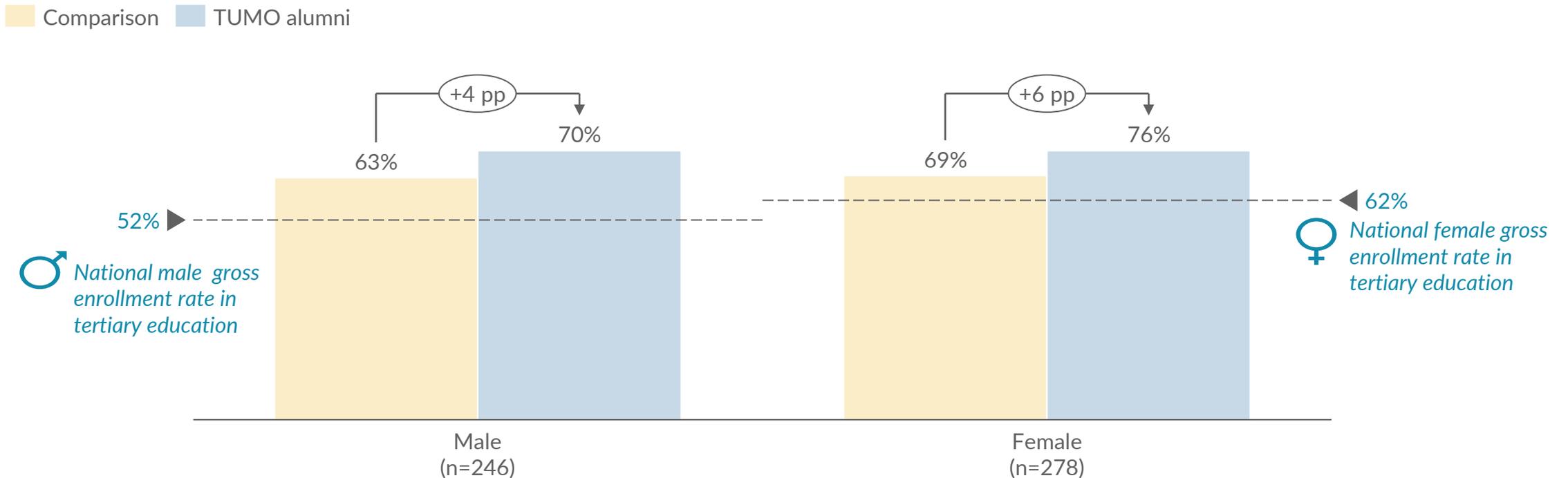
Notes: (1) In response to survey question “On a scale of 1-7, to what extent do you think TUMO is helping you perform better at school over time?” (2) In response to survey question “On a scale of 1-7, to what extent do you think you are more willing to participate in school/TVET and outside class because of TUMO?”; (3) In response to survey question “On a scale of 1-7, to what extent do you think you are able to better manage your time and track your progress in your studies because of TUMO?”; (4) In response to survey question “On a scale of 1-7, to what extent do you think you find it easier to work in groups because of TUMO?”; (5) N for all questions was 265



Post-school, alumni go on to have higher enrollment in tertiary education than comparison and national average ...

Overall, enrollment rates in tertiary education are higher than national averages for TUMO alumni^{1*}, with the difference being the largest for male alumni. In line with national trends, female respondents had higher enrollment than male respondents

% of respondents between 18-22 enrolled in tertiary education (bachelors/TVET)²
 Treatment, 18-22 yrs (N=196), Comparison (N=222)



Notes: (1) Data for national enrollment rates by gender is from 2017 as per official national sources. This rate may have changed and have moved closer to the comparison level, but it is unlikely to be significantly different or change the trend observed for TUMO students ; (2) Calculated by summing up respondents who were either currently at university (Bachelors)/TVET or had secured admits and were waiting to start.

Source: *National Statistics Office of Armenia (Armstat), 2017

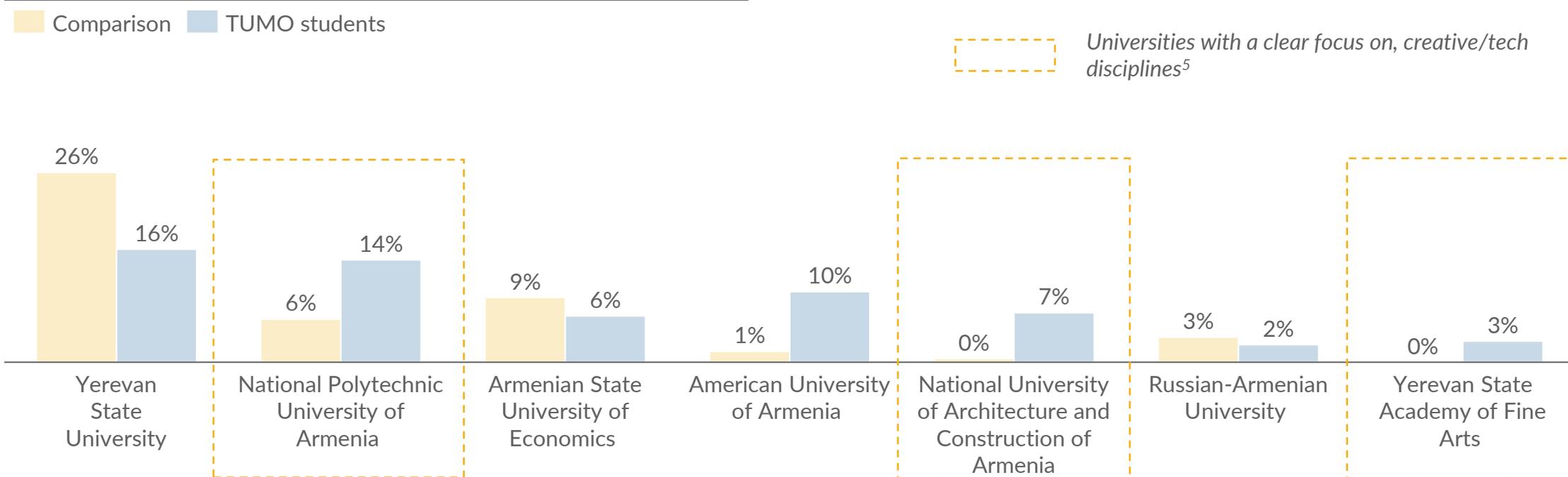


...and attend some of the top tech/creative focused universities in the country

24% of TUMO alumni were attending top Armenian universities with a tech-engineering or creative focus, compared to just 6% of the comparison

% of respondents engaged in self-learning activities in the last year¹

Treatment, 18+ yrs (N=205), Comparison (N=202)^{2,3,4}



Notes: (1) In response to the question “which university do you attend?”; (2) Respondents were those that were currently attending university; (3) Tallies for State University of Economics, National Polytechnic and State Academy of Fine Arts includes enrollment in both Yerevan and Gyumri branches.; (4) The comparison group also attended Shirak State University (9%), Yerevan State Medical University (6%), Armenian State Pedagogical University (6%) etc.; (5) Highlighted universities have a distinct focus on creative/tech disciplines, however, other universities may also have strong departments for creative/tech disciplines.

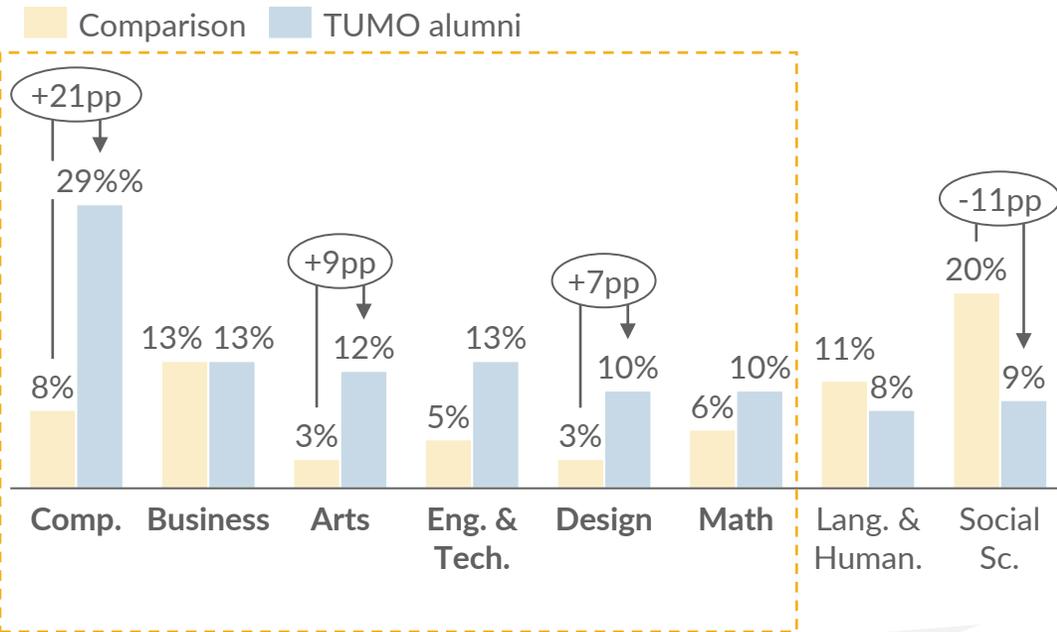
Sources: [QS rankings](#); [Times Higher Education](#); [Edu Rank](#); [Uni Rank](#)



In line with university trends, alumni reported higher overall enrollment in technology/creative disciplines, especially in Yerevan...

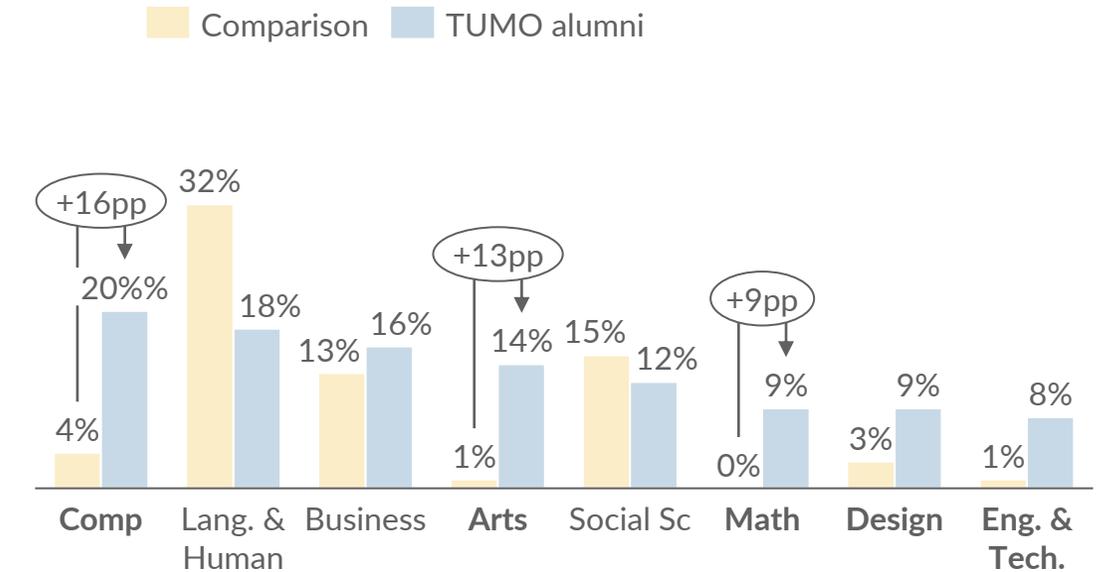
TUMO alumni had higher enrollment in creative/tech disciplines especially in computer degrees (29% of treatment as opposed to 8% of comparison). Outside Yerevan, alumni also had high enrollment in Languages & Humanities and Social Sciences

Distribution of university disciplines studied by respondents in Yerevan¹
Treatment, Yerevan, 18+ yrs (N=131), Comparison (N=128)^{2, 3, 4}



Trends by gender also match the aspirations of current students. Female alumni had higher enrollment in Languages & Humanities and Business. Male alumni had higher enrollment in Computers and Math.

Distribution of university disciplines studied by respondents outside Yerevan¹
Treatment, Non-Yerevan, 18+ yrs (N=76), Comparison (N=72)^{2, 3, 4}



The higher prevalence of non-creative/tech related disciplines could simply be because **higher education, especially for relevant disciplines, is largely concentrated in Yerevan**

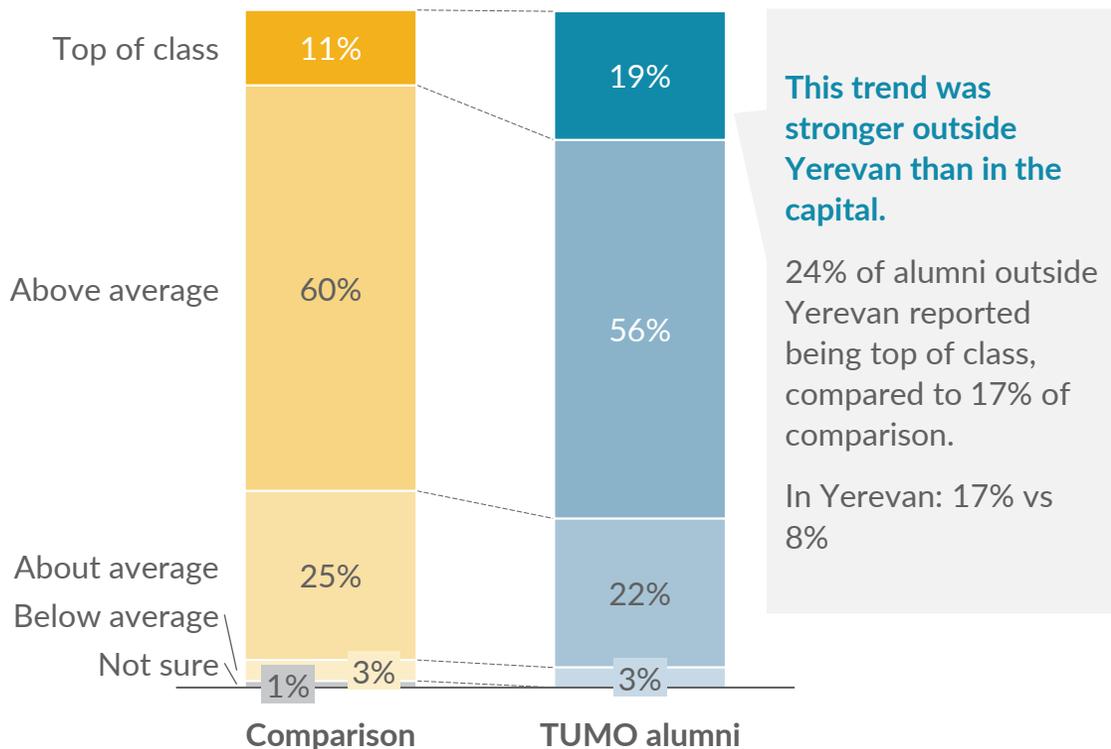
Notes: (1) In response to the question "What type of discipline did you pursue?"; (2) Respondents are those who are currently pursuing a bachelors or have secured an admit and are about to enter; (3) Other subjects include Law, Medical Science, Communications, Natural Sciences and Education which have not been included in chart due to low participation from both comparison and alumni; (4) After matching for similar characteristics, differences in computers math and design are statistically significant at the 95% confidence interval.



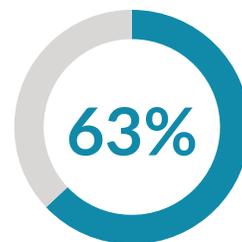
...and felt that TUMO helped them do well at university by building a solid foundation of both hard and soft skills

Directionally, TUMO alumni reported being at the top of their class in university more often than the comparison group...

% of respondents that reported different levels of academic performance relative to class average in university/TVET (self-reported)^{1, 2, 3, 4}
 Treatment, 18+ years (N=186), Comparison (N=195)



...and partly attributed the impact to TUMO



of alumni felt that TUMO helped them build the skills needed to perform well in university/TVET⁵

“I was studying in college at that time, and it helped me master the subjects because it seems to me that **TUMO gave me the flexibility of my mind and taught me how to think. Everything became easy for me.**”
 - Alumni, Yerevan

“**Many of my professors from university taught the same classes at TUMO.** I found that a lot of what I learned in university was a repetition of what is already taught at TUMO.”
 - Alumni, Yerevan

Notes: (1) In response to the question “How well do you think you are doing in university/TVET compared to the rest of your class?/think you did in university/TVET compared to the rest of your class?”; (2) Respondents include those currently at University, Accounts for 37.6% of the total sample; (4) Self-perception of performance relate to class average was statistically significant at the 90% confidence interval; (5) N= 430



Professors also felt that TUMO students came into university with stronger foundations and were more independent and active

“I see differences in technical programs; **TUMO students are better prepared for classes that require computers and graphics** as compared to their peers who did not have access to these opportunities.”
- Fine Arts Professor, Yerevan

“I think they are **more inclined to work independently**, because they are doing their own projects. However, I also see their teamwork in extra-curricular like debate. **They are also able to work in a team very well.**”
- Geography Professor, Dilijan

“**I can't distinguish as it's very individual**, there are students who know the subject very well or have some work experience, and there are students who only study in one direction.” - Programming Professor, Gyumri



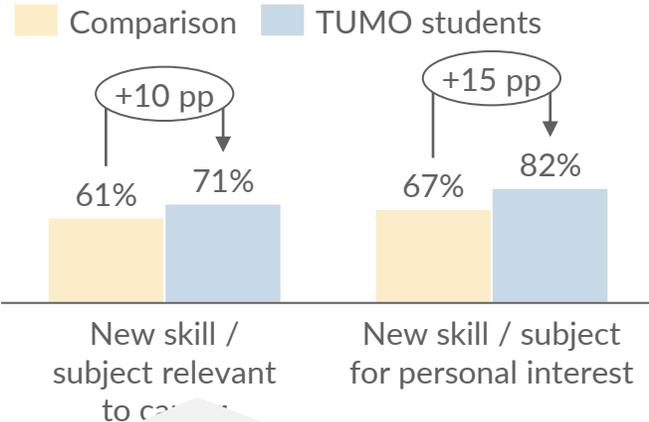
Beyond academic performance, what stands out is TUMO's impact on the learning attitudes and all-round development of students



TUMO students had higher engagement in learning new skills and extra-curriculars, implying enhanced curiosity; students attributed this to TUMO

>80% of TUMO students reported teaching themselves a new skill/subject in the last 3 months...

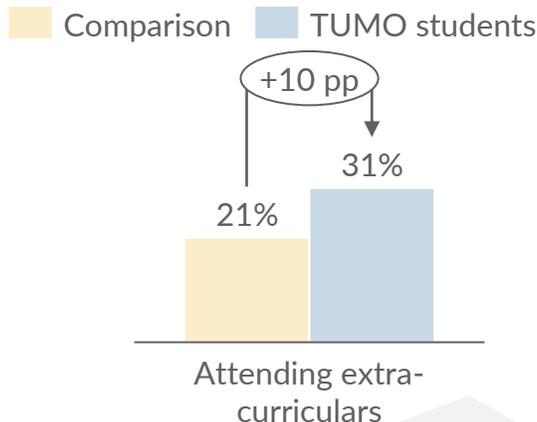
% of respondents who taught themselves a new skill in the last 3 months^{1,4,5}
 Treatment, 12-17 yrs (N=262), Comparison (N=183)



85% of TUMO students between 12-17 yrs³ felt that TUMO helped them become more curious and better learners.

...and they spent a significantly higher amount of time in extra-curricular activities

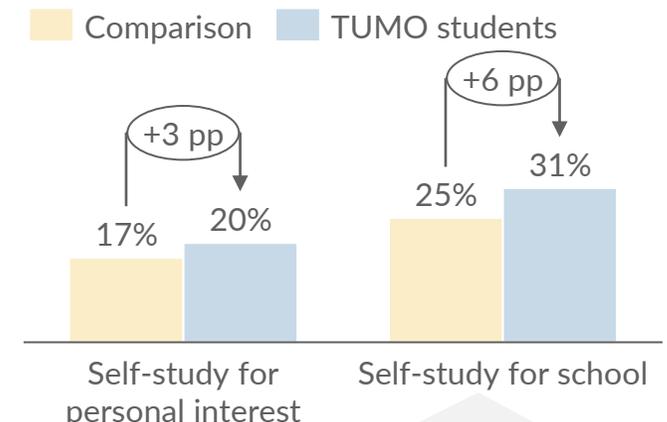
% of respondents who spend more than 2 hrs. a day on extra-curriculars^{2,6}
 Treatment, 12-17 yrs (N=262), Comparison (N=183)



Part of the difference could be because TUMO students count TUMO classes as an extra-curricular.

Despite that, it is worth noting TUMO students spent similar amount of time in self-study

% of respondents who spend more than 2 hrs. a day on self-studying^{2,7}
 Treatment, 12-17 yrs (N=262), Comparison (N=183)



This **impact was significantly higher for students between 12-14 yrs.** With age, the difference in time spent declined.

Notes: (1) In response to the question "In the past 3 months, have you done any of the following?"; (2) In response to the question "How much time do you think you spend on the following activities on an average day"; (3) N = 265; (4) There was significant difference in students teaching themselves skills relevant to career at the 90% confidence interval; (5) There was a significant difference in students teaching themselves a new skill/subject relevant to personal interest - TUMO students were ~2 times more likely to teach themselves a new skill/subject on personal interest.; (6) Difference on time spent in extra curriculars is significant at the 95% confidence interval.; (7) Difference in time spent on self-studying is not significant at the 95% confidence interval.



Parents also observed that their children had higher self-motivation and enhanced willingness to learn new things because of TUMO

“**Both my children have become more purposeful. It is possible that this is the influence of Tumo** because their approach is to focus on one’s own power. This could be the reason that my children set their own goals and motivate themselves to achieve it.”
– Parent of current student, Yerevan

“**Self-education is always there. Their communication is very active, if they don't understand something, they ask or start looking for the answer themselves.**”
– Parent of a current student, Gyumri

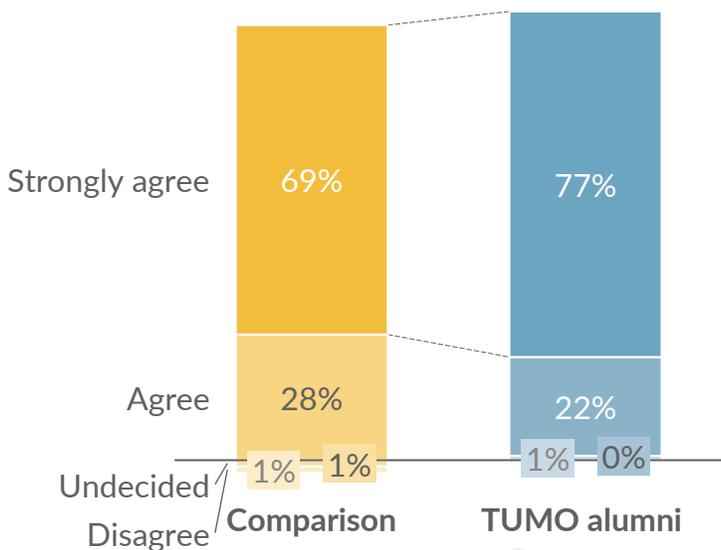
“**They want to try everything.** They see that there is something that they are not good at, and they want to study that too. They do not let the course remain unknown to them.”
– Parent of a current student, Yerevan



This trend continues in university; alumni were more eager to learn new skills, and spent more time on independent projects

Alumni enjoyed learning new skills/subjects more than comparison...

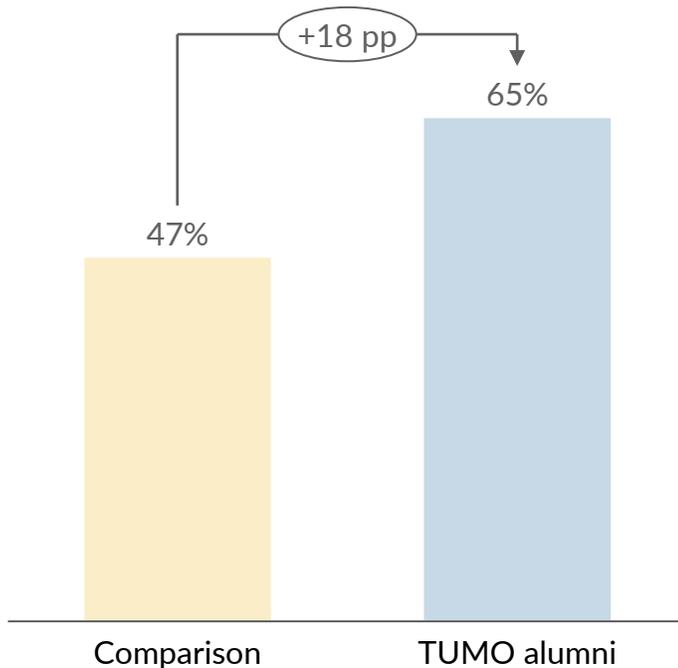
% of respondents that felt they enjoyed learning new skills/subjects^{1, 2}
 Treatment, 18+ years (N=205), Comparison (N=202)⁷



Alumni in Yerevan more strongly agreed (77%) relative to their comparison (66%). **This was less pronounced outside Yerevan (75% vs 73%)**

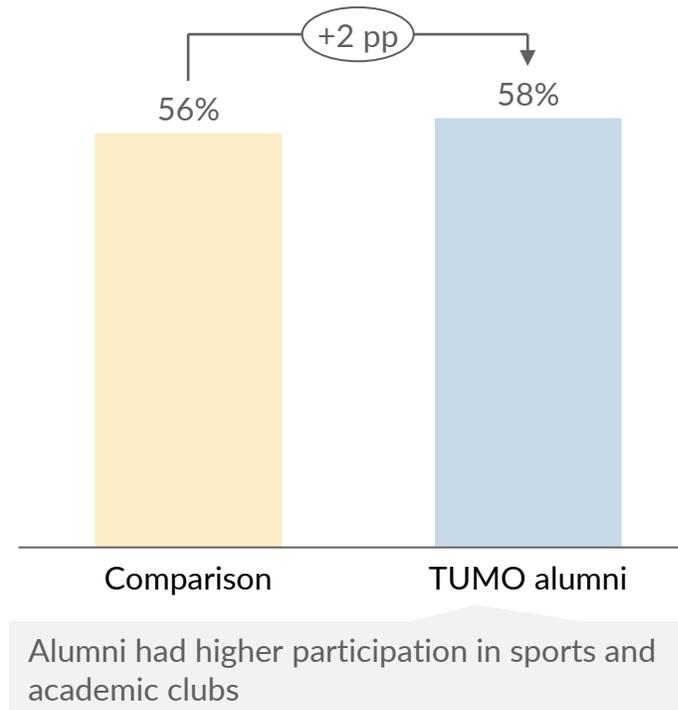
...and spent more time in an average day engaged in independent projects

% of respondents who spent more than 1 hr a day on independent projects^{3, 4}
 Treatment, 18+ years (N=186), Comparison (N=194)⁸



Even then, the level of participation in extracurriculars was similar in both groups

% of respondents at university engaged in some form of extra-curricular activity^{5, 6}
 Treatment, 18+ years (N=209), Comparison (N=202)⁹



Notes: (1) In response to the question "To what extent do you agree with the statement: I enjoy learning new topics/subjects and developing skills?"; (2) There was a significant difference in alumni enjoying learning new skills at the 95% confidence interval; (3) In response to the question "How much time do you spend in an average day working on independent projects?"; (4) There was a significant difference in alumni spending more time working on independent projects at the 95% confidence interval (5) In response to the question "Do you/did you participate in any of the following in university/TVET or outside?"; (6) Not statistically significant; (7) Those at university, entering university or applying to university; (8) Those currently at university (bachelors, TVET or Masters); (9) All respondents who had attended University (current/graduated/attended but dropped out)

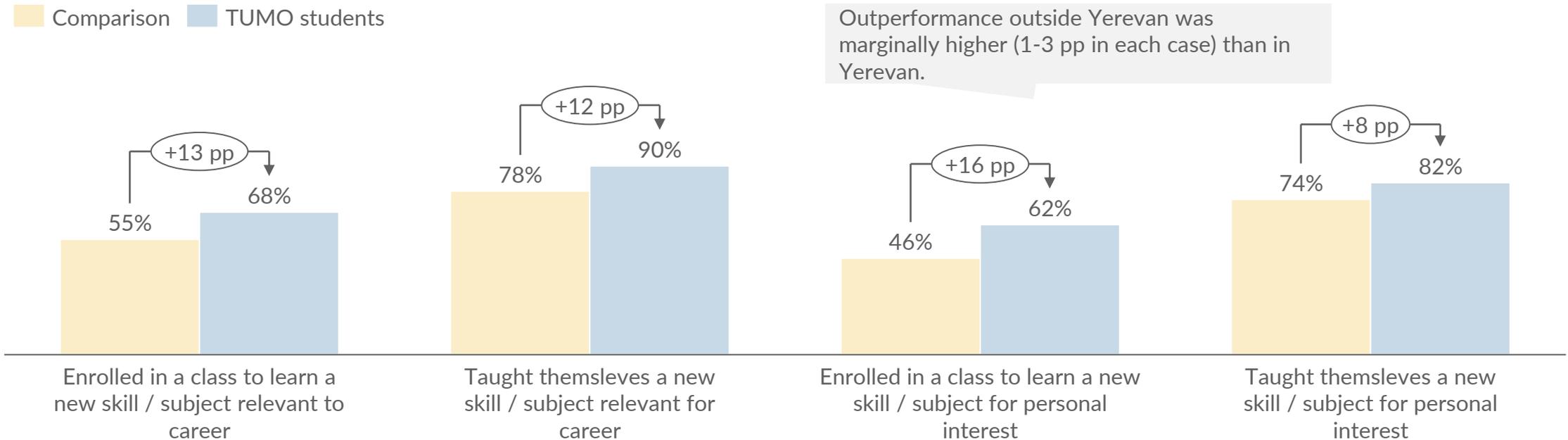


Even alumni in the workforce reported higher engagement in building new skills, suggesting that TUMO builds a lifelong desire to learn

A higher percentage of TUMO alumni in the workforce reported engaging in learning a new subject/skill in the last year, especially to satisfy personal interest. ~75% are above 23 years old, suggesting that this continues even as alumni grow older

% of respondents engaged in self-learning activities in the last year¹

Treatment, 18+ yrs (N=242), Comparison (N=314)^{2, 3, 4, 5}



Notes: (1) Respondents were those in the workforce, in between jobs or looking for their first job; (2) In response to the question "In the past 1 year, have you done any of the following?"; (3) Accounts for 55% of sample; (4) There was significant difference in students teaching themselves skills/enrolling themselves in a class relevant to career at the 95% confidence interval; (5) There was significant difference in students teaching themselves skills/enrolling themselves in a class for personal interest at the 95% confidence interval; (6)

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- ***Rewarding careers***
- *Civic ownership*
- *Learner satisfaction*

3 | Looking ahead: Reflections from the evaluation

4 | Annex

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- *Demographics of the sample*

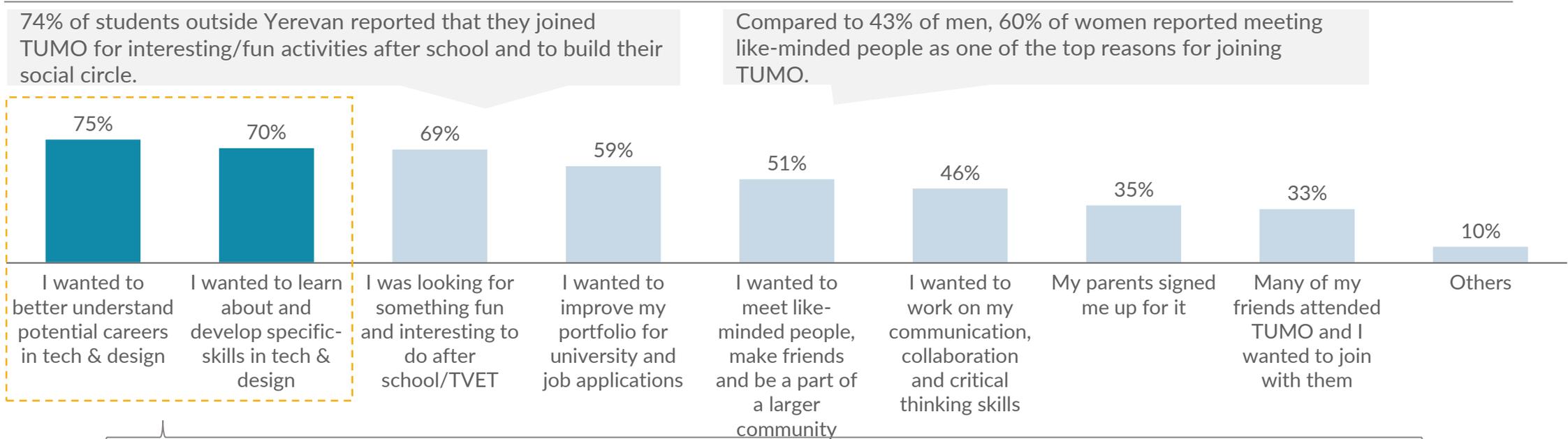
TUMO helps its students explore and nurture pre-existing interests in tech/creative disciplines, enabling them to make informed career decisions



Students join TUMO for different reasons with top two most reported being to explore careers and develop specific skills in tech/creative sectors

Students joined TUMO for a variety reasons – besides exploring careers and skills, a significant share also joined to build like-minded peer groups, do something interesting after school and under the influence of their parents and friends

Distribution of top reasons for joining TUMO¹
TUMO current students, 12-17 yrs (N=262)



74% of students outside Yerevan reported that they joined TUMO for interesting/fun activities after school and to build their social circle.

Compared to 43% of men, 60% of women reported meeting like-minded people as one of the top reasons for joining TUMO.

“

“I wanted to become an ambassador at first, but one day I saw a video and became interested in programming. As soon as I found out about TUMO, I told my family members to take me to register”

- Current student, Gyumri

“

“At first I had the impression that only programming was taught there, but then I realized that it is not only programming but also a creative part. That's why I decided to go.”

- Current TUMO student, Gyumri

Notes: (1) In response to the question “What were your top reasons for joining TUMO?”

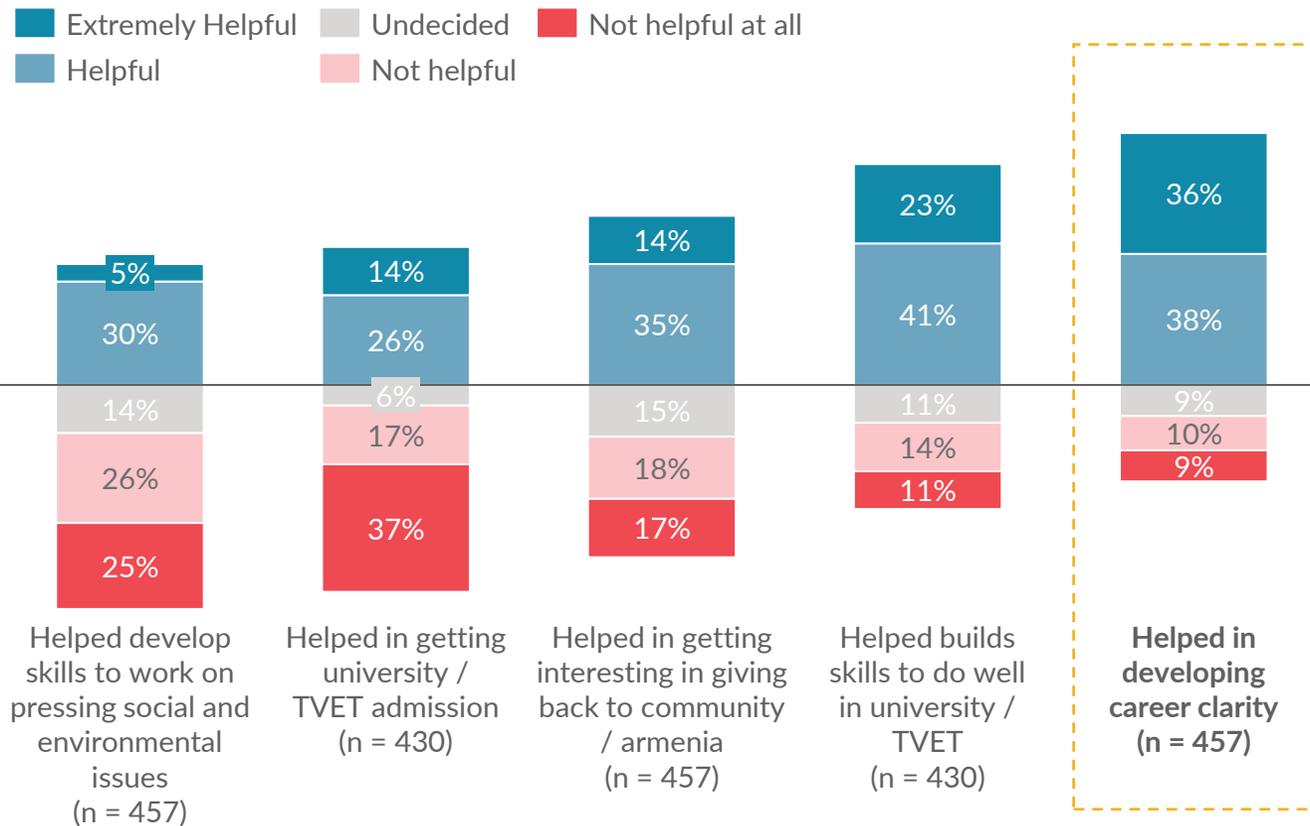


TUMO helps its students further explore their interests and equips them to make more informed career decisions

Alumni felt most strongly about TUMO's role in helping them develop career clarity by...

...equipping them with the knowledge & experience to make informed career decisions

Distribution of student perceptions regarding TUMO's long-term impacts on them¹
Treatment, >18+ yrs²



“It gives you more experience so that you can better decide what you will do in the future. In other words, if we talk about career, you have already chosen a profession when you join TUMO. But you get more clarity and experience.”
- Alumni, Yerevan

“I knew that I wanted programming, but since it is a branched profession, I wanted to understand exactly which direction I wanted. TUMO helped me in that matter a lot”
- Alumni, Yerevan

“Before I went, I did not think that I would pay attention to the creation of games. I went to do programming and tried animation, but when I tried creating games, it worked, and I became interested in doing that”
- Alumni, Yerevan

Notes: (1) In response to the question “On a scale of 1-7, To what extent has TUMO helped in the following?”; (2) N varies because different segments of TUMO alumni were asked to comment on long-term outcomes relevant for them. E.g., Only TUMO alumni who were in/about to enter/or had graduated from university were asked to comment on TUMO's role in helping them gain University admission and do well at the university



Parents also felt that TUMO helped them understand their children's strengths and enabled students to make informed career choices

“

“TUMO helped us discover abilities and strengths of our children that we might not have found otherwise. I consider it a very important result, for which it was worth attending those 5 years.”

- Parent of current student, Yerevan

“

“My son realized through TUMO that he has a desire for robotics and programming, and he can go in that direction as well. TUMO provides advice of course but asks the student to choose.”

- Parent of current student, Gyumri



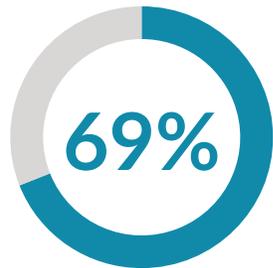
TUMO's holistic support helps its learners secure more stable, better-paying, and fulfilling careers in growing and dynamic tech/creative sectors



TUMO equips its students with both the skills and network to unlock work opportunities in creative tech sectors

6 in every 10 alumni highlighted that TUMO helped them develop their profile for job applications, especially by providing a portfolio of work; over half of the alumni felt that TUMO's network was helpful in them securing a job

Distribution of student perceptions regarding TUMO's role in helping get a job
Treatment, 18+ yrs (N=241)^{1, 2, 3}



69% of alumni strongly felt that TUMO was helpful or extremely helpful in **developing skills and profile for jobs**



53% of alumni strongly felt that TUMO was helpful or extremely helpful to them for jobs **due to the industry network they had built**

“**TUMO gives us a portfolio of all our work. That is the best thing about TUMO.** I applied to a company, they gave me several tasks to do at home, I couldn't believe that I did it. The next day I went to their office, and they hired me.”
- Current student, Gyumri

“There was **a specialist who did not work in TUMO, but was teaching when he came, and he noticed me and decided to call me to work with them.** He scheduled an interview, and I got the job. I want to say that if TUMO is written in your CV, employers are more willing to hire you because they know what TUMO offers to people”
- TUMO Alumni, Yerevan

“Even after so many years, **we keep in touch with the foreign trainers of those courses, which also opened a lot of great job opportunities.** One even wrote a letter of recommendation for me.”
- TUMO Alumni, Yerevan

Notes: (1) In response to the question “To what extent did TUMO help you secure a job by (i) helping you become more employable (develop skills, improve profile) (ii) letting you leverage a network of industry professionals and peers?” (2) Respondents were those in the workforce/applying for their first job/had work experience but in between jobs (3) Accounts for 52% of total alumni sample



Employers also noted that they saw TUMO as a hallmark of quality and viewed alumni favorably during recruitment...

“**To be honest we consider TUMO’s education more important than university education because of the kinds of specialists it brings in.** We get a lot of applicants from TUMO, and they seem very interested in applying their knowledge in the working environment” – Director, Armenian Branding company

“**If they went to TUMO you immediately think they are more proficient in technology, than someone who did not have that opportunity.** Of course, after that you have to check the skills and it also varies from person to person” – Director, Education foundation

“**Candidates from TUMO are able to present themselves better. You can definitely see the difference** and if we have an entry level position, we prefer to give this to TUMO. The important thing to check is what they did at TUMO. If they can show that, we find it a big advantage” – Senior Recruiter, Armenian SaaS company



...highlighting their ability to work in teams, take responsibility and learn independently.

Some employers noted performance varies significantly by individual, and couldn't point to other clear Tumo effects

“There is some difference, mostly that **TUMO students are more aware of the market and have more clarity on what they want to do. They also have larger networks**, especially with foreign professors.” – Director, Armenian Branding company

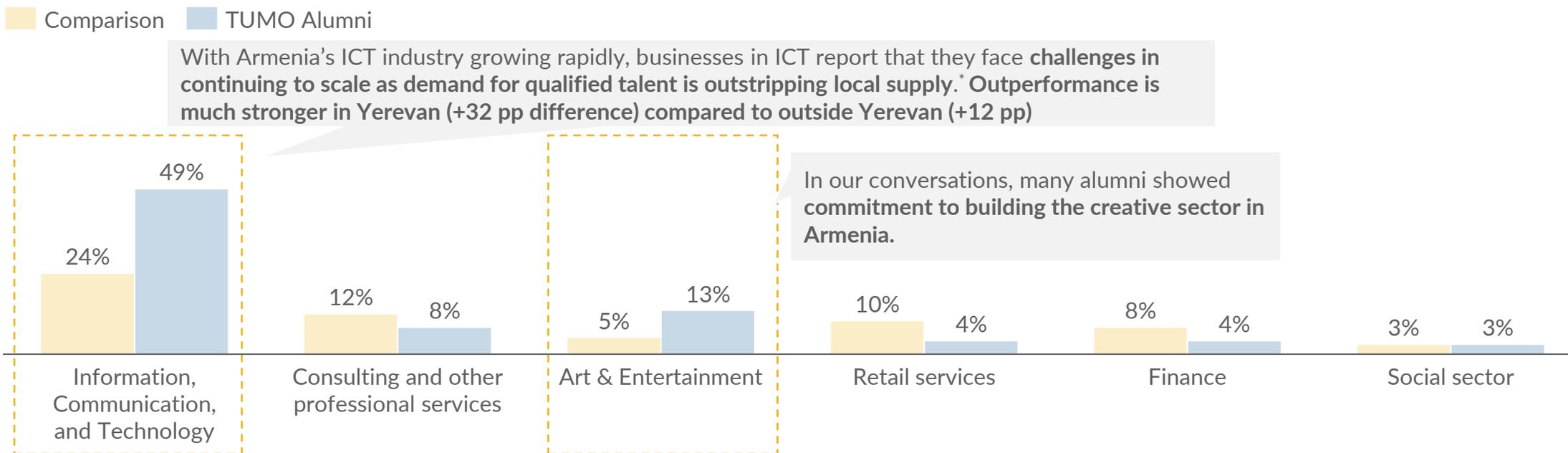
“One thing that I would like to highlight is their ability to work in a team and also be able to take individual responsibility. This is very important for an employer, but I’m not sure to what extent TUMO was the factor here.” – Export Vertical, Logistics company

“I can’t really say there is a difference but what I can say is that it feels like **TUMO students stand out because they are always searching for something, always in search of new things to learn and new contacts**” – Director, Armenian Software company

>60% of TUMO alumni were employed in tech/creative sectors and wanted to build the sector in the country; 2x the proportion of the comparison group

~50% of TUMO alumni are engaged in ICT, one of Armenia's high-priority and fast-growing sectors, helping address a shortage of qualified local labor in the market that could hinder the sector's growth

Distribution of industries that respondents are employed in¹
Treatment, 18+ yrs (N=242), Comparison (N=314)^{2, 3, 4}



“I have always wanted to raise the level of animation in Armenia because it is in a sad state. The same is with photography”
- Alumni, Yerevan

“Together with the only Armenian woman who presented a film at the Cannes Film Festival, we made a documentary about water in Armenia. It was a great moment of pride for us.”
- Alumni, Yerevan

Notes: (1) In response to the question “Which industry did you work in?/Are you applying for?/Are you working in?”; (2) Respondents were those in the workforce/applying for their first job/had work experience but in between jobs; (3) Other sectors not included in chart are Medical services, Law, Manufacturing, Trade and Transportation, Marketing, Construction, and Agriculture. These were not included due to low engagement by both comparison and alumni; (4) After matching for similar characteristics, differences in ICT and Art & Entertainment are significant at the 95% confidence interval.

Sources: *Armenia ICT sector overview, US International Trade Administration



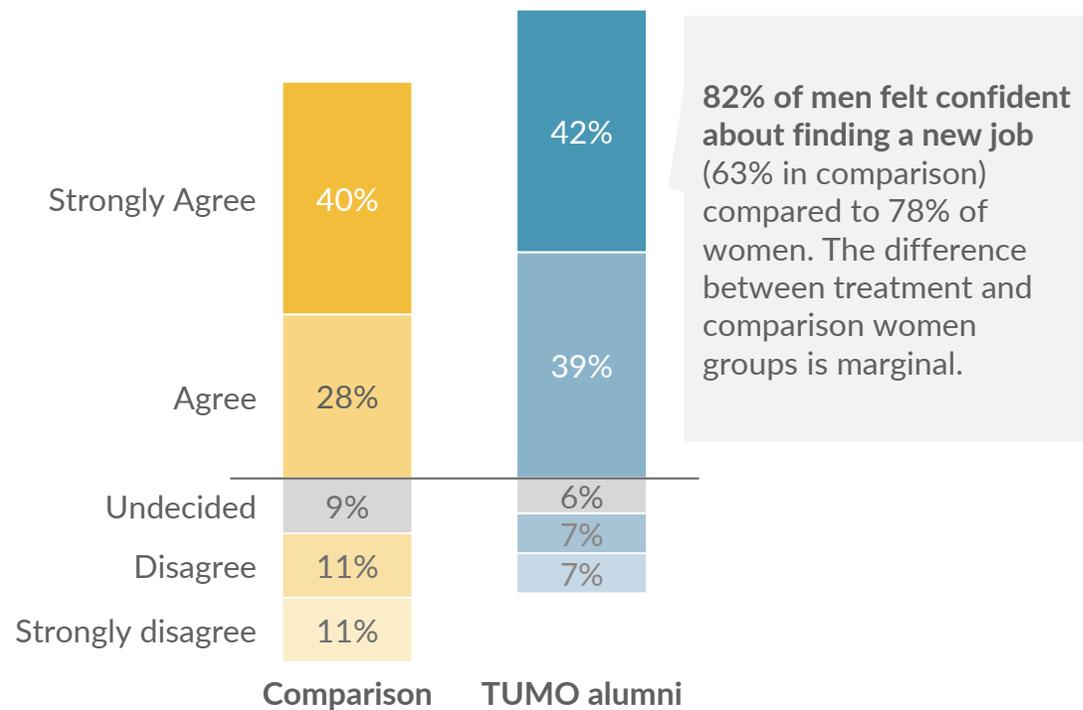
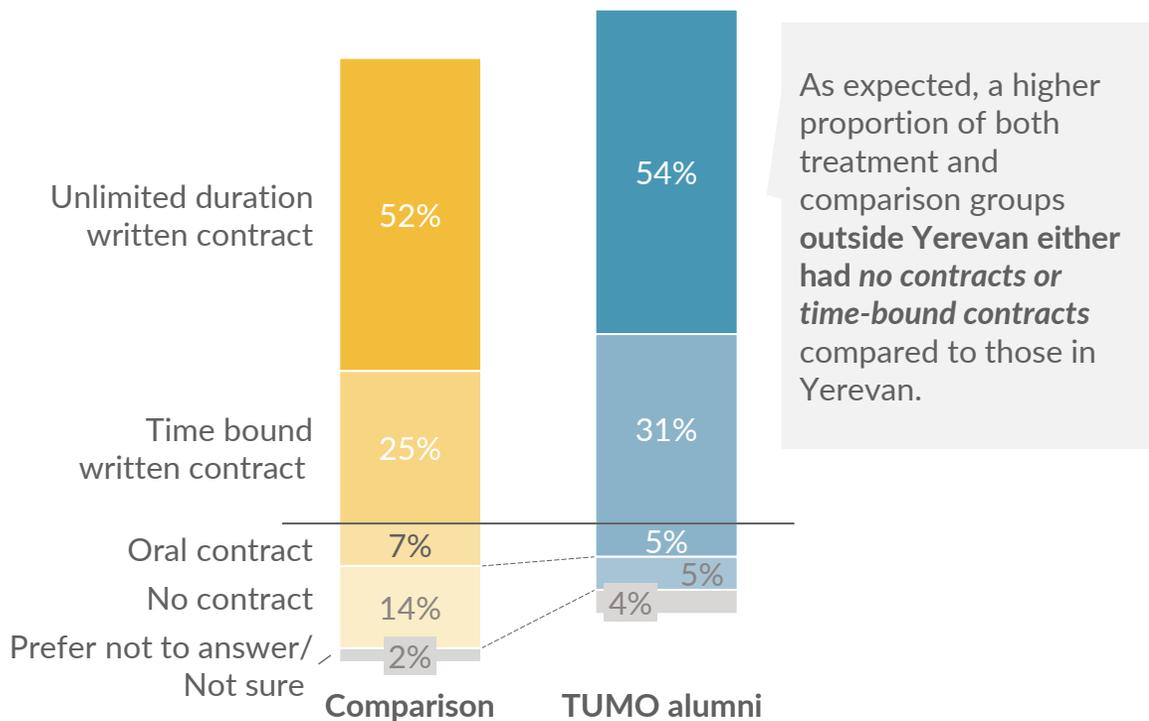
Alumni have higher levels of job stability and security, indicated by the higher incidence of formal employment and confidence in their ability to get a job

Only 5% of TUMO alumni reported having no contracts, much lower than the comparison group and national average⁴

Alumni also reported overall higher confidence in their ability to secure another job should they leave their current role

Distribution of contract-type held by respondents in current/last job¹
18+ yrs ; Treatment (N=195), Comparison (N=239)^{2,3, 4}

% of respondents who feel they could get a job in 3 months if they left their current role^{5,6}
18+ yrs ; Treatment (N=233), Comparison (N=297)⁷



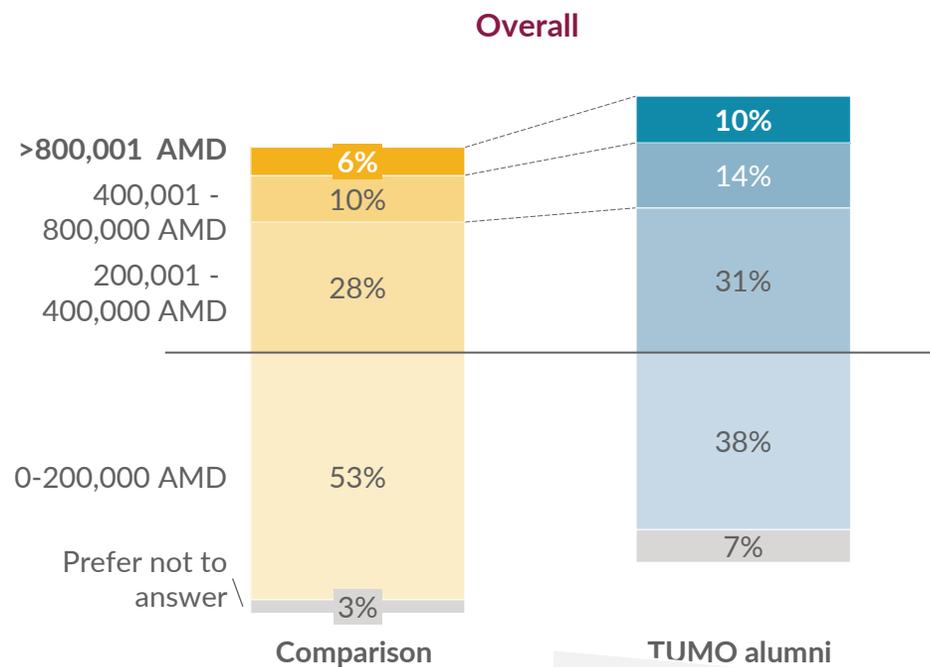
Notes: (1) In response to the question “What type of contract do you hold in your current job?/Did you hold in your last job?”; (2) Respondents where those in workforce/between jobs who were wage employed. (3) Approximately 40% of the workforce is in the informal economy in Armenia.; (4) After matching for similar characteristics, differences in the type of contract held is statically significant at the 95% confidence interval (5) Respondents where those in workforce/between jobs; (6) In response to the question “On a scale of 1-7, to what extent do you agree with the statement: I am confident of my ability to find another equivalent or better job within 3 months if I were to leave/be fired from my current role?”; (7) After matching for similar characteristics, differences in proportion of respondents who feel they can get a job in 3 months is statistically significant at the 90% confidence interval.



Moreover, they also earn more compared to comparison groups and national averages – notably, the gender gap persists in TUMO alumni as well

Despite being younger and having less work experience on average, TUMO alumni reported higher salaries⁴

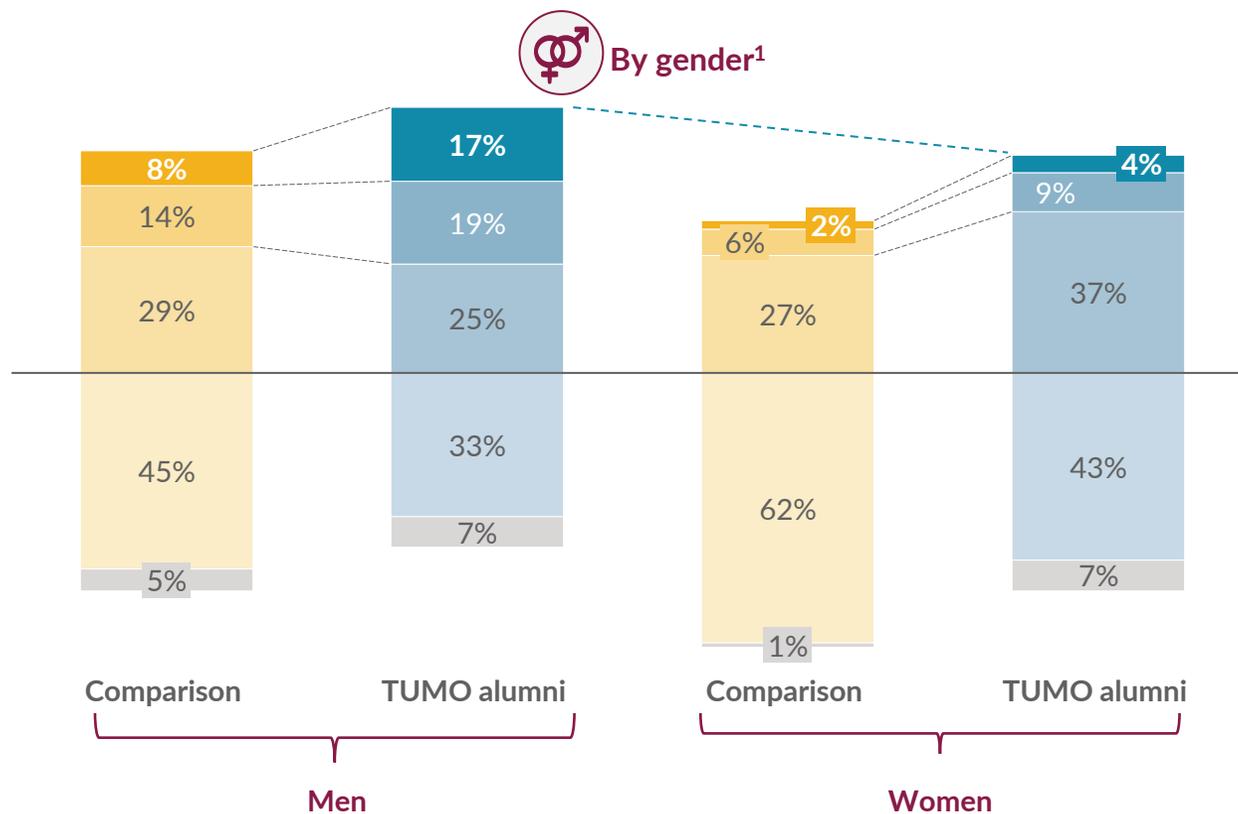
Distribution of respondent's average monthly salary in Armenian Drams (AMD)¹; 18+ yrs, Treatment (N=233), Comparison (N=297)^{2, 3, 5}



Differences also persist between regions – 33% of alumni in Yerevan earned above 400K AMD/month compared to just 11% of alumni outside Yerevan.

Strong differences by gender persist; 17% men reported salaries greater than >800k AMD/mo compared to just 4% women

Distribution of respondent's average monthly salary in Armenian Drams (AMD) by gender¹ 18+ yrs, Treatment (N=233), Comparison (N=297)^{2, 3, 5, 6}



Notes: (1) In response to the question "What is your average monthly salary?/Was your average monthly salary in your last job?" (2) Respondents were those above the age of 23 years and in workforce/were in between jobs.;(3) Accounts for ~44% of total sample; (4) Comparison data is similar to what the national average for 23-30years olds looks like in Armenia. National averages are available in the annex.; (5) After matching alumni and comparison with similar characteristics, difference in income is statistically significant at the 95% confidence interval

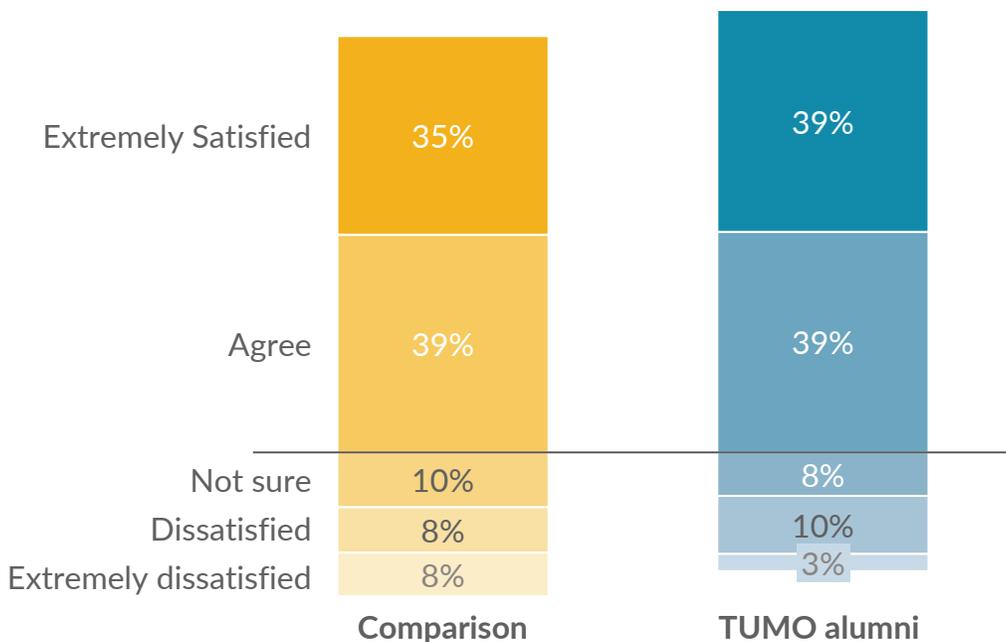


Directionally, alumni appear to be employed in organizations with clearer growth prospects and stronger professional development support

A higher proportion of alumni were more satisfied with the growth prospects and professional development support at their workplaces, indicating potentially faster trajectories and upskilling opportunities

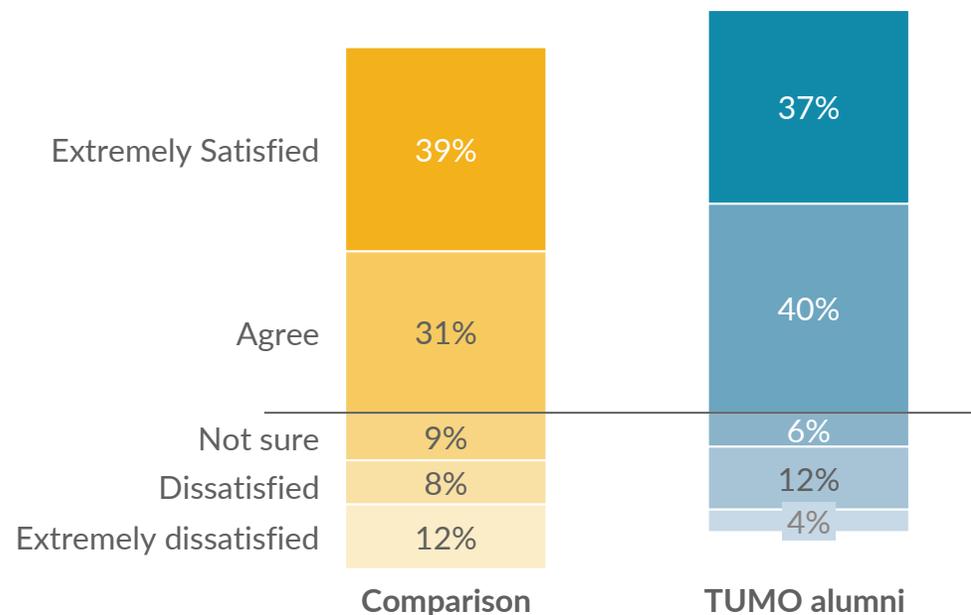
% of respondents satisfied with growth prospects and clarity on pathway in their current job¹

Treatment, 18+ yrs (N=233), Comparison (N=297)²



% of respondents satisfied with the professional development support they are getting at their workplace³

Treatment, 18+ yrs (N=233), Comparison (N=297)²

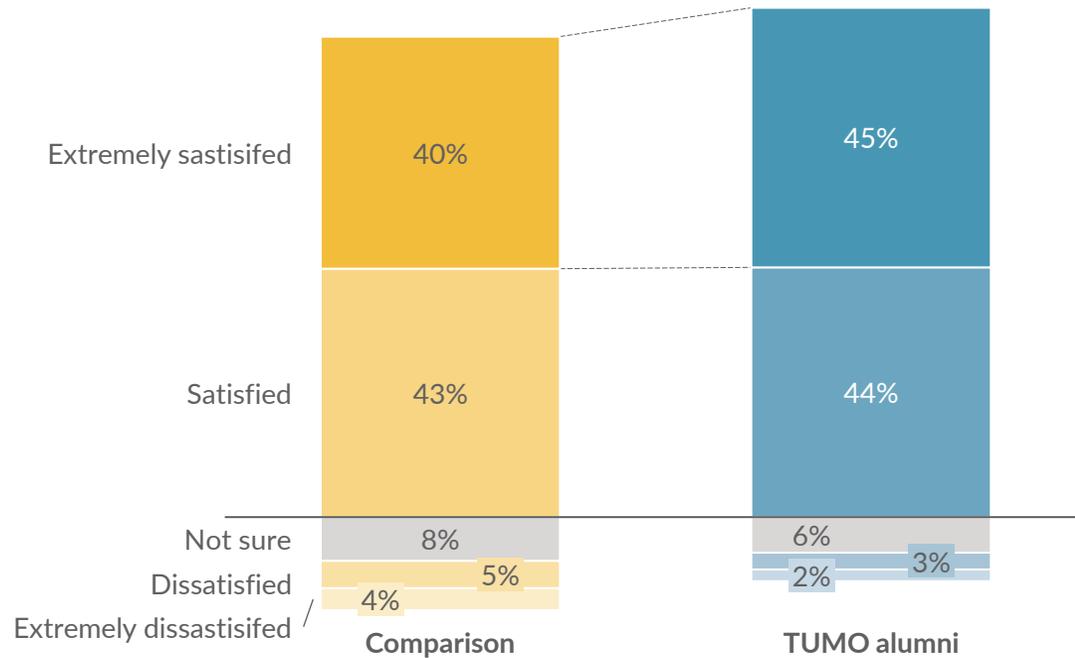


Notes: (1) In response to the question "How satisfied are you with the salary and benefits at your job?" (2) Respondents were those above the age of 23 years and in the workforce/were in between jobs.; (3) In response to the question "How satisfied are you with the support for professional development you receive at your job?"

Stability and security coupled with better pay and growth avenues results in higher job satisfaction and more fulfilling careers

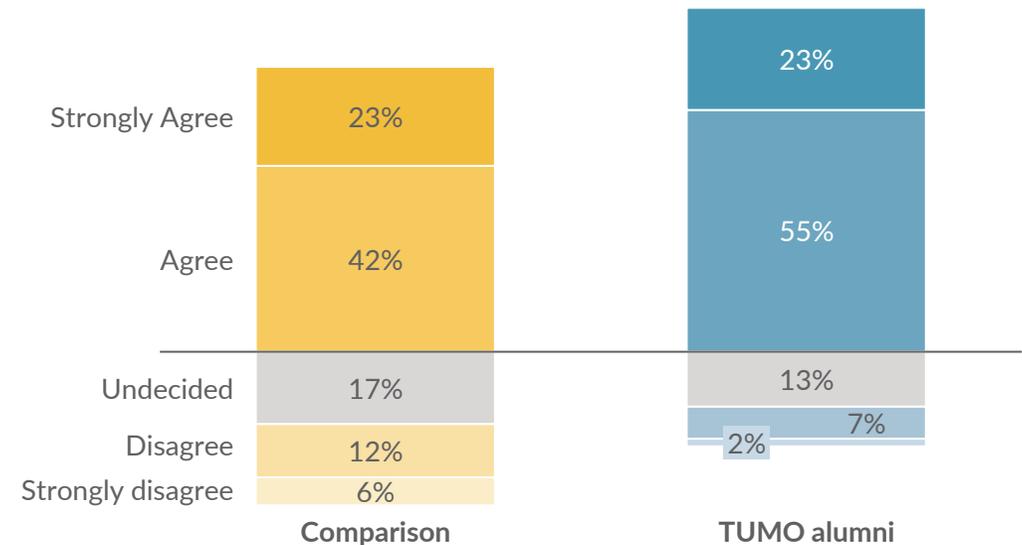
TUMO alumni overall report higher satisfaction with the choice of their career...

% of respondents satisfied with the choice of career¹
 Respondents in workforce, Treatment, 18+ yrs (N=241), Comparison (N=341)²



..and feel that they get a good package for their background and qualifications

% of respondents who feel they get a good package for their qualifications, experience, and sector³
 Treatment, 18+ yrs (N=233), Comparison (N=297)²



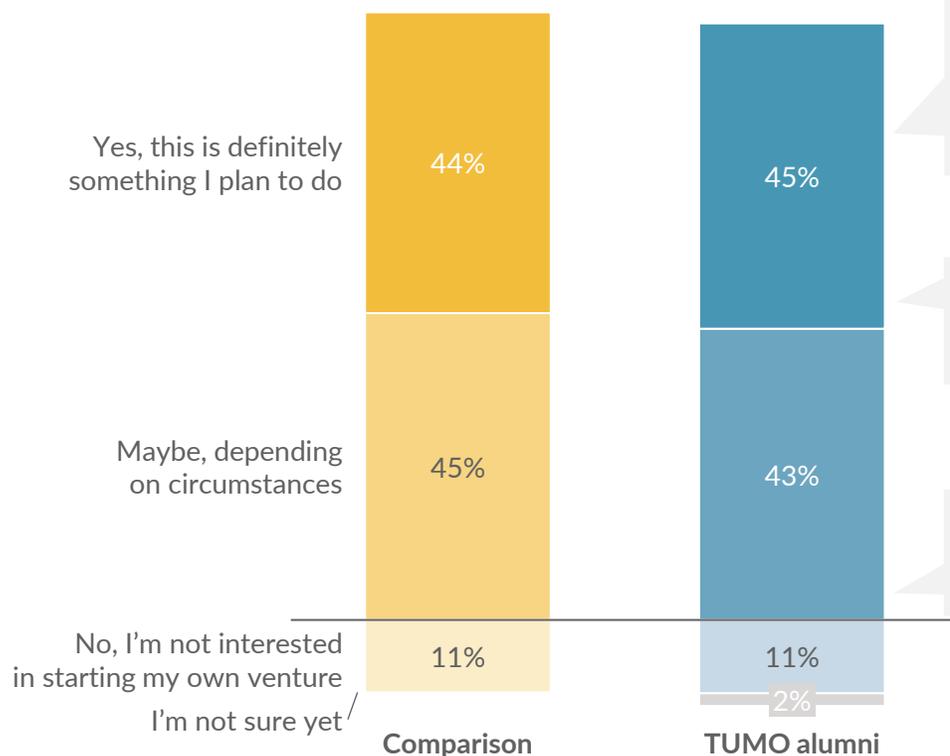
Alumni outside Yerevan more strongly agreed than their comparison (26% vs 17%). This was slightly reversed in Yerevan (22% vs 26%)

Notes: (1) In response to the question “How satisfied are you with your overall choice of career keeping in mind your personal and professional goals?”; (2) Respondents were those above the age of 18 years and in workforce/were in between jobs; (3) In response to the question “To what extent do you agree with the statement: I feel that I get a good package (salary/benefits) for my qualifications, experience, and sector?”; (4) After matching alumni and comparison with similar characteristics, difference in satisfaction with career choice is statistically significant at the 90% confidence interval; (5) After matching alumni and comparison with similar characteristics, difference in satisfaction with package and salary is statistically significant at the 95% confidence interval.

Whilst the entrepreneurial activity & aspirations of alumni and comparison were similar, alumni interest in disruptive tech start-ups needs to be further studied

Alumni have a higher opportunity cost to starting up, which may explain the similar levels of aspiration

Distribution of entrepreneurial aspirations of respondents¹
 Treatment, 18+ yrs (N=271), Comparison (N=338)^{2,3}



- 14% of treatment and 15% of comparison reported being entrepreneurs; national rate of new entrepreneurial activity was 21% in 2019*⁴.
- However, 22% of alumni entrepreneurs were engaged in high-growth commercial start-ups, compared to 15% of the comparison entrepreneurs
- Only 8% of alumni outside Yerevan were entrepreneurs compared to 19% of alumni in Yerevan and 13% of comparison outside Yerevan

- 30% of Armenian adults were planning on starting a business in the next 3 years, as of 2019**; As our question did not specify a timeline, the responses across both groups are likely to be in line with national trends.

Opportunity cost of starting up on their own for TUMO alumni may be higher given above average salaries and employment in fast growing sectors (e.g., ICT), especially in the current economic environment in Armenia.

Notes: (1) In response to the question “Are you interested in starting your own venture at some point in the future?”; (2) Respondents were those in workforce either as wage employees or engaged in their family business and those in university/waiting to start/applying to Uni who intend to join wage employment after their degree; (3) After matching alumni and comparison with similar characteristics, difference is statistically significant at the 95% confidence interval. (4) Share of population aged 18-64 years that just started or manage a new business

(5) Sources: * [Global Entrepreneurship Monitor, Armenia National report, 2020](#); ** [EU Commission, Armenia SME factsheet, 2021](#)

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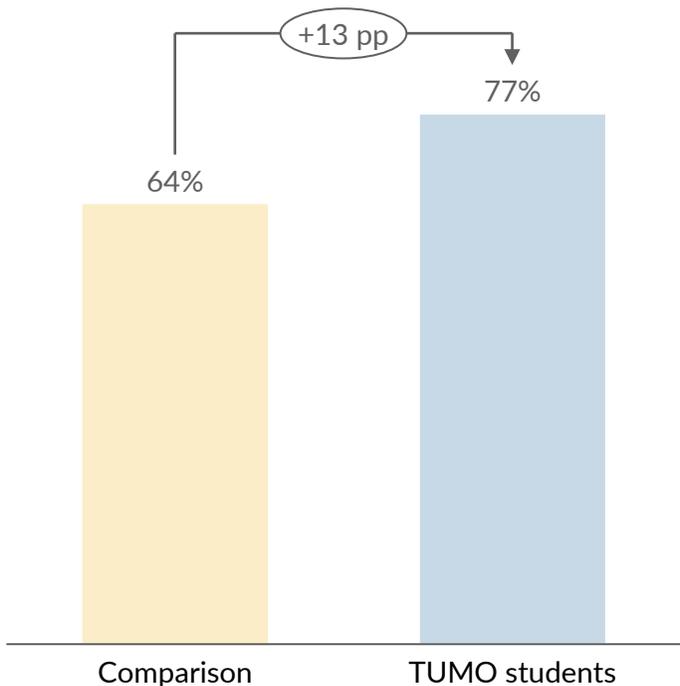
Both TUMO students and alumni displayed a higher level of awareness of socio-economic issues, while there were no meaningful differences in their participation in the traditional forms of civic action



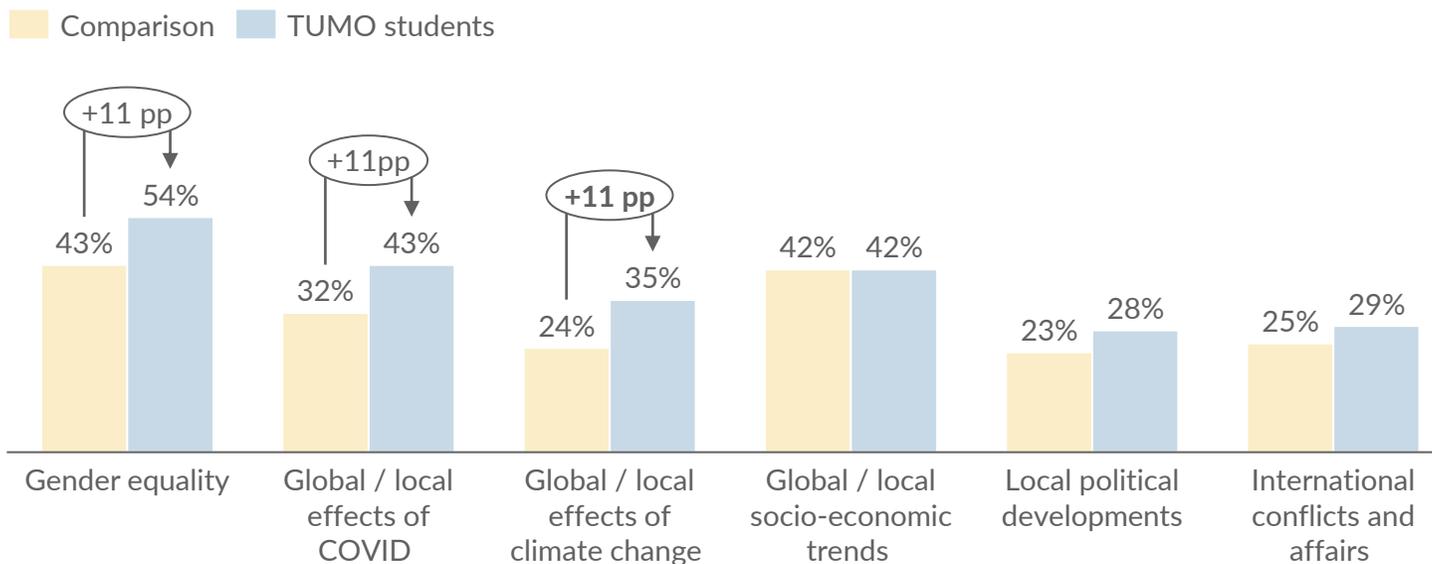
TUMO students reported higher familiarity with socio-economic issues, possibly due to diverse social circles and exposure to international facilitators

TUMO students were more familiar with socio-economic issues, especially gender equality and the global local effects of COVID & climate change; female students & those in Yerevan outperformed male students & those outside Yerevan respectively across all topics

% of respondents that feel they can explain at least one of the given socio-economic topics^{1,2}
Treatment, 12-17yrs (N=262), Comparison (N=183)



Distribution of socio-economic topics that respondents felt they could explain well^{1,3}; % of respondents³
Treatment, 12-17 yrs (N=262), Comparison (N=183)



“When you go to TUMO, the trainers and other people completely change your way of thinking. In our group, **there are different people from all over the country, and everyone has a different way of thinking. You learn something from each of them.**” – Current student, Yerevan

Notes: (1) In response to the question, “Which of the following do you feel you are familiar with and can explain well?” (2) Given socio-economic topics included Gender equality, Global/local effects of COVID, Global/local effects of climate change, Global/local socio-economic trends, Local political developments, International conflicts and affairs; (3) After matching for similar characteristics, the difference in awareness levels is significant at the 95% confidence interval for effects of COVID and climate change.



Teachers also noted that TUMO students tended to be more widely informed

“Yes, they are more active, more developed children. **TUMO's students are generally more informed.** They know what is happening in the country, and in the world.
- Russian, Yerevan

“Yes, I can say that these students are more informed. They have a **broader mindset and view on life.** Maybe this is because of TUMO, maybe this is personal, I cannot say but the difference exists.”
-English teacher, Yerevan

“I can say that they are informed, yes. **But it is only partly related to TUMO. It is more personal.** There is a person who is not interested in, for example, politics or other topics, and does not follow the news about these things.”
- Armenian literature teacher, Yerevan

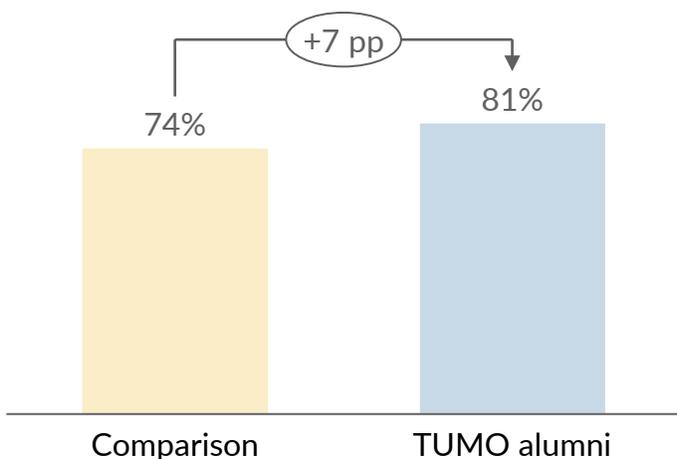
“TUMO's children are generally more active in all activities: social, school, and general. **They constantly talk about various topics, but mostly about the happenings in the technological world.** This is the technological age. Information spreads quickly. Maybe attending TUMO helps in this matter” - Teacher, Yerevan



Alumni also have slightly higher awareness, but the relative difference declines, likely due to the higher enrollment of comparison group in social sciences

Overall, alumni reported marginally higher awareness of at least one topic

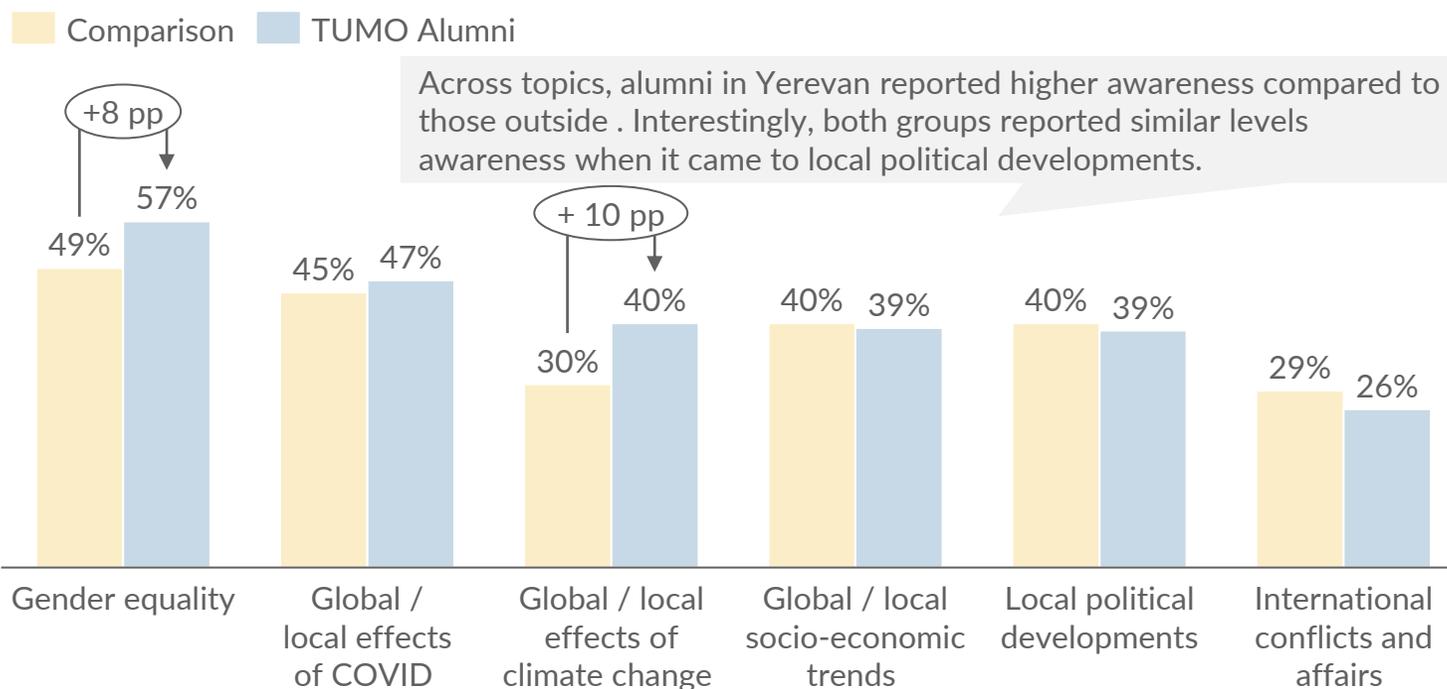
% of respondents that feel they can explain at least one of the given socio-economic topics¹
 Treatment, 18+ yrs (N=462), Comparison (N=548)



Impact may be declining (compared to current students)³ because of higher enrolment in humanities and social sciences of the comparison group; ~40% of comparison were enrolled/had studied social sciences/humanities compared to 27% of alumni.

While they were more familiar with gender equality and global/local effects of climate change, the trend reversed for other topics, particularly international conflicts

Distribution of socio-economic topics that respondents felt they could explain well¹; % of respondents⁴
 Treatment, 18+ yrs (N=462), Comparison (N=548)



Across topics, alumni in Yerevan reported higher awareness compared to those outside. Interestingly, both groups reported similar levels awareness when it came to local political developments.

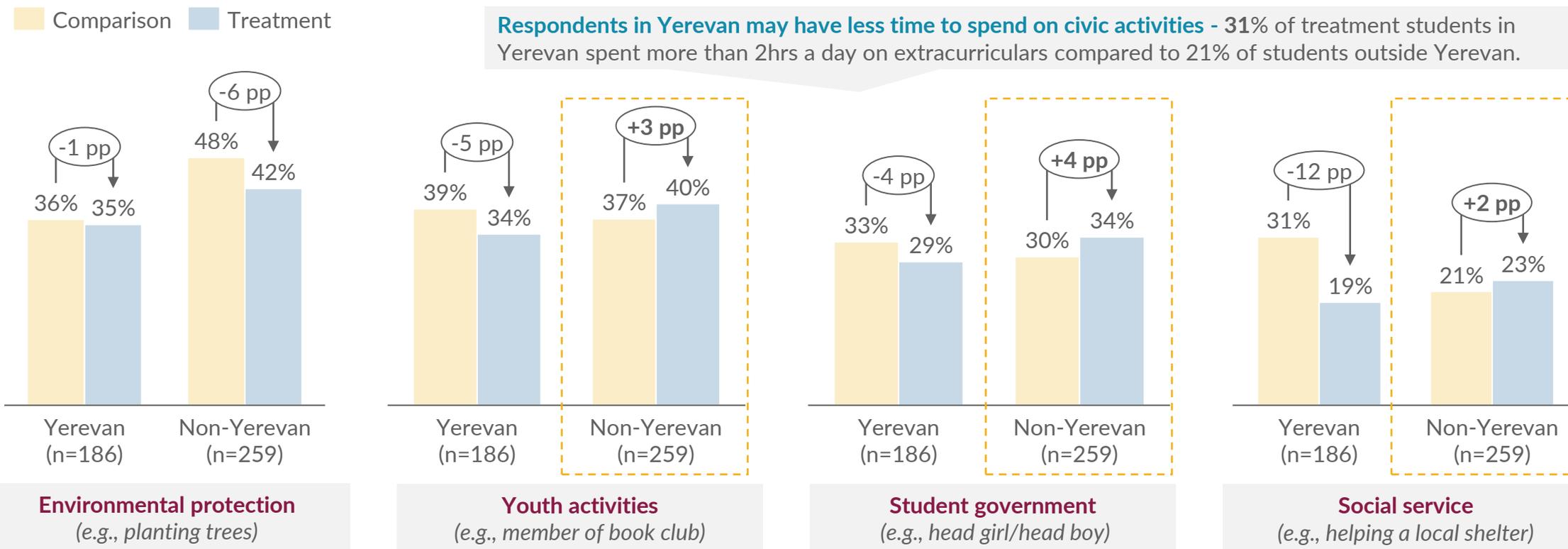
Notes: (1) In response to the question, "Which of the following do you feel you are familiar with and can explain well?" (2) Given socio-economic topics included Gender equality, Global/local effects of COVID, Global/local effects of climate change, Global/local socio-economic trends, Local political developments, International conflicts, and affairs; (3) For current students, the difference between treatment and comparison groups is 13pp. (4) After matching for similar characteristics, the difference in awareness levels is significant at the 95% confidence interval for effects of climate change. (5) The difference between current students and alumni may also be explained by the evolution of the TUMO model.



Meaningful differences in traditional forms of civic action were not observed between TUMO students and the comparison group

Students outside Yerevan had higher overall engagement and marginally outperformed the comparison; lower engagement by TUMO students in Yerevan may be explained by reduced bandwidth due to higher engagement in extra-curriculars (including TUMO)

% of respondents that participate in any of the listed activities outside school/TVET, by region^{1,2}
 Treatment, 12-17 yrs (N=262), Comparison (N=183)



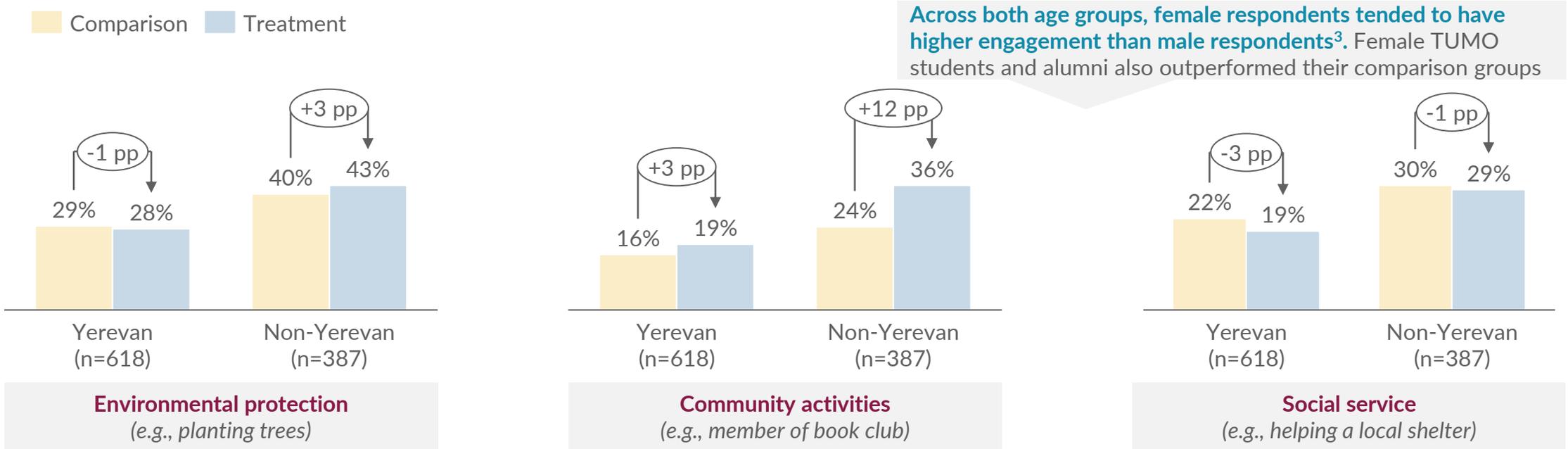
Notes: (1) In response to the question "Do you participate in any of the following in/outside of school/TVET?"; (2) After matching for similar characteristics, differences in participation in various civic activities amongst treatment and comparison were not statistically significant at 95% confidence interval.



Alumni also reported similar level of engagement in environmental and community activities as comparison; differences by region persisted

Respondents outside Yerevan consistently had higher civic engagement than those in Yerevan. This may be a result of the tighter and more traditional communities outside Yerevan – some of which may also retain old soviet notions of social contribution

% of respondents that participate in any of the listed activities outside school/TVET, by region^{1,2}
 Treatment, 18+ years (N=462), Comparison (N=548)



Across both age groups, female respondents tended to have higher engagement than male respondents³. Female TUMO students and alumni also outperformed their comparison groups

Across both age groups, TUMO students and alumni had highest engagement in environmental protection in line with their high awareness of the global and local effects of climate change

Notes: (1) In response to the question "Do you participate in any of the following in your free time?"; (2) After matching for similar characteristics, differences in participation in various civic activities amongst treatment and comparison were not statistically significant at 95% confidence interval. (3) Higher female engagement was statistically significant for environmental protection and community activities at a 95% confidence interval



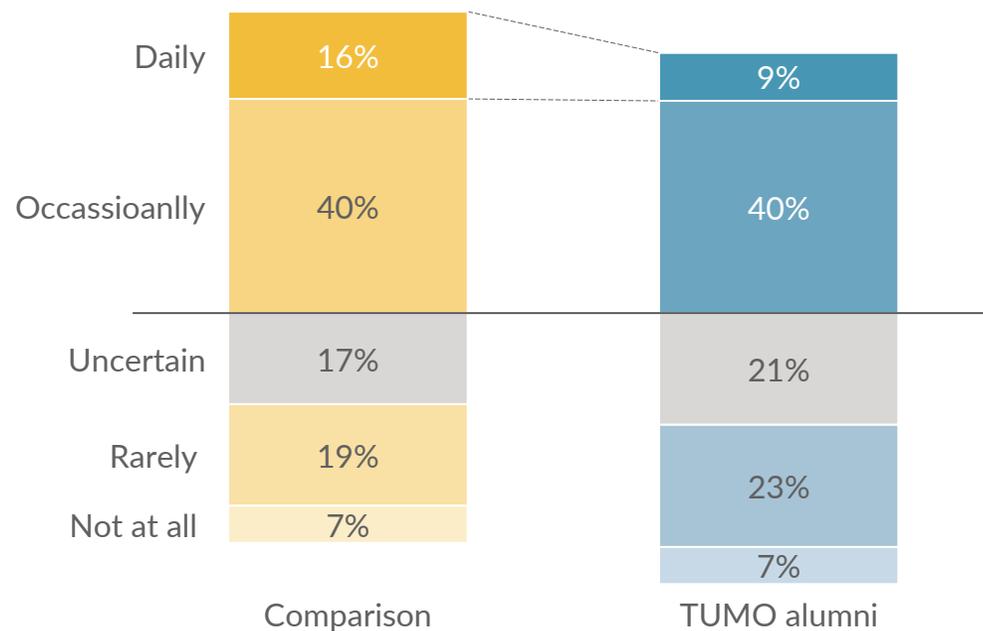
Current students and alumni were more globally oriented, actively following developments and opportunities to learn from international best practices



TUMO alumni are more globally oriented - they pay closer attention to global developments and issues relative to the comparison...

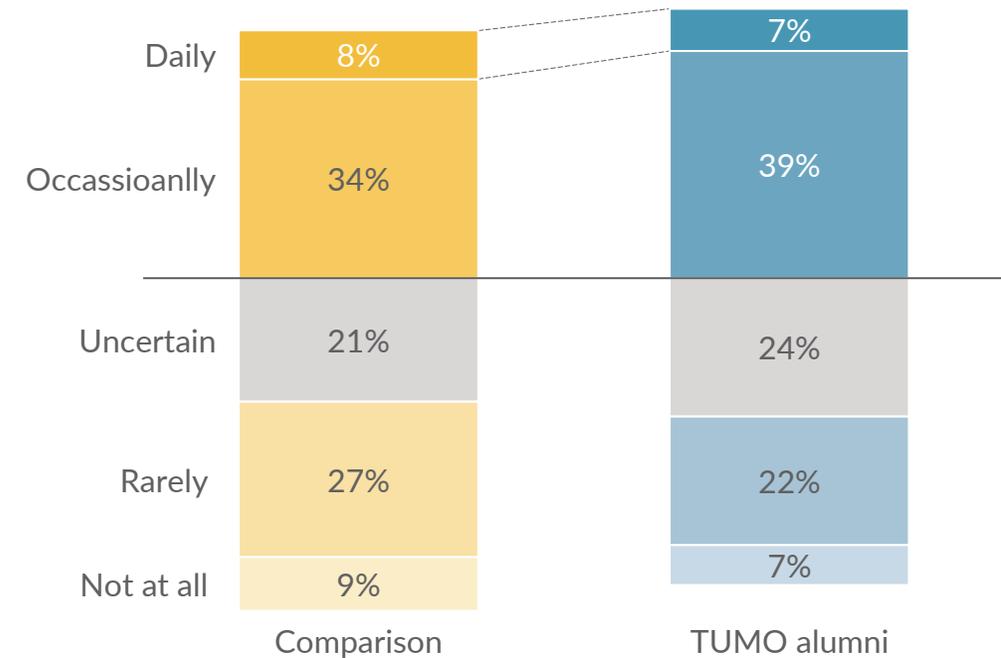
While the comparison followed regional issues more religiously compared to TUMO alumni...

% of respondents who follow current affairs and development in the region^{1,3}
18+ years; Treatment, (N=462), Comparison (N=548)



...TUMO alumni pay closer attention to global issues; 46% of alumni either follow global affairs daily or occasionally

% of respondents who follow current affairs and development globally^{2,3}
8+ years; Treatment, (N=462), Comparison (N=548)



Notes: (1) In response to the question, 'How actively do you follow current affairs and development the region? (2) How actively do you follow current affairs and development globally? ; (3) After matching for similar characteristics, both regional and global differences are statically significant at the 95% confidence interval. TUMO alumni were less likely to follow regional issues compared to the comparison groups. However, TUMO alumni were more likely to follow global issues compared to comparison group.



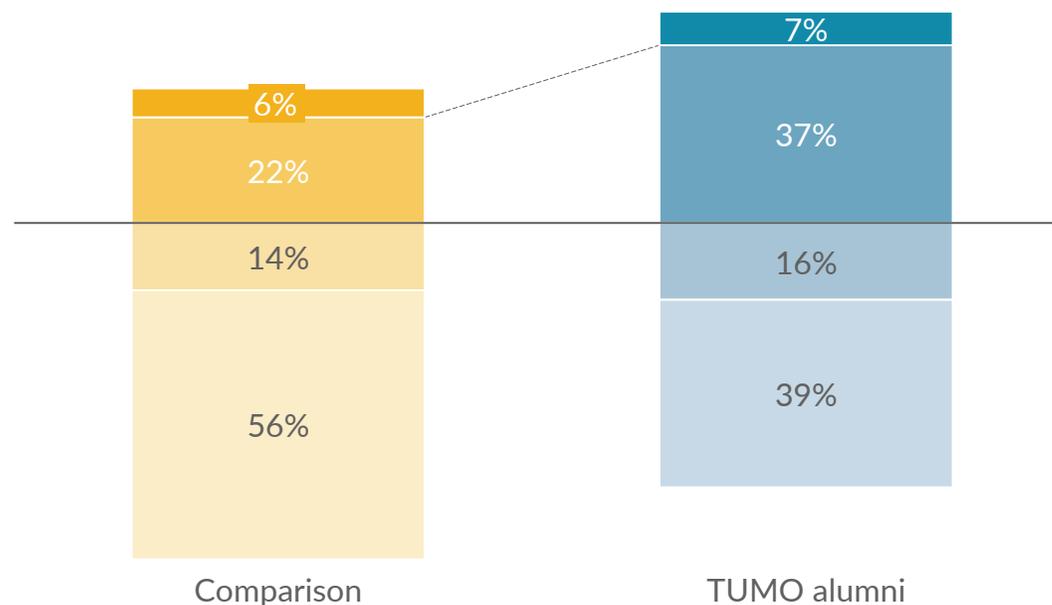
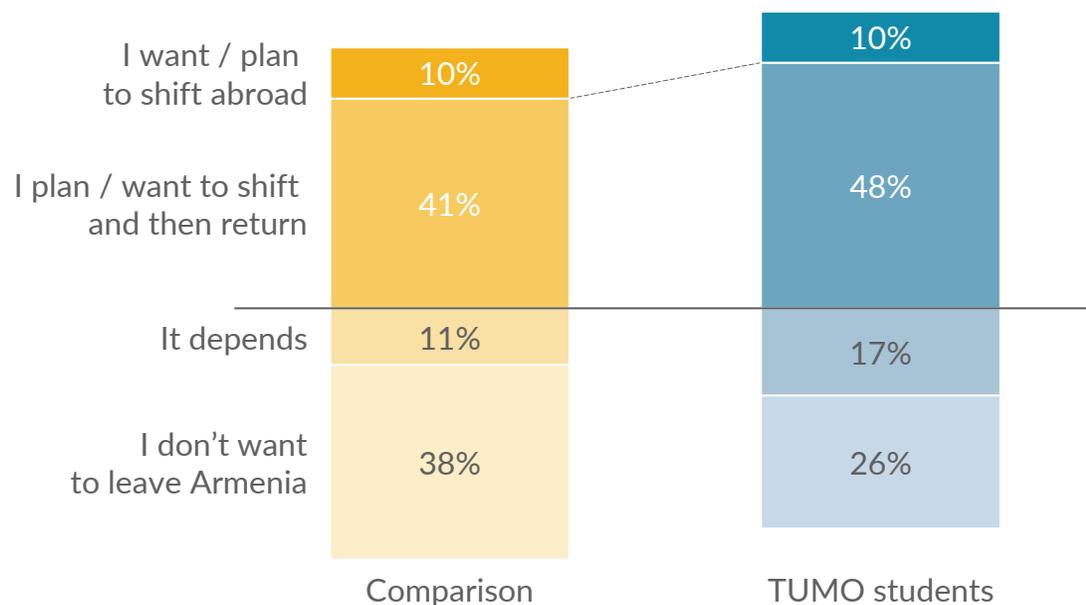
...and have a greater desire to pursue global opportunities, potentially helping to bring back international practices

58% of TUMO students expressed to explore global study and work opportunities, largely in line with comparison

With age, the desire to go abroad maintains much more strongly for TUMO alumni than for comparison

*Distribution of attitudes towards leaving Armenia; % of respondents^{1,2}
12-17 years; Treatment, (N=262), Comparison (N=183)*

*Distribution of attitudes towards leaving Armenia; % of respondents^{1,3}
18+ years; Treatment, (N=462), Comparison (N=548)*



61% of female students want to/plan to leave and return, compared to 35% of male students – a higher share of female students reported that they wanted to but could not due to personal/financial reasons.

37% of alumni in Yerevan planned to leave Armenia and return compared to 22% of alumni outside Yerevan. Female alumni also had a higher desire to leave and return than male alumni.

Notes: (1) In response to the question, 'Of the following options which do you think best describes how you feel about staying in Armenia?'; (2) After matching for similar characteristics, difference in willingness to leave Armenia amongst treatment and comparison for 12-17-year-olds was not statistically significant at 95% confidence interval. (3) After matching for similar characteristics, TUMO Alumni were more likely (~1.7 time) to leave Armenia as compared to nonbeneficiaries (at the 95% confidence interval).



Alumni associated TUMO with a sense of national pride and hope for the country, even though TUMO's impact on civic attitude was less of a highlight compared to other outcomes



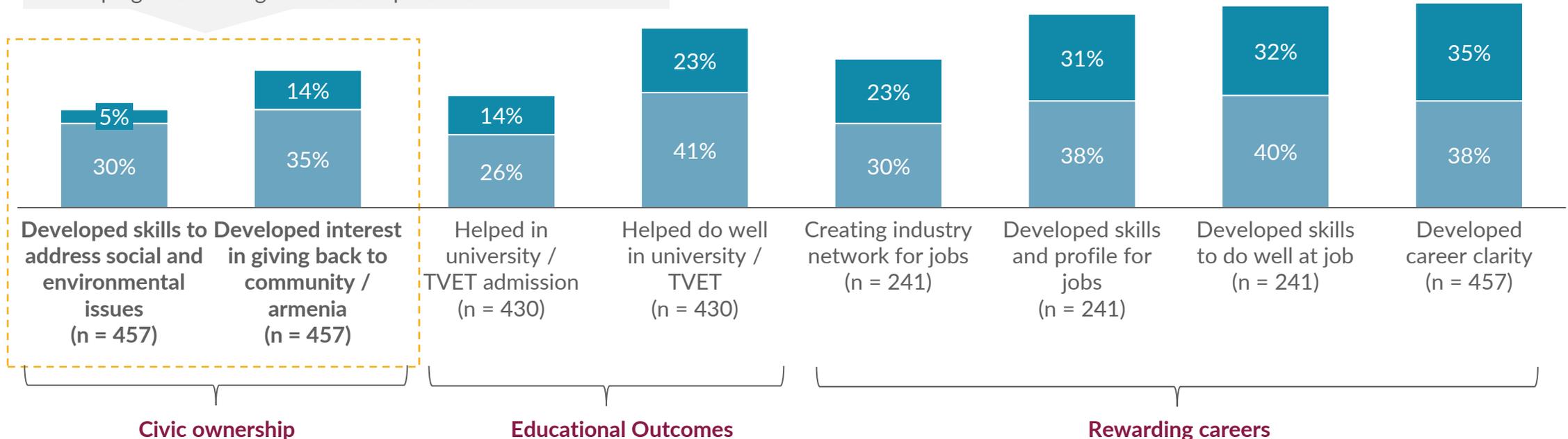
Alumni had somewhat positive perceptions regarding TUMO's impact on their civic attitudes and values, though not as strong as for other outcomes

Compared to other outcomes, alumni found TUMO to be less helpful in creating long-term civic ownership

Distribution of alumni perceptions regarding TUMO's long-term impacts on them¹
Treatment, 18+ yrs²

Extremely Helpful Helpful

58% of alumni outside Yerevan felt TUMO was helpful in developing interest to give back compared to 44% in Yerevan.



Notes: (1) In response to the question "On a scale of 1-7, To what extent has TUMO helped in the following?"; (2) N varies because different segments of TUMO alumni were asked to comment on long-term outcomes relevant for them. E.g., Only TUMO alumni who were in/about to enter/or had graduated from university were asked to comment on TUMO's role in helping them gain University admission and do well at the university.



Students felt that TUMO played a role in helping them connect with their culture and developing national pride

“

“TUMO existed only in Yerevan and in Armenia when I was there, and it was a great honor. **At that time, my dream job was to work at Tumo where I could benefit others**” – Alumni, Yerevan

“

“I feel that TUMO made me more aware and connected to Armenian culture and art than social or political issues. TUMO does not even allow political discussions or actions to take place” – Current student, Gyumri

“

“I felt the proudest in my life within TUMO - it was the 25th anniversary of Armenia's independence, and they decided to present me and another student together with famous Armenians: Komitas, Henrik Mkhitaryan. It was blinding” – Alumni, Yerevan

“

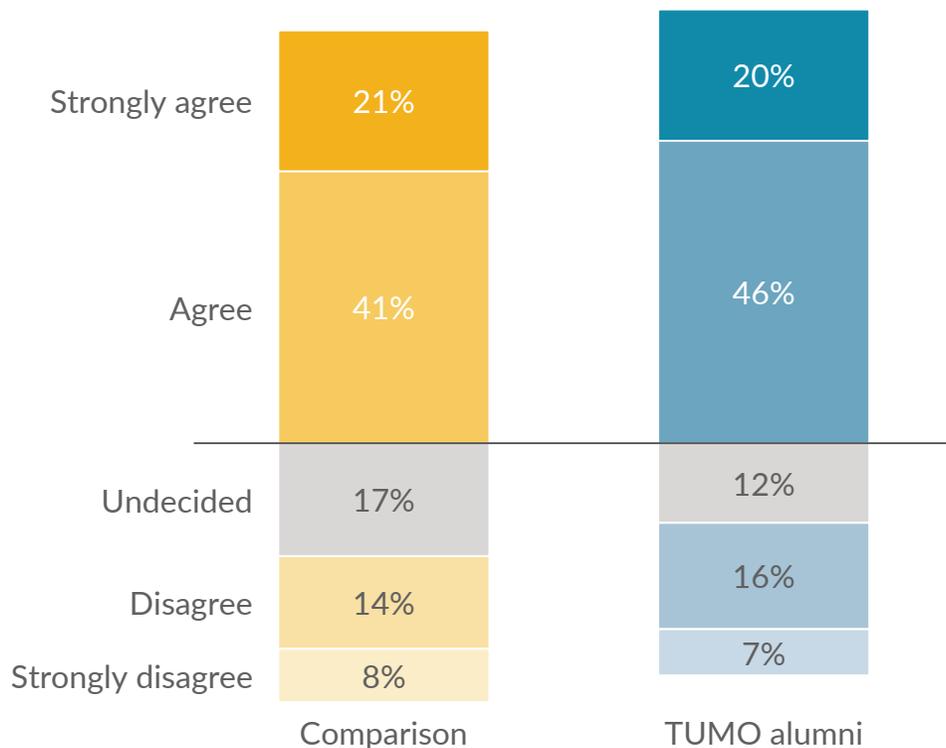
“I don't accept when people throw garbage on the street. I force them to throw it in the trash can. TUMO didn't teach me this, but **it helped me to see the phenomena and problems happening around me**. Seeing that, I can't not do nothing” – Current student, Gyumri



In fact, alumni had a directionally higher level of desire to give back to their community/country relative to the comparison

66% of alumni agreed/strongly agreed that they wanted to give back to their country, compared to 61% of comparison

% of respondents who want to give back to their country¹
 18+ years; Treatment, (N=462), Comparison (N=548)²



68% of alumni outside Yerevan agreed/strongly agreed that they wanted to give back to their country, compared to 64% in Yerevan³



72% of female alumni agreed/strongly agreed that they wanted to give back to their country, compared to 58% of male alumni⁴

Notes: (1) In response to the question, 'To what extent do you agree with the statement "I want to give back to my community/country?"; (2) After matching for similar characteristics, the difference in willingness to give back to Armenia amongst treatment and comparison was not statistically significant at 95% confidence interval.; (3) 60% of comparison in Yerevan and 64% outside Yerevan agreed/strongly agreed that they wanted to give back to their country.; (4) 52% of male comparison and 69% of female comparison agreed/strongly agreed that they wanted to give back to their country.



While parents noticed positive changes in civic attitudes, not all agreed on TUMO's role in this nor were they in favor of TUMO focusing on it, especially in Gyumri

“Children usually start attending at age of 12 and have not formed their opinions yet. They are still children. **No one here can say for sure civic engagement comes as a result of attending TUMO**” – Parent of current student, Yerevan

“**At home, if we open the water for a long time, he gets irritated. We did not teach this at home, but we are in favour of it.** He typically comes home with thoughts about the country and **we feel he should have the chance to live an active political life**” – Parent of current student, Yerevan

“They are independent in expressing their opinion. They have a position. **After Tumo, all children begin to acquire environmental tendencies which is important for me.** However, a little bit of socialist mentality is formed among them, which I'm a little bit not in favor of.” – Parent of current student, Yerevan

“**We are very happy that there are no political things in Tumo.** If suddenly one day it is there, I will immediately take my children out. This is not the age for them to be focused on this. They can be active when older.” – Parent of current student, Gyumri



All stakeholders agreed that scaling TUMO would be beneficial for the country's human and economic development, especially in regions outside Yerevan



Stakeholders highlighted that TUMO helps shift youth into modern emerging sectors, contributing to the country's economic development



Teachers

“**TUMO gives an opportunity to think ahead in terms of innovation in technology.** TUMO discovers children with talent and develops them which is very beneficial for the economy of the state.” - Physics teacher, Gyumri

“As TUMO expands it will become a bigger factor in society. **It will help build more advanced specialists** that will be useful to society in various fields.” - Literature teacher, Yerevan



Professors

“It will definitely have an impact. **The more well-trained specialists we have, the more qualified personnel there will be in the labor market,** and this will naturally affect the economy.” - Professor, Web subjects, Yerevan

“Of course, it is possible. **Improving the economy is a complex issue, and students are a part of it.** Now the whole world is based on new technologies; if they are implemented in our country, we will be more developed” - English professor, Gyumri



Parents

“For example, after going to TUMO, **a village child** whose family has always done animal husbandry **can envision a different life and already has other aspirations.**” - Parent of current student, Gyumri

“I agree that **TUMO has a great influence on the economy in the sense of raising the character of its students.** In fact, I want TUMO to have a competitor - that results in more new ideas and successes.” - Parent of current student, Yerevan



Additionally, TUMO's role in building rounded individuals and providing opportunities to those with less exposure is highly valued



Teachers

“As an education program, TUMO builds the foundation of our society- the formation of children's thinking. **If we have an educated generation, we will also have a future**”.- Physics teacher, Gyumri

“By keeping children occupied and mentally busy, TUMO gives the opportunity to break **indifference** and negative vices. The more active children we have, the more we will succeed”. - Literature teacher, Yerevan



Professors

“TUMO gives children discipline, responsibility and teamwork, all important for being a good human being and citizen” - University rector, Yerevan

“TUMO gives a certain sophistication in terms of how to behave - what to do or what not to do in a social environment. This is very important right now in the post-war situation, when everything is very tense” - Journalism professor, Yerevan



Parents

“Our people are very talented, but **many children do not discover their abilities in order to develop them. TUMO gives them that chance**; All children in Armenia should get this opportunity.” - Parent of current student, Yerevan

“It helps children use their time more productively. Through this, children, especially boys, are removed from the streets and **kept away from bad influences** which is a big problem in Gyumri” - Parent of current student, Gyumri



Employers also highlighted TUMO's role in both human and economic development, especially in building a new generation of specialists in the creative tech sector

“Each generation brings in a new mindset and new ideas and if TUMO expands that process will allow more Armenian children to develop the right mindset that will be beneficial for the country.” – Senior Talent Recruiter, Armenian SaaS company

“Good specialists bring economic development. A good specialist can't do bad work if they have gotten the right information and TUMO helps to build a new generation of quality specialists” – General Manager, Book Exporter/Importer

“The future generations of Armenia are studying there. The more that generation is developed, the better our future will be and TUMO has big role in this matter. The important thing is to ensure that they stay in the country so that we don't lose good people.” – General Manager, International Comics company

“It will definitively have an impact on the human and economic development of Armenia. Any such institution that gathers people to learn about so many different topics and help them communicate will do that, but it is especially important because we consider the Tech sector to be a priority– Director, Armenian Software company

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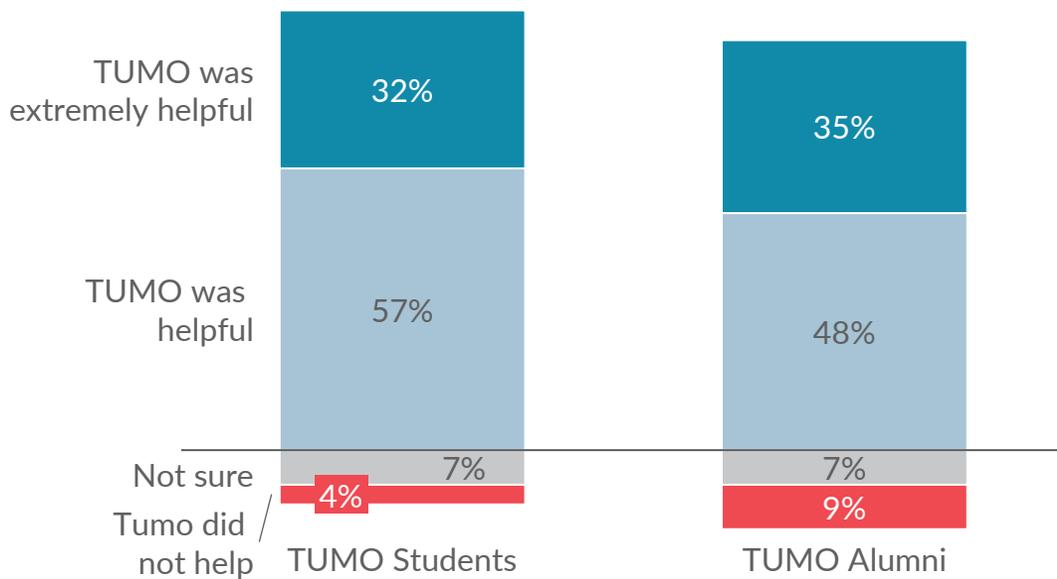
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Both students and alumni report high levels of satisfaction with the program and are highly likely to recommend TUMO to peers

89% of students and 82% of alumni felt TUMO had been helpful/extremely helpful in realizing the goals they joined with...

% of respondents who felt TUMO was helpful in realizing their goals¹
12-17 yrs; Treatment, (N=262)

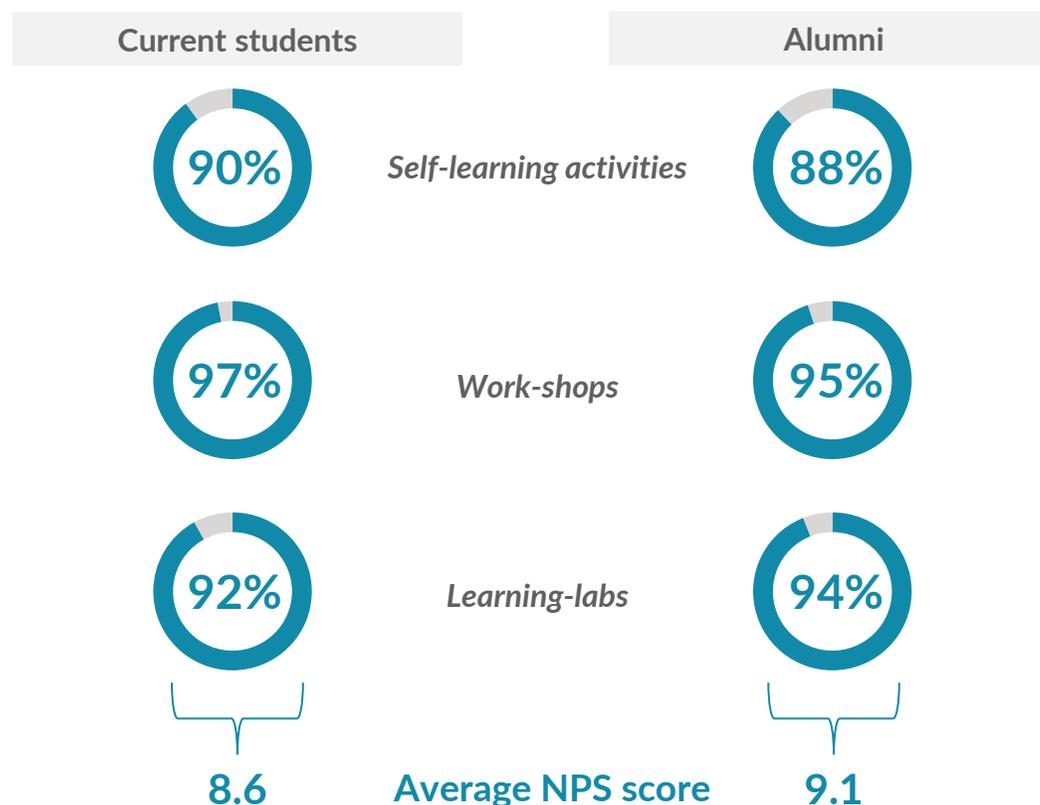


> 70% joined primarily to explore careers in tech/design and develop relevant skills

74% joined primarily to develop creative/tech related skills. 63% joined to explore careers

...and are highly satisfied with TUMO's core components. Alumni are slightly more likely to recommend TUMO

% of respondents satisfied/extremely satisfied with stages of the program²
Treatment³; 12-17 yrs (N= 262); 18+ yrs (N= 462)

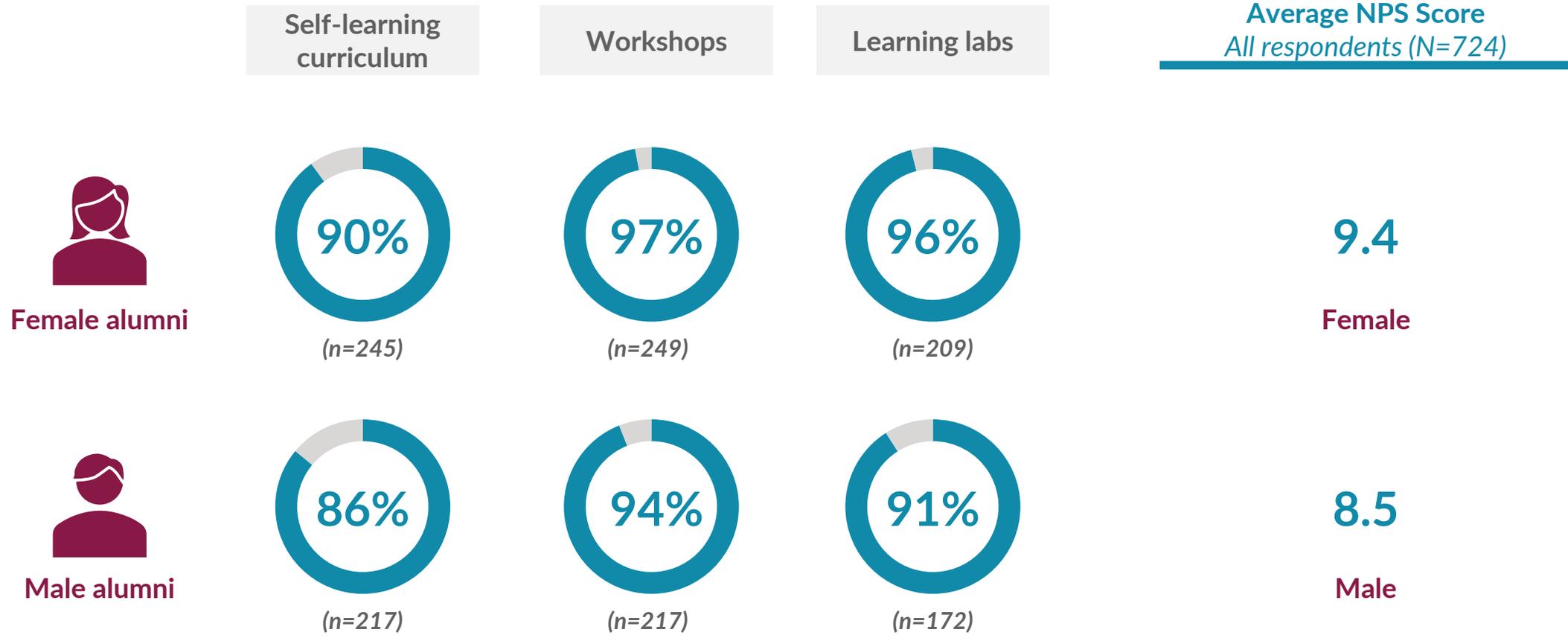


Notes: (1) In response to the question, 'To what extent do you feel TUMO helped you realize your goals?'; (2) In response to the question, 'To what extent are you satisfied with the following?'; (3) N varies by component because some students will not have met the criteria to attend workshops or learning labs yet, and thus selected "Not applicable"



Notably, female alumni reported higher levels of satisfaction and were noticeably more likely to recommend TUMO than male alumni

% of respondents satisfied/extremely satisfied with key stages of the TUMO program¹
+18 yrs; Treatment (N= 462)²



These trends hold true for current TUMO students as well

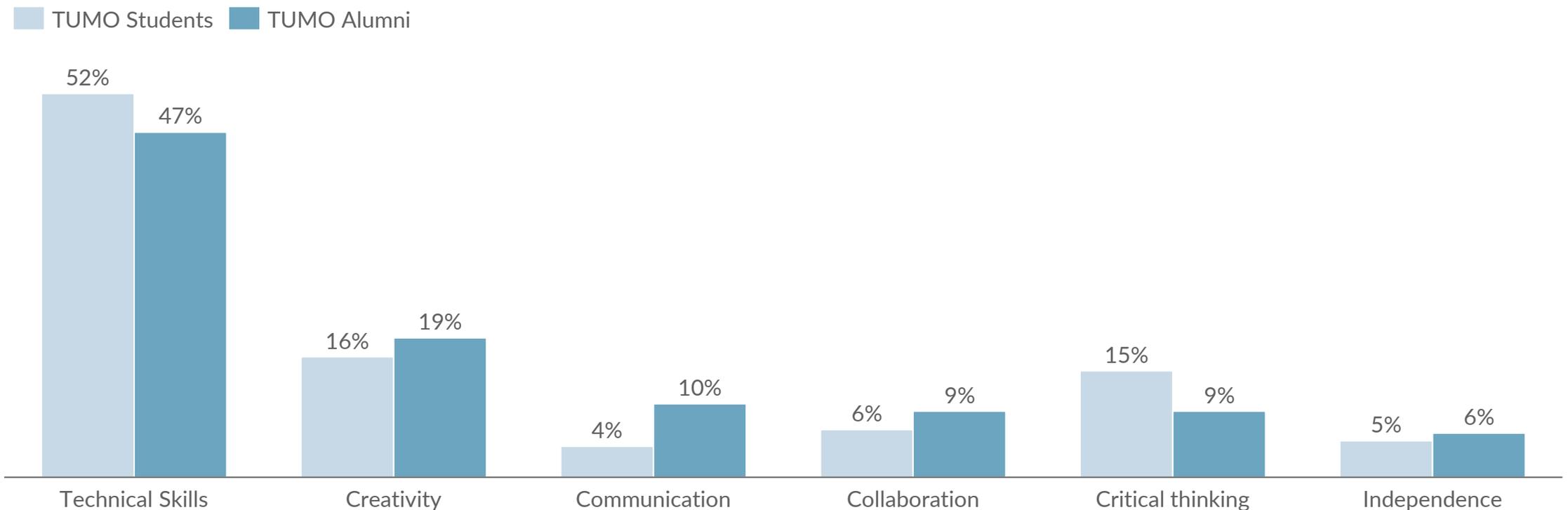
Notes: (1) In response to the question, 'To what extent are you satisfied with the following?'; (3) N varies by component because some students will not have met the criteria to attend workshops or learning labs yet, and thus selected "Not applicable"



Technical skills and creativity stand out as the top skills learners got from TUMO

Though both students and alumni ranked the skills they received from TUMO similarly, alumni highlighted TUMO's role in helping them strengthen their communication and collaboration skills more than current students

Distribution of top skills that students and alumni felt they developed at TUMO¹
 Treatment, 12-17+ yrs (N=242), 18+(N=460)



Notes: (1) In response to the question *What are the top skills that you gained from TUMO?*

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Emerging from our evaluation, we feel that there are 3 key areas that TUMO could reflect on going forward

Our evaluation showed that **TUMO is having a powerful impact on individual learners**, especially in developing positive learning attitudes and unlocking career outcomes.

Something to reflect on: there may be potential to both **deepen individual impacts and link these to wider and more positive impacts on society** as a whole

1

What is the role that we envision TUMO students and alumni playing in the society?

Can/should there be a greater focus on entrepreneurship? A philanthropic mindset?

2

How can you exponentially grow your impact and realize your vision to empower youth?

What are TUMO's non-negotiable components that need to be preserved with scale? What kinds of partners and geographies should be the focus?

3

How can you build a stronger knowledge and evidence base to strengthen your programs?

As TUMO continues to grow, how do we ensure we are measuring the right things in the right ways?

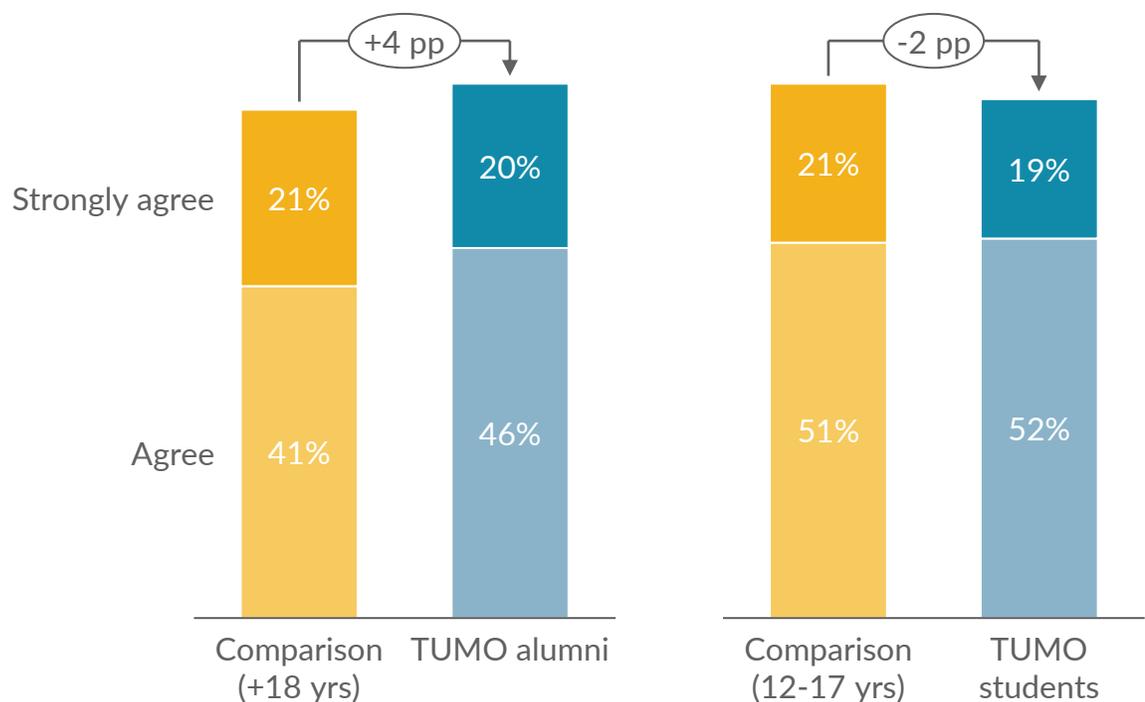
Questions to reflect on:

- (i) What kinds of civic outcomes does TUMO wish to achieve?
- (ii) How intentional do we want to be about developing entrepreneurs?

Answering some key questions can help TUMO better understand the type and depth of civic outcomes it wishes to achieve

There is currently limited difference between the civic attitudes of students/alumni and comparison groups

% of respondents who want to give back to Armenia^{1,2}
Treatment, (N=724), Comparison (N=731)



TUMO needs to answer some key questions* to define its civic outcomes and incorporate the same into its programs

Defining your vision

1. What are the civic principles that you want your learners to form attitudes on? (E.g., Equality, Freedom, Rule of Law, Sustainability etc.,)

2. What is the role you want your learners to play in society? (Participation (democratic, community), Leadership (civic leaders, industry leaders))

Delivering your vision

1. To what extent do you wish to modify your programs to realize your desired civic outcomes? (Active discussion and training vs incorporation of lenses into existing curriculum)

2. To what extent can you modify your programs to realize your desired civic outcomes? (Is there reluctance from parents, students and donors to accept modifications to the program?)

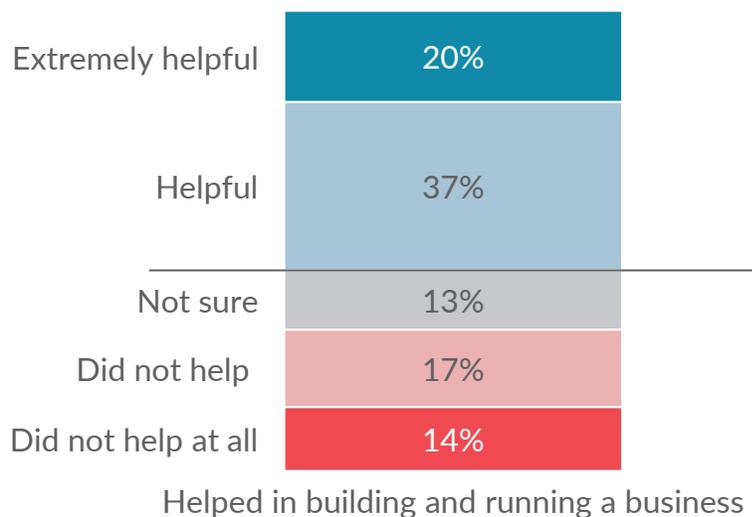
Notes: (1) In response to the question, 'To what extent do you agree with the statement "I want to give back to my community/Armenia?"; (2) After matching for similar characteristics, difference in willingness to give back to Armenia amongst treatment and comparison was not statistically significant at 95% confidence interval

Source: (*) IEA, International Civic and Citizenship Education Study Assessment Framework, 2022

TUMO needs to reflect on how intentionally it wishes to build leaders and innovators that can help to grow tech/creative sectors

42% of alumni with start-ups did not feel that TUMO equipped them to become entrepreneurs

*% respondents who felt TUMO gave them the skills to build and run their own business¹
Treatment, 18+ yrs (N=65)¹*



Both alumni and current student had similar entrepreneurial aspirations as the comparison groups, though the nature of these may differ^{2,3,4}

TUMO could consider placing greater emphasis on understanding learner aspirations and developing an innovation mindset in its cohorts

Understand perspectives and aspirations

Dedicated survey on perspectives on entrepreneurship and their desire to become entrepreneurs in the short-medium term. This can start at time of joining to monitor changes over time

Encourage innovation

Host and promote participation in more hack-a-thons and competitions in collaboration with industry and the public sector

Promote entrepreneurial mindsets

Create a dedicated learning pathway for students with high entrepreneurial aspirations in partnership with leading incubators and accelerators

Notes: (1) In response to the question, "To what extent did TUMO help you build the skills needed to start and run your own venture?"; (2) In response to the question "Are you interested in starting your own venture at some point in the future?"; (3) Respondents were those in workforce either as wage employees or engaged in their family business; (4) After matching alumni and comparison with similar characteristics, difference is statistically significant at the 95% confidence interval

Looking ahead, TUMO can grow its impact exponentially in two ways:

- (i) Doubling down on its impact on career outcomes
- (ii) Sustainably scaling to reach a wider cohort

Stakeholders highlighted a desire for more support with job placement

TUMO can provide additional support to its learners and alumni by helping them discover and secure career opportunities

Issues highlighted in our interviews

“*In TUMO, one thing that is missing is the support to help you get a job. TUMO can take good students who have completed certain courses or projects and help them get more experience*” – Current student, Yerevan

“*Have a database of graduates and keep in touch with us. Share events with us and other networking opportunities like universities do. **The potential of graduates isn't being used right now.***” – Alumni, Yerevan

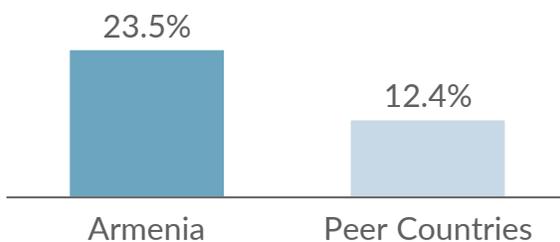
Suggested solutions

- **Provide more structured internship support for promising students.** TUMO can also explore corporate partnerships to help alumni secure placements
- **Create a more robust alumni network and outreach platform** that allows TUMO to leverage its alumni and provide them with more opportunities to upskill and connect with one another for opportunities

TUMO can more rapidly realize its vision to empower an entire generation of youth by scaling through school partnerships

TUMO can play a key role in addressing Armenia's skill gap...

Share of youth that is NEET^{2,3}; % of youth population, 2021*



A key driver is a significant mismatch in skills demanded by the market and those provided by the secondary general education system**

This is caused by dated pedagogy and pronounced vacancies in Maths, Physics, Informatics and Technology, which TUMO is well placed to help mitigate***

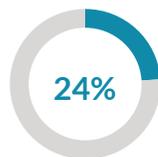
...but will need to explore ways to ensure access to a wider cohort of learners



of comparison group over 18 yrs wanted to attend TUMO but couldn't¹



of those said they didn't have time to attend



of those said they couldn't travel to the nearest centre

Stakeholders felt school partnerships were a powerful way of ensuring this

“TUMO should cooperate with community schools so that we don't end up singling out children. All children need to receive such high-quality education” - Director, Armenian Education Foundation

“I want my son to go to TUMO but its too far away from us. That way Armath is good because it is at the school and access is easier” - Breavis moderator, Yerevan

“TUMO should partner with schools and engage the teachers, and help us better understand what TUMO does, how we can promote it and give more students access” - English teacher, Yerevan

The World Bank could be a strong partner in this effort - its new Education Improvement Project (EIP) in Armenia has a focus on promoting STEM and project based learning in schools****

Notes: (1) N= 186 ; (2) Not in Education, Employment or Training; (3) Peer countries include those in Eastern Europe and Central Asia
Source: (*) ILO Stat; (**) Armenia 2021-2041, Education, 2021; (***) Shushan Movsisyan, Teacher Shortage in Armenia, 2023; (****) World Bank press release, 2022

Partnering with schools may require a new TUMO model– some key questions can help define the right approach to take

1

What should TUMO teach?

What are the most important learning pathways that TUMO should promote and how does this vary by region and type of school?

2

Where should TUMO focus?

Which regions should TUMO focus on? What kinds of schools? What prerequisites should be in place?

3

How should TUMO engage with schools?

Should TUMO seek to build capacity at a school level or focus purely on providing after-school experiences to students?

4

Who should TUMO partner with?

How can TUMO leverage the existing efforts of government, donors and other providers such as Armath?

This approach should not be seen as a replacement to TUMO's flagship approach but rather as a supplement that helps more students begin their journey with TUMO

A decision will need to be made on whether TUMO is okay with making a potential trade off between the depth and scale of its impact outside flagship centres

As TUMO grows, investing in strong knowledge and evidence gathering processes can be instrumental in refining and strengthening programs

Students and alumni raised some issues and opportunities in our survey and interviews that they felt TUMO should pay attention to

1

Enrolment practices may be compromising learner experience

“I don’t like the environment as much these days. **There are many students who just come for fun and disrupt classes** and now you can’t get as much personal attention. There should be some filtering” – Current student, Yerevan

This is a very common complaint that we heard from interviews and surveys.

In order to preserve TUMO’s philosophy of unfiltered access, what could be explored is a stricter probation period, wherein student suitability is assessed after joining by considering their motivation, behaviour and performance in a given time period

2

There may be an opportunity for TUMO to refine and expand its courses

“**Perhaps the program will be updated**, because in the 2nd stage of website development we are moving to PHP language, which is hardly used, another language can be used instead like C++” – Current student Yerevan

3

TUMO may want to explore how to customize the pace of its programs for promising students

“There are periods where you do everything quickly, and there are periods where you remain idle. This was sometimes too long, **there could be pause of several months between the first and second level**” – Alumni, Yerevan

These indicate the potential for TUMO to do deeper and more frequent studies on student and alumni perspectives, some of which are detailed out on the next slide

Looking ahead, TUMO can build a stronger evidence and knowledge base for its interventions

Periodic surveys

1	Student feedback survey	<ul style="list-style-type: none"> • Overall student perceptions of the programme, and its components (pace, duration, skills offered etc.) • Barriers and challenges faced in accessing training or completing courses • Feedback and suggestions for improvement
2	Survey for educational and career outcomes	<ul style="list-style-type: none"> • Baseline survey at time of joining capturing grade, type of school, academic performance, attitude towards learning and educational aspirations • Baseline survey at time of joining capturing motivation to join, career awareness and clarity and career aspirations • Periodic surveys at attendance milestones to observe changes and student attribution to TUMO
3	Alumni Tracer Surveys	<ul style="list-style-type: none"> • Career outcomes (employment status, sector of employment, relation to TUMO focus areas, career progression etc.) • Skill relevance (extent to which TUMO prepared them secure and perform in their role) • Aspirations (what are alumni's plans for further education, career growth and trajectory) • Feedback (how would alumni like TUMO to better support them, what changes would they recommend to the program?)
4	Labour market assessments	<ul style="list-style-type: none"> • Assessment to identify key skill demands and gaps in relevant Armenian sectors to inform TUMO's offerings both in terms of what to teach and the level of proficiency it wishes its students to attain before leaving to set them up for successful careers

Potential additional analysis

1. Analysis of start-ups

Studying the extent to which TUMO alumni are involved in emerging Armenian start-ups

2. Impact on regions outside Yerevan

Broader study to test perceptions and impact of TUMO presence at a community level outside Yerevan

3. Employer survey

Study to understand views of employers regarding alumni through qualitative and quantitative measures

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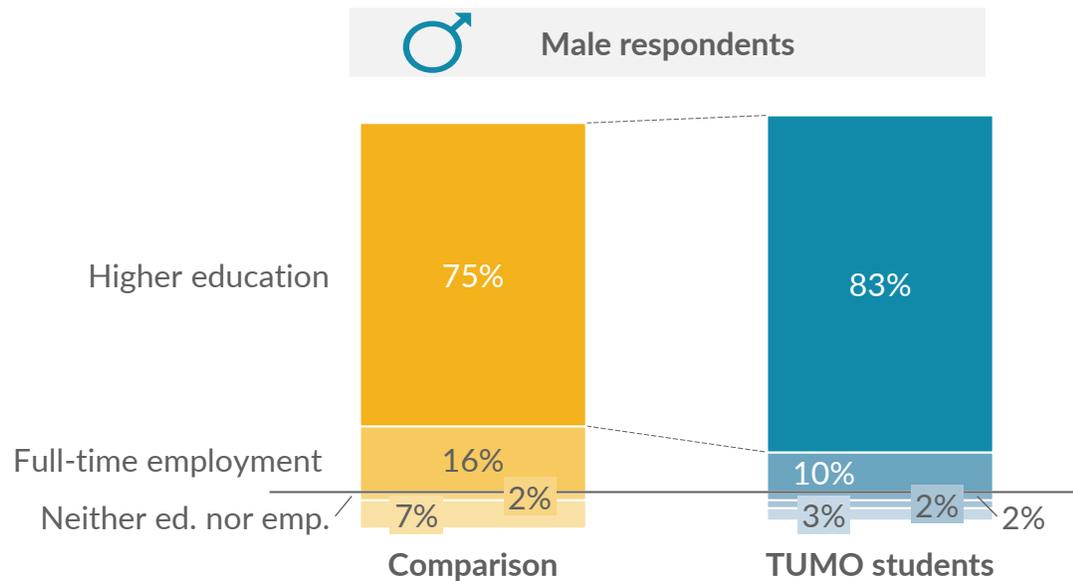
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TUMO students in school directionally reported a greater desire to enroll in tertiary education, especially male students

Male TUMO students reported a higher desire to pursue higher education, particularly bachelors' degrees...

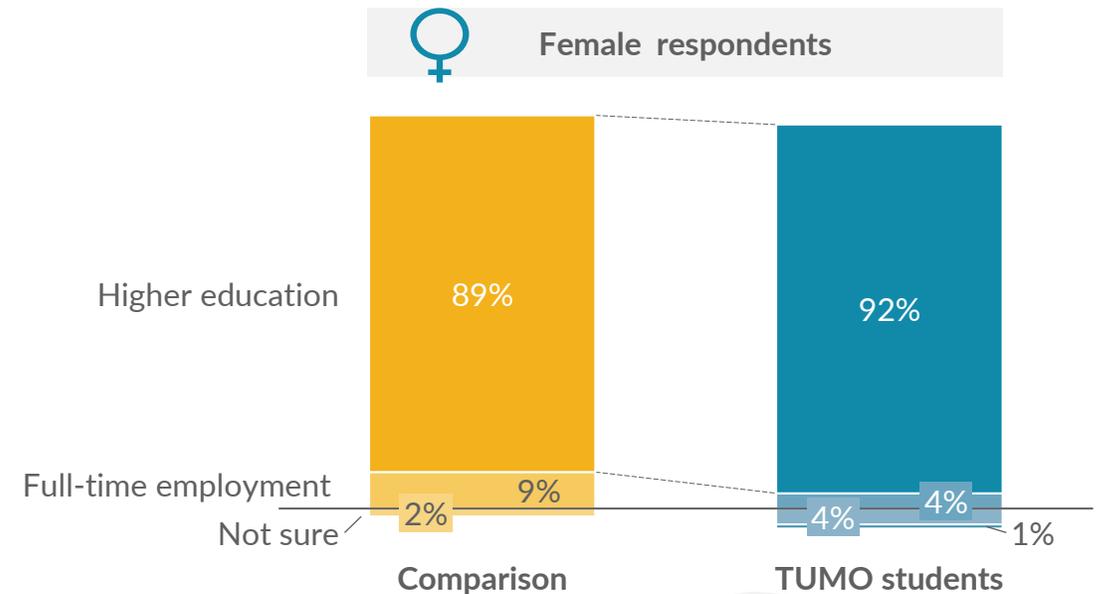
Distribution of desired pathways post grade 12, % of male respondents¹
Treatment, 12-17 yrs (N=132), Comparison (N=92)^{2,3}



Male TUMO students also reported a greater desire to pursue bachelors for higher education as opposed to TVET- 85% of treatment reported wanting to do bachelors, as opposed to 72% of comparison.

...and female TUMO students reported a higher desire to obtain post-grad degrees

Distribution of desired pathways post grade 12, % of female respondents¹
Treatment, 12-17 yrs (N=132), Comparison (N=88)^{2,3}



Female TUMO students also had a greater desire to obtain masters and post-grad degrees than comparison- 59% of treatment wanted to do post-grad as opposed to 47% of the female comparison group. The trend was reverse for male TUMO students.

Notes: (1) In response to the question "What are your plans post-high-school (grade 12)/vocational education"; (2) Respondents included those in grade 10 and those currently in grade 9 who intended to finish grade 12 (~99 % of total sample); (3) Difference for male respondents is statistically significant at the 90% confidence interval (without matching for similar characteristics).

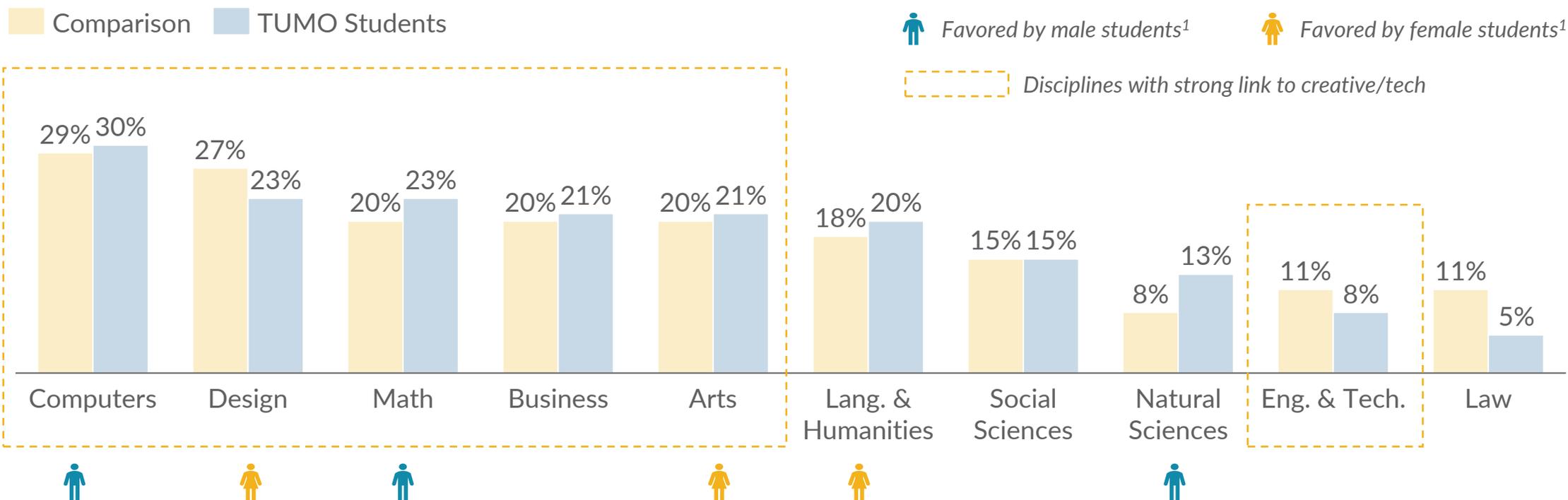


Both current and waitlisted students appear to have similar levels of interest in pursuing tech/creative disciplines after school

Degrees related to Computers, Design, Math, Art, and Business were of top interest to both the treatment and comparison group

Distribution of top two disciplines for respondents planning to go for Bachelors²

Respondents that plan to pursue Bachelors after grade 12; Treatment, 12-17 yrs (N=203), Comparison (N=119)³

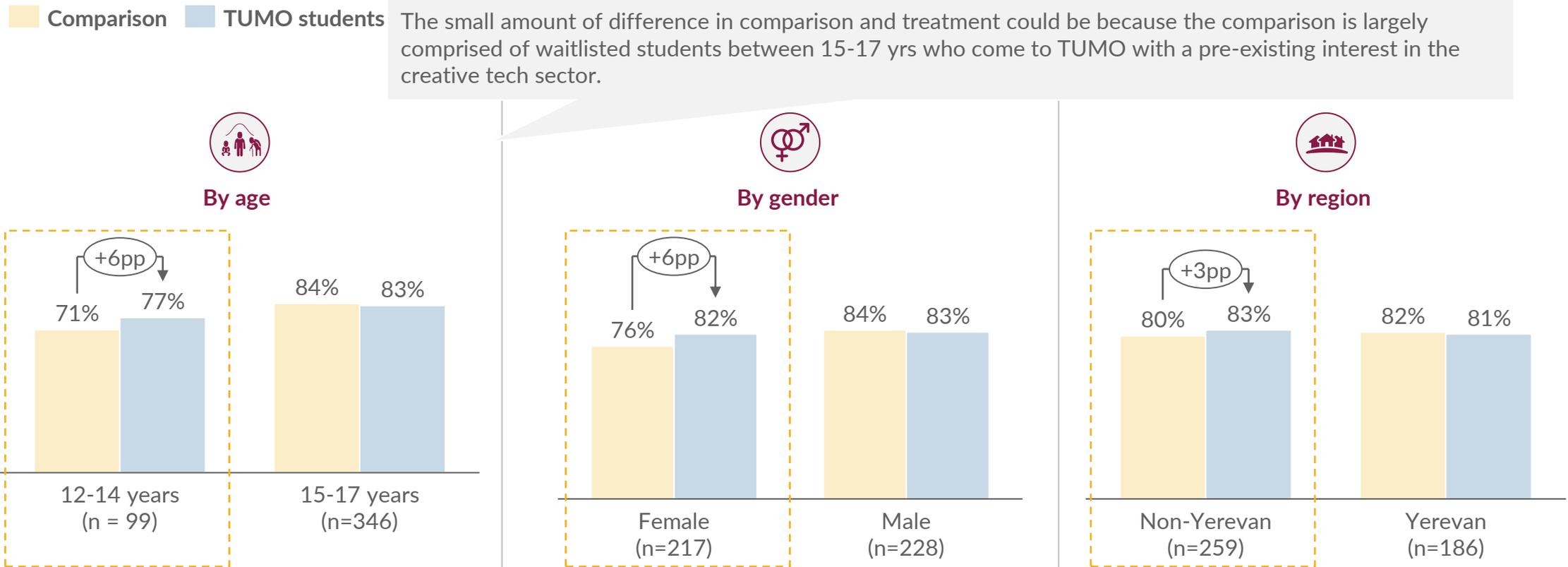


Notes: (1) Male and female icons denote subjects where the difference between interest expressed by each gender was greater than or equal to 10 percentage points; (2) In response to the question "What are the top two degrees/types of majors you are considering?"; (3) Account for 72% of the sample; (3) Medical sciences, education, and communication have not been included in the graph given very small proportions (<5%) and marginal differences between treatment and comparison groups.

TUMO's overall impact on career clarity relative to the comparison group is unclear; certain segments may be experiencing impact

Younger students, women and students outside Yerevan reported slightly higher career clarity compared to their counterparts

% of respondents that strongly or very strongly know which career they want to pursue¹
 Treatment, 12-17 yrs (N=262), Comparison (N=183)

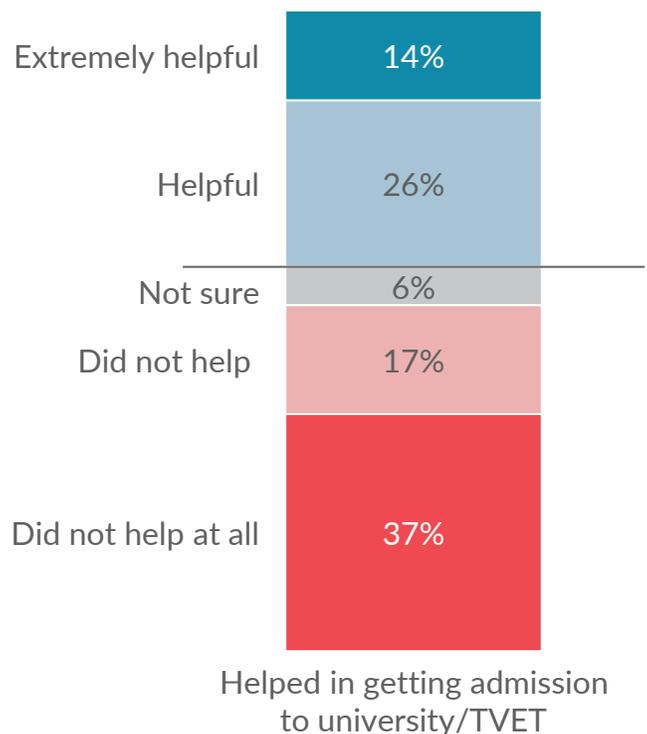


Notes: (1) In response to the question “On a scale of 1-7, to what extent do you agree with the following statement: I know what career I want to pursue?” (2) Differences in career clarity amongst treatment and comparison were not statistically significant at 95% confidence interval, however, there appears to be directional trends for certain segments.

>50% of alumni did not feel that TUMO helped them in securing university admissions, especially in Armenian universities

Most alumni do not believe that TUMO provides them with significant benefits during university applications...

Distribution of student perceptions regarding TUMO's role in helping their admission to university¹; Treatment, 18+ yrs (N=430)^{2,3}



...however, students attending international universities felt that TUMO helped in enhancing their overall profile

“I can't say that TUMO really helped with my admission. However, I know that at American University, **your overall profile helps and TUMO does give you that experience.**”
– Alumni, Yerevan

“American university pays attention to your overall profile, but this is not the case with state universities. There **TUMO doesn't help in state universities because they only look at your marks and not your overall profile.**” – Alumni, Yerevan

It must be noted that TUMO may be helping students indirectly; students and alumni felt TUMO helped them do better at school and current students reported higher grades than comparison.

Notes: (1) In response to the question “To what extent did TUMO help you get admitted to your university/TVET?”; (2) Respondents were those who were at University/applying to university or had completed university and were now in workforce. (3) Accounts for 93% of total TUMO Alumni sample

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Our evaluation utilized a quasi-experimental design to assess TUMO's impact on students and alumni

We looked to determine the impact of TUMO on its students and alumni by comparing them with a sample of similar individuals that had not enrolled in TUMO or had enrolled but not yet started the program

Comparison
for current
TUMO
Students
(12-17 yrs)

Current students (at TUMO for > 1 yr) were compared with incoming students that were waitlisted or have minimal exposure (less than 3 months) to TUMO's program.

- Since all TUMO students are being enrolled through the same registration process and subjected to the same enrolment criteria, this pool of waitlisted and incoming students can be assumed to be similar in terms of characteristics as the current students at TUMO
- We also ensured that the comparison was similar to current students with regards to gender, age and region

Comparison
for TUMO
Alumni
(18-30 yrs)

Alumni (at TUMO for 2-3 yrs) months have been compared with a randomly selected sample individuals, representative of the Armenian population, who could have theoretically enrolled in TUMO classes but did not^{1,2}.

- The approach differed from current students because TUMO does not disallow any eligible applicants to enrol (for example because of capacity constraints) – thus study could not leverage a pool of TUMO applicants who did not enrol based on a random selection process
- The comparison was selected after stratifying the data-base by gender, age (between 18 – 30 in line with the distribution of alumni we had access to) and region to ensure comparability

To control for income distribution across both groups, we clubbed treatment and comparison by the rental zone of their address, which acted as a proxy for socio economic status of the respondent - as rent is typically correlated with income and other determinants of socio-economic status. Post survey analysis showed that both treatment and comparison group were aligned in terms of distribution across rental zones

We leveraged statistical matching to reduce biases in our study and tease out TUMO's true impact

When the treatment (in this case TUMO education) is not randomly assigned to the study participants, it is recommended to reduce the bias for the estimated treatment effect through statistical matching.

- **Why did we match?** - Because a different outcome for TUMO students compared to non-TUMO students could be caused by confounding factors (such as gender/region etc,) matching is applied to control for such confounding factors. This helps isolate the differences between both groups on the basis of a single key variable (in this case, enrollment in TUMO)
- **How did we match?** - A matching algorithm was created to construct a matched sample with the use of weights. Through this, we were able to identify candidates in the comparison group whose observable characteristics are close or like their counterparts in the treatment group, creating two groups that are similar in every aspect but the variable being tested for.
 - We used one of the most popular matching approach in recent literature is propensity score matching, or PSM ([Rosenbaum & Rubin, 1983](#))¹. The PSM approach uses regression to perform the following, (i) predict group membership, (ii) assigning propensity scores to individual participants, (iii) match those participants across membership groups using the propensity scores.
 - Propensity Scores (Link) are calculated per respondent, and scores that are closer to each other are considered to match using Mahalanobis Distance (MD)
- **What did we match for?** The key variables used for matching were:
 - Age of respondent
 - Gender of respondent
 - Region of respondent

Quantitative sampling strategy (1/2) | We secured survey responses from 724 TUMO students and alumni and 731 comparison group participants.

	Treatment Group			Comparison Group		
	Current TUMO students (12-17 years)	TUMO alumni (18-22 years)	TUMO alumni (23+ years)	Waitlisted TUMO students (12-17 years)	Non-TUMO students (18-22 years)	Non-TUMO students (23+ years)
Yerevan	162	140	141	124	161	168
Gyumri	64	57	38	49	43	62
Dilijan	18	23	13	1	12	13
Stepanakert	18	26	18	9	17	23
Other	N/A	5	1	N/A	34	15



Aim for 50:50 gender split with minimum 40% quota for both sexes



Best possible matching of socio-economic backgrounds of comparison and treatment

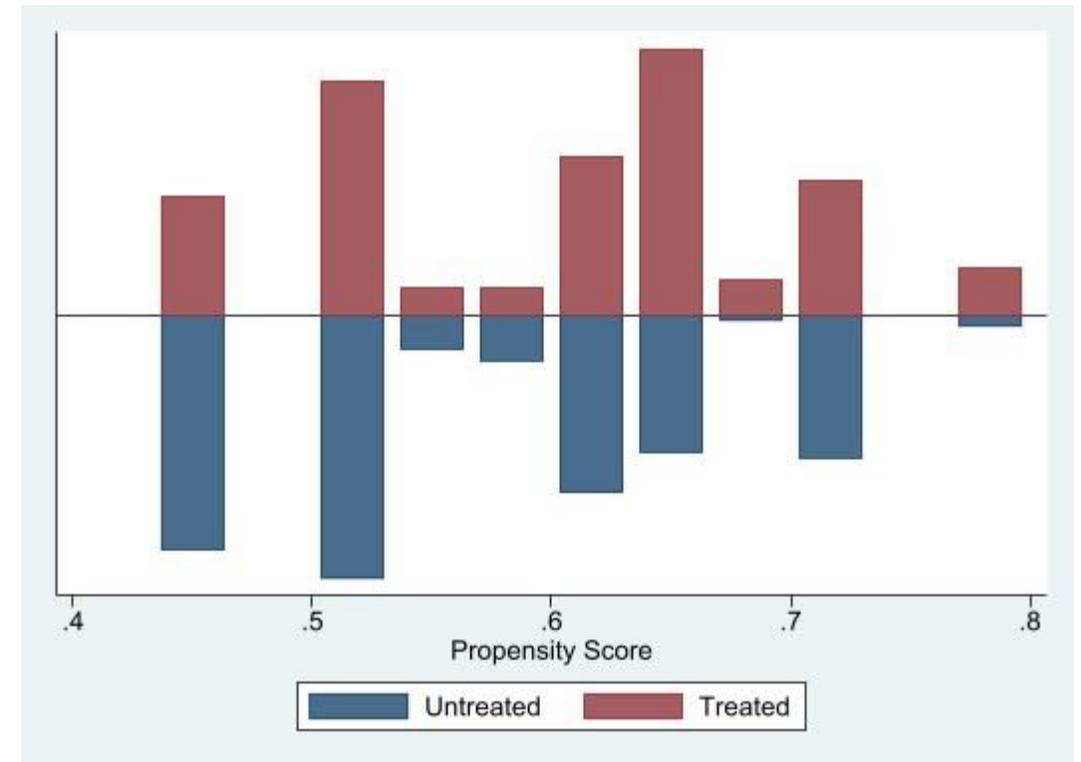
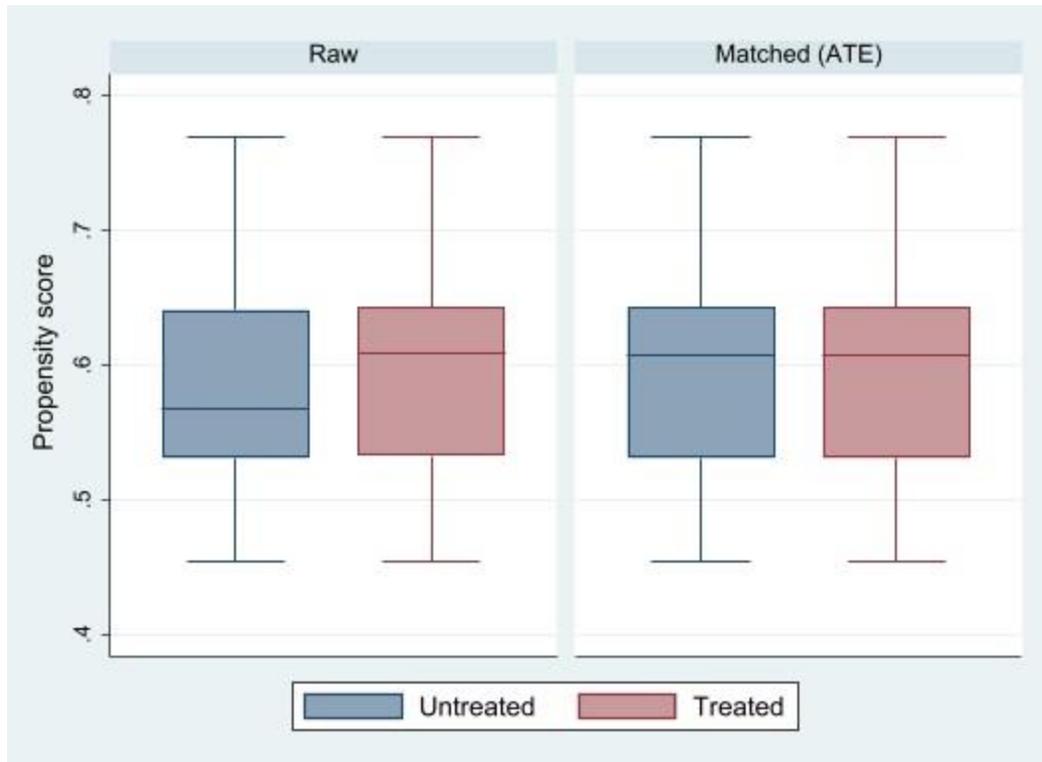
Quantitative sampling strategy (2/2)

Quantitative Phase

- Stratified sampling by gender, location and time spent in TUMO was employed across the two groups of TUMO beneficiaries (current students/awaiting list, and alumni group). In selection of the control group, gender and location were considered to ensure beneficiaries and non-beneficiary characteristics closely match.
- A sample was extracted from a database of students and former students of TUMO. All respondents in the sample were called by TUMO and consented to participate in the survey. Furthermore, the sample observed a 50:50 gender split, as well as stratification by age, by location (Yerevan, Gyumri, Dilijan, Stepanakert), and by the time they had spent at TUMO. A buffer of 20% was added to the tallies to cater for attrition during the telephone survey. These stratas were observed on an ongoing basis during survey to ensure a balanced sample was achieved.
- Selection of incoming/waitlisted TUMO students followed the same principles.
- To select the alumni group control sample, respondents were selected from a database derived from nationwide representative surveys having been conducted over the past few years by our survey partner Breavis. Because basic socio-demographic characteristics had already been collected from previous surveys, respondents were selected within the age groups and locations of interest, similar to the treatment group. The survey also sought to achieve a gender balance, similar to the split in the treatment group.

Post-matching (1/2) | All current students were successfully assigned to a match in the waitlisted and incoming student samples

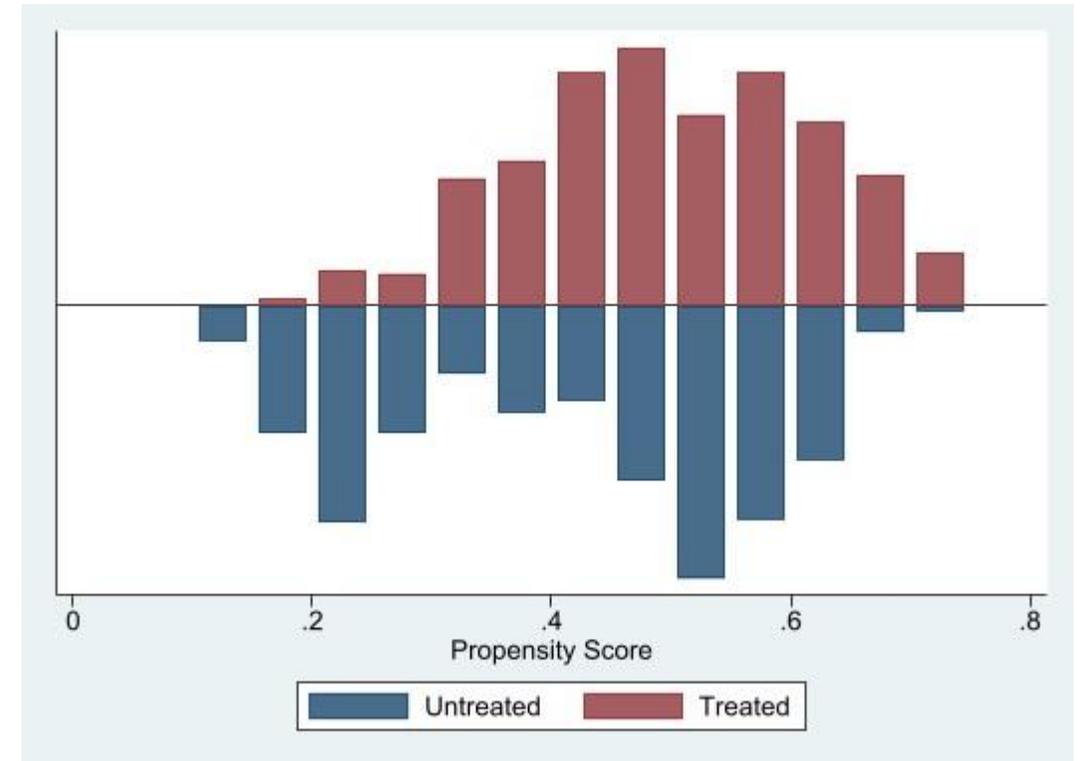
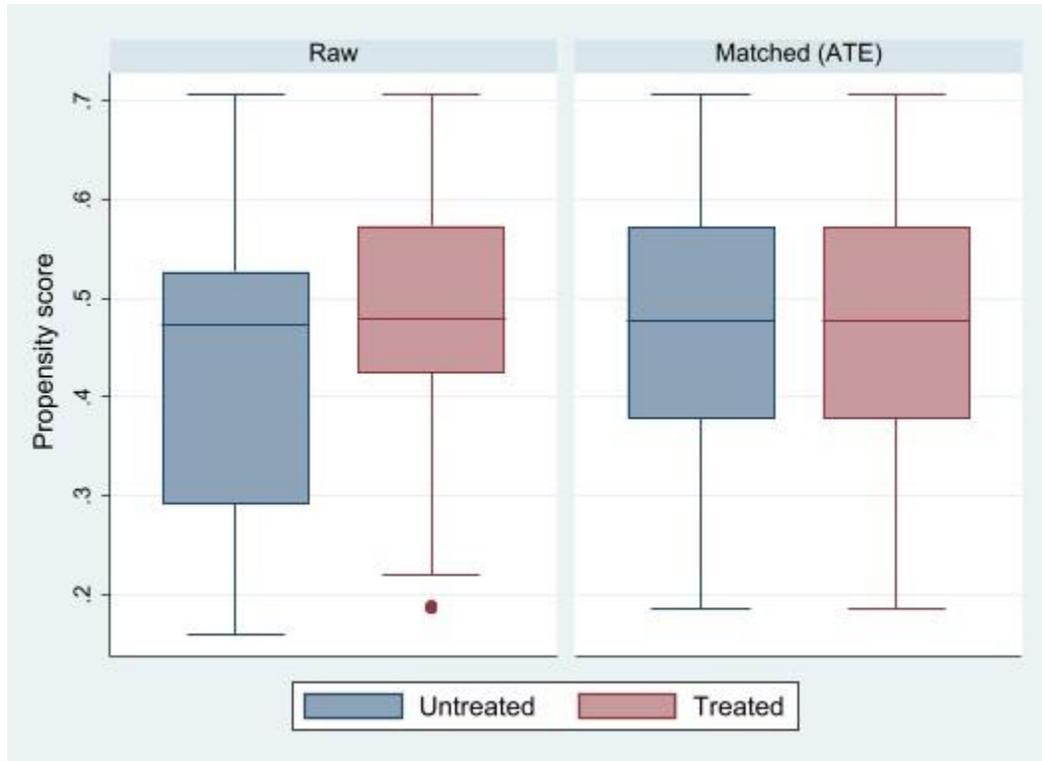
Graphical evaluation of the quality of matching among current students and their comparison group



- All the 449 participants (265 TUMO students and 184 non-TUMO students) were matched successfully.
- The graph illustrates evidence of overlaps as given by observations on support.

Post-matching (2/2) | All TUMO alumni were successfully matched to non-TUMO alumni

Graphical evaluation of the quality of matching among TUMO alumni and their comparison group using calliper distance of 0.01



- All of the 1010 observations (462 TUMO alumni and 548 non-TUMO alumni) were matched successfully.
- The graph gives clear indication of evidence of overlaps as given by observations on support.

Qualitative sampling strategy (1/2) | We aimed to be purposeful about interviews to ensure adequate representation and relevance of interviewees

7 FGDs, 30 KIIs and 2 IDIs with key stakeholders across Yerevan, Gyumri, and Dilijan

TUMO students	Current students	<ul style="list-style-type: none">• 2 FGDs in Yerevan• 1 FGD in Gyumri	<ul style="list-style-type: none">• 50:50 gender split• Mix of disciplines and time at TUMO
	Alumni	<ul style="list-style-type: none">• 1 FGDs in Yerevan• 2 In-depth interviews in Yerevan	<ul style="list-style-type: none">• 50:50 gender split• Mix of disciplines and time at TUMO• Mix of those in workforce, University and NEET
Other stakeholders	Parents	<ul style="list-style-type: none">• 2 FGD in Yerevan• 1 FGD in Gyumri	<ul style="list-style-type: none">• 50:50 gender split in participants and students they represent• Provide insights on the differences observed by parents for their children attending/having attended TUMO
	Teachers	<ul style="list-style-type: none">• 6 KIIs in Yerevan• 4 KIIs in Gyumri and Dilijan	<ul style="list-style-type: none">• Mix of public and private schools• Provide insights on the differences noticed between students how have attended TUMO and those that have not attended TUMO
	Professors	<ul style="list-style-type: none">• 6 KIIs in Yerevan• 4 KIIs in Gyumri and Dilijan	<ul style="list-style-type: none">• Mix of public and private universities• Provide insights on the differences noticed between students how have attended TUMO and those that have not attended TUMO
	Employers	<ul style="list-style-type: none">• 10 KIIs in Yerevan	<ul style="list-style-type: none">• Mix of 5 sectors (ICT, Education, Logistics, Marketing)• Provide insights on the differences noticed by employers between employees who have attended TUMO and those that have not attended TUMO

Qualitative sampling strategy (2/2)

Qualitative Phase

- A purposive sampling approach was used in the selection of stakeholders for the interviews. The selection was by virtue of the participants/respondents' capacity to provide richly-textured information about TUMO's operations. It is for the same reason that we only selected participants/respondents from TUMO's database and referrals provided by TUMO students and alumni.
- While for some participants categories we received exact numbers targeted for interviews (current TUMO students, TUMO alumni, and parents of TUMO students and alumni), for other categories there was over-recruitment (Professors, Teachers, and Employers) and participation was mainly determined by availability for interviews in the study timeframe.
- The qualitative interviews were primarily aimed at supplementing the quantitative survey. The qualitative interviews allowed for a more in-depth analysis of specific questions and understanding the narrative behind the numerical values from the quantitative survey.

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1 | Recap of the TOC and evaluation framework

2 | Understanding TUMO's impact

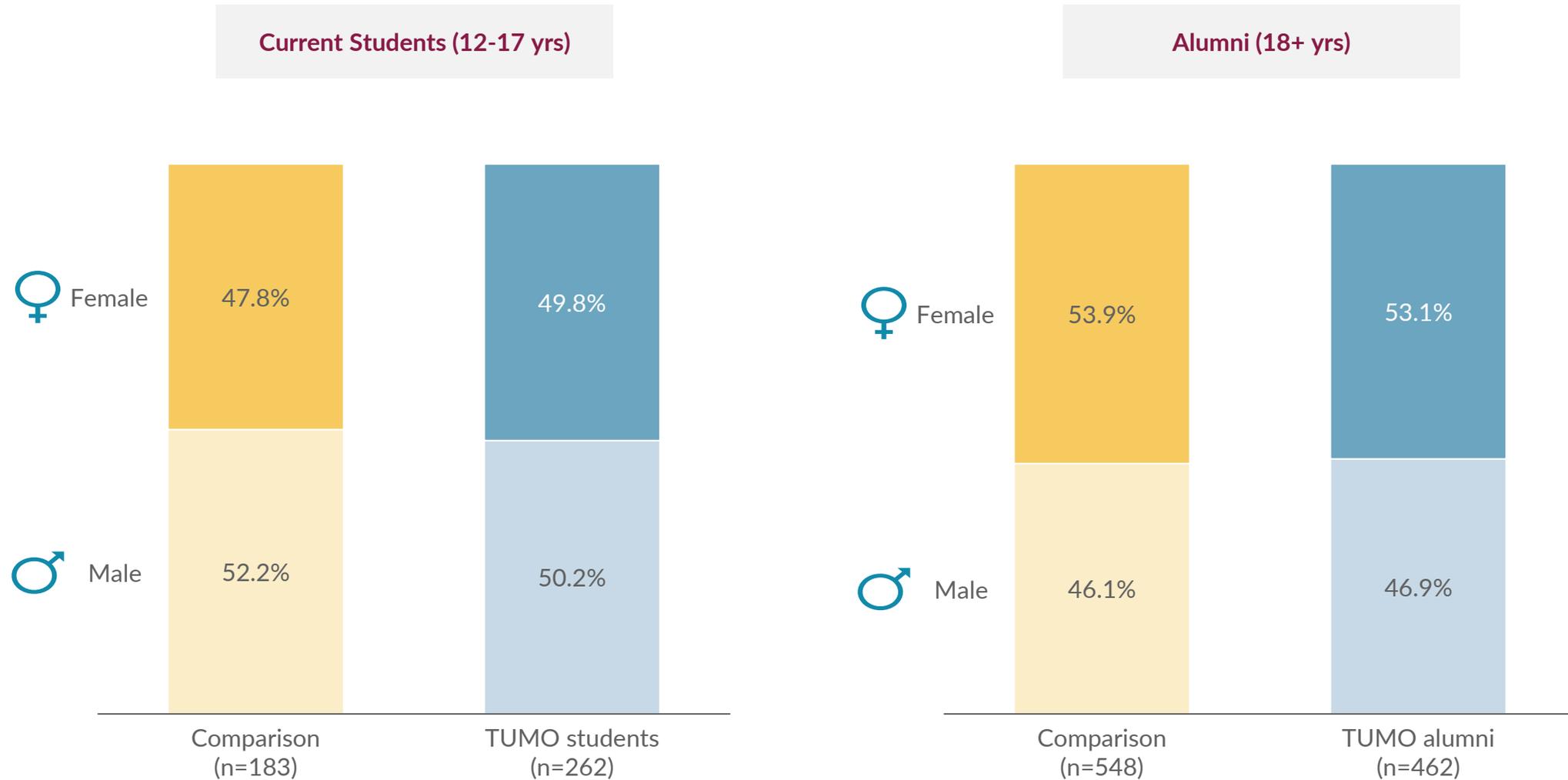
- *Educational outcomes*
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3 | Looking ahead: Reflections from the evaluation

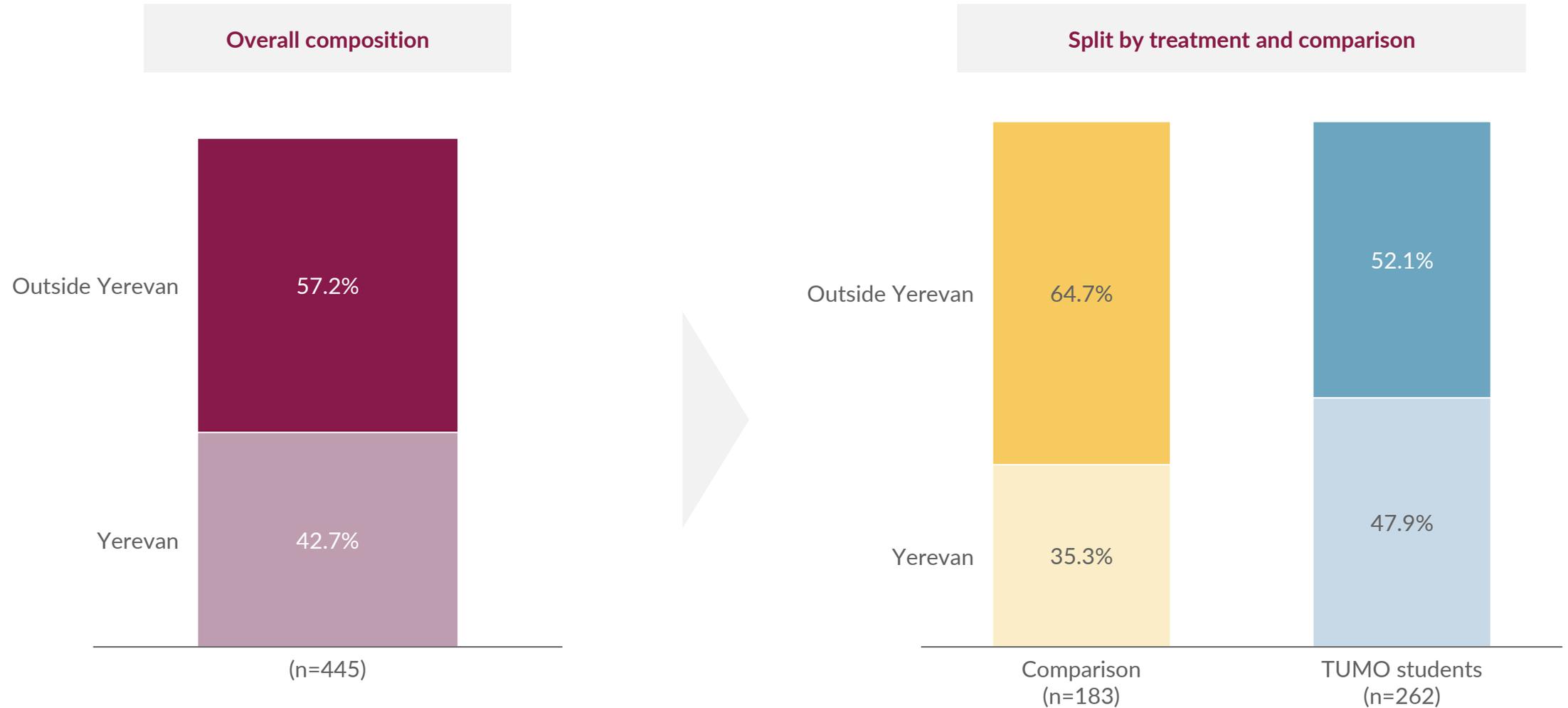
4 | Annex

- *Additional findings*
- *Methodological note*
- *Demographics of the sample*

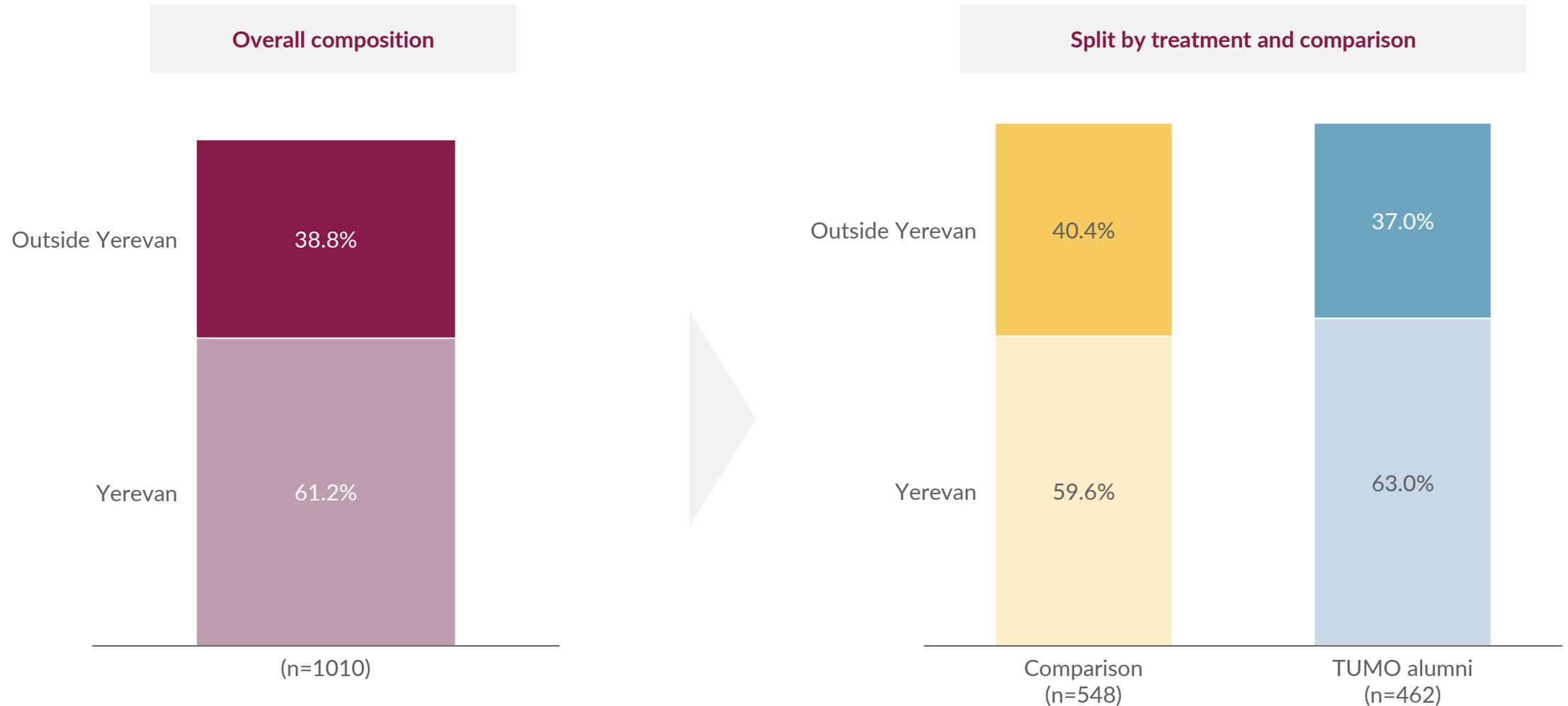
Gender split was largely equal for the student survey, and the alumni survey had slightly higher female representation



Region mapping for current students and comparison | A greater share of respondents were from outside Yerevan, especially for comparison

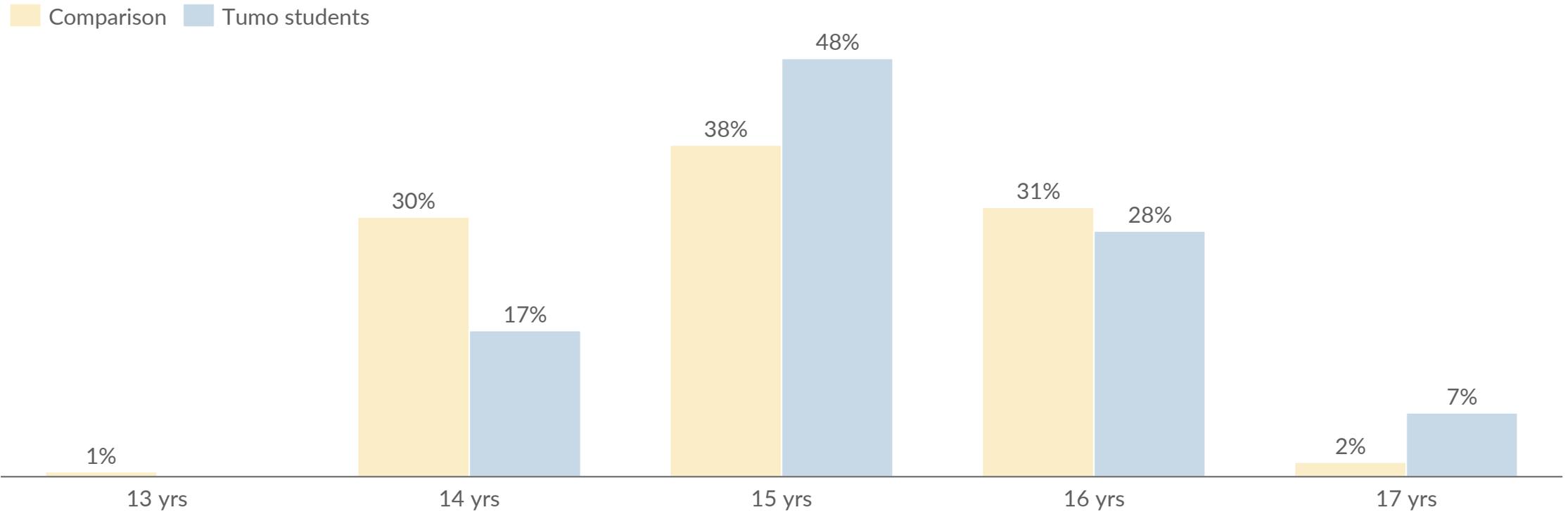


Region mapping for alumni and comparison | A greater share of respondents were from Yerevan, with similar splits for both treatment and comparison



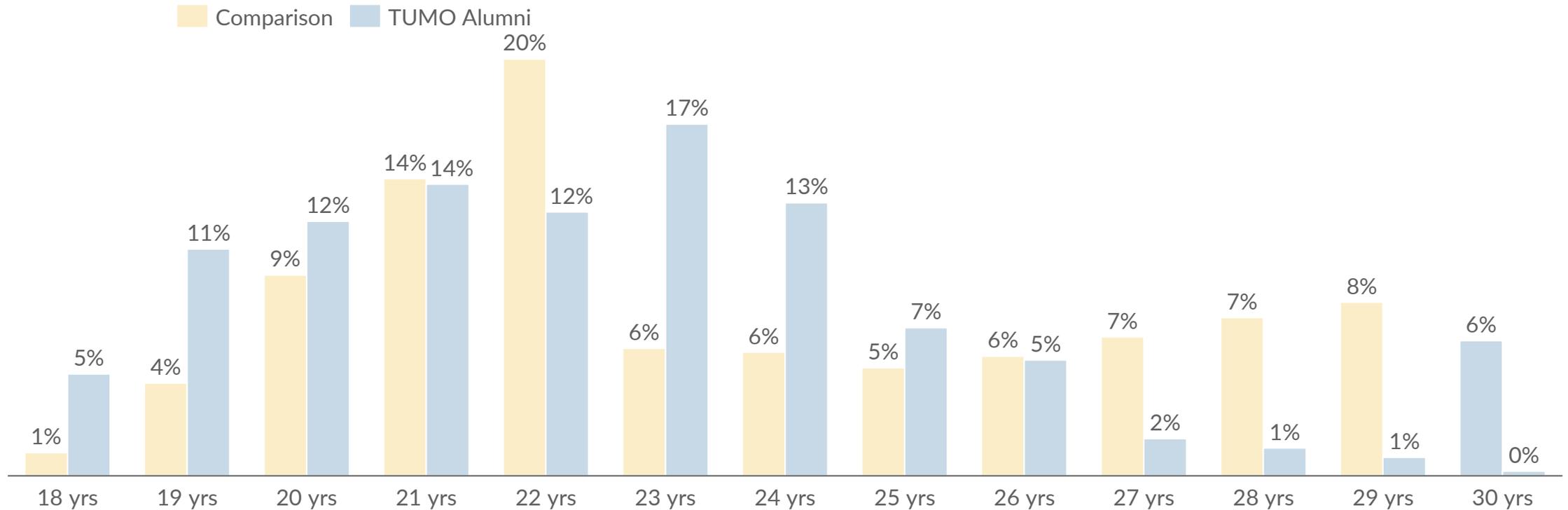
Age mapping for current students and comparison (12-17 yrs) | Comparison group was marginally younger than treatment group

Distribution of age of respondents between 12-17 yrs ; % of respondents 18+ years; Treatment, (N=262), Comparison (N=183)



Age mapping for alumni and comparison (18+ yrs) | Treatment group was overall younger than comparison group

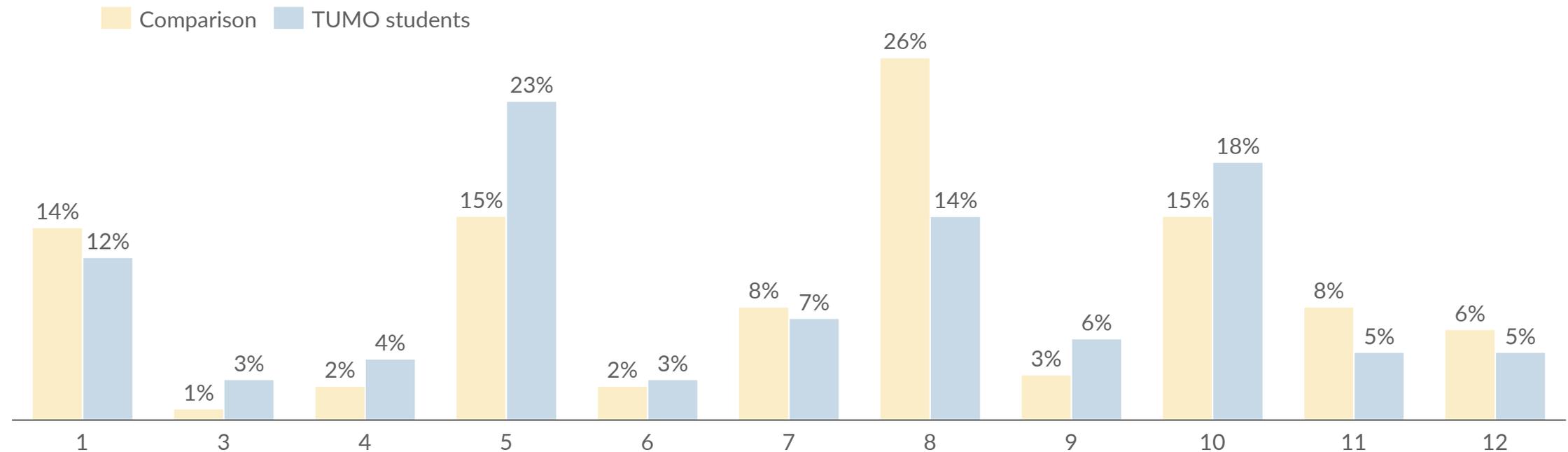
*Distribution of age of respondents over 18 years ; % of respondents
18+ years; Treatment, (N=462), Comparison (N=548)*



Income mapping for current students and comparison | Distribution of rental zones for treatment and comparison was similar

Distribution of rental zones of age of respondents between 12-17 yrs ; % of respondents

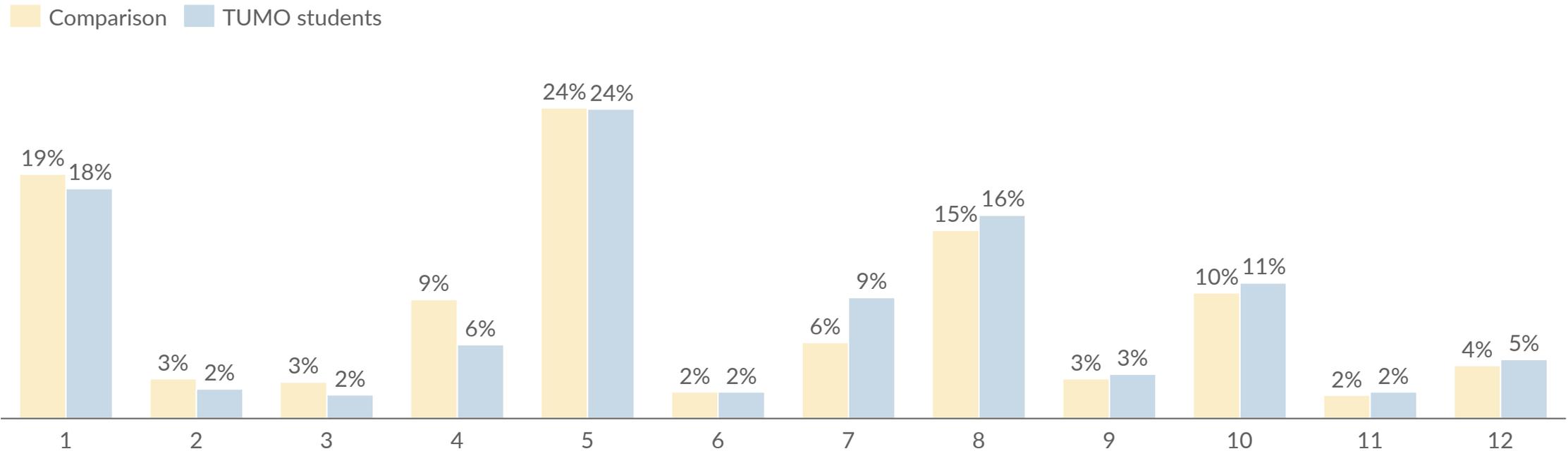
18+ years; Treatment, (N=262), Comparison (N=183)



26% of respondents are missing rental zone mapping data: ~22% of current students and ~32% of comparison group

Income mapping for alumni and comparison | Distribution of rental zones for treatment and comparison was similar

Distribution of rental zones of age of respondents over 18 yrs ; % of respondents
18+ years; Treatment, (N=462), Comparison (N=548)

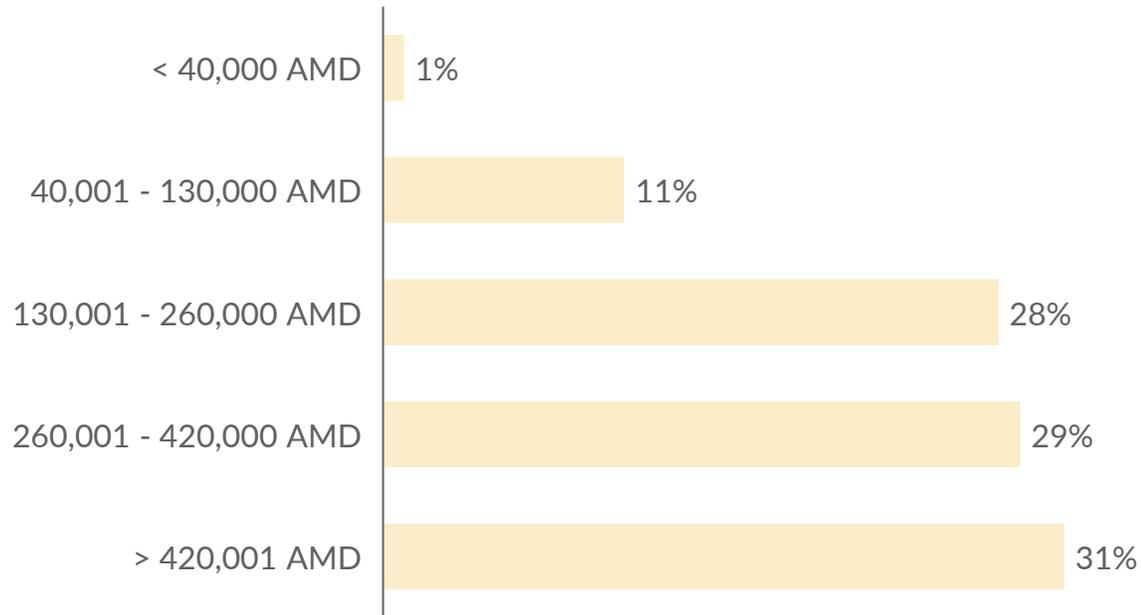


~20% of respondents are missing rental zone mapping data: ~22% of alumni and ~16% of comparison group

These numbers will continue to be updated as we process geo-tagging data. However, the trend will be unlikely to differ

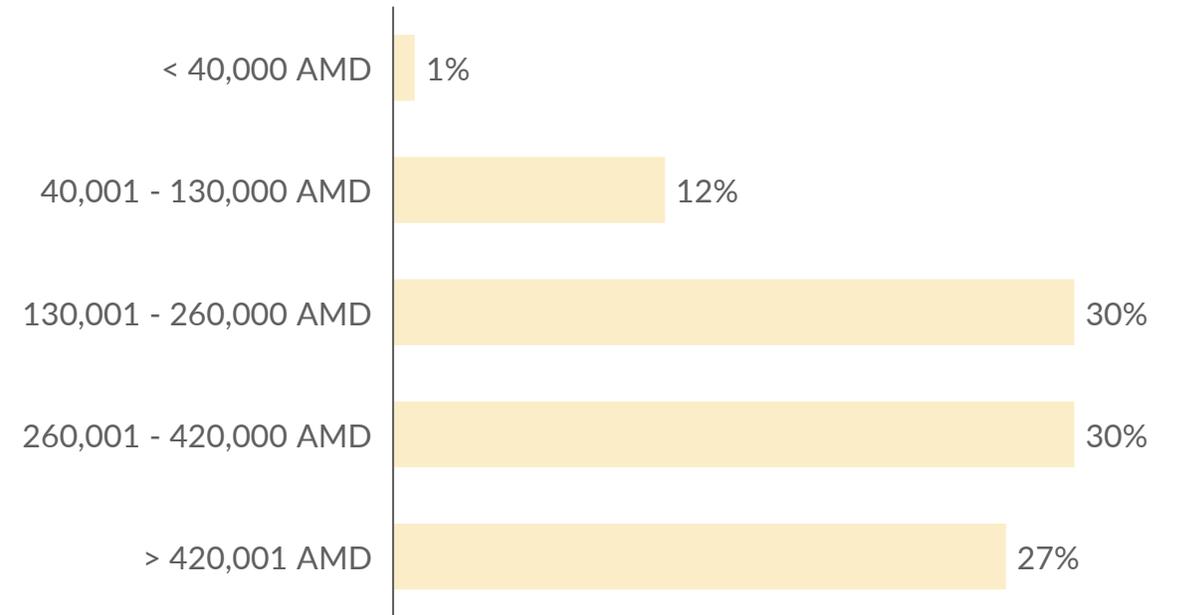
The average income of the comparison group for 18+ yrs sourced from the Breavis data base was similar to national trends

Distribution of average income of Breavis database used to construct comparison group over 18 yrs



Breavis Database

Distribution of average income of in Armenia



National trend

