Co-funded by the Erasmus+ Programme of the European Union

Youth & THE CITY

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Youth & the City

Training Framework Report

(WP2 - A4 Youth & the City Training Framework Report)

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 1 of the information contained therein.

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 2 of the information contained therein.

Co-funded by the Erasmus+ Programme of the European Union

Youth & THE CITY

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 3 of the information contained therein.

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Introduction

This **Training Framework Report** is an intellectual output, produced under the project "Youth & the Cities" co-funded by the Erasmus+ Program of the European Commission.

The **main objective** of the project, as a whole, was on the one hand to promote the skills of young people (target age 17-30) on the topic of smart cities in order to empower them to contribute to the planning of more sustainable, climate-resilient and inclusive cities and on the other hand to foster communication and collaboration between the young people themselves and the representatives of the municipalities of the partner organisations' cities.

In order to be able to promote the skills of young people on the topic of smart cities, one of the outputs of the project is the creation of an online platform (http://www.youthandthecity.eu/) and the development of free and accessible training tools and resources, including a **Training Course**, which will be uploaded onto the online platform.

Preparatory to the creation of the *Youth & the City Training Course* is this **Training Framework Report**. Indeed, crafting a successful training program demands a structured framework that addresses every phase of the learning journey, ensuring learners are engaged, informed, and equipped to apply their knowledge. The framework of a training programme is the fundamental starting point for the development of a relevant and quality training course that not only imparts knowledge but can also generate tangible results and a lasting impact.

The main points that will be covered by the present Training Framework Report are described by the following consequent steps:

a) identifying the specific learning needs of our main target group (young people 17 - 30 years old) on the topic of green and smart cities by collecting, analysing and interpreting quantitative and qualitative data through the administration of a survey to a sample of young people and experts from the partner countries;

b) defining the learning objectives in terms of knowledge, skills and attitudes that the course intends to convey;

c) defining the key contents or learning points that will be the subject of the course useful for achieving the learning objectives;

d) defining the structure of the course and selecting the mode of delivery (- eLearning, classroom sessions, webinars, hands-on projects, etc.

e) defining a strategy for evaluating and monitoring the learning outcomes achieved by the learners, evaluating the usability of the platform and the degree of user satisfaction with the overall learning experience;

The structure of this training framework report will therefore be based on the development of the points outlined above and will be divided into two parts: the first, the training needs assessment (**Part A**) will focus on the analysis of the data and the interpretation of the results from the surveys submitted to the young people and experts from the partner countries; the second (**Part B**), will be devoted to the definition of the training course programme on the basis of the conclusions drawn from the analysis of the young people's learning needs.

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

PART A - Training needs assessment

Premise

The partner organizations of the "Youth & the City" project, in order to create a learning platform about smart cities for a younger audience, decided to collect data from youngsters and experts in the field of smart urban planning that interact with young people (such as educators, professors, PhD students, teachers and so on).

Project partners were asked to conduct field research to assess the training needs of young people and develop proper strategies for effectively transferring skills to understand smart cities. The field research was conducted in order to gather diverse perspectives on the training needs of young people to design the training materials that will equip young people with the necessary skills to contribute towards building sustainable and environmentally friendly cities.

Methodology

Experts interview guidelines.docx

The research aims, on the one hand, to gather information and insights from experts about the learning needs and competencies necessary to empower young people to contribute to smart, sustainable, and inclusive urban planning. On the other hand, it aims to collect knowledge on the learning needs of young individuals interested in sustainable urban planning by their own contribution.

The platform used to create and send out the survey was Google Modules, as it is a cost-free online tool and easy to use for people of all ages and backgrounds.

Survey on learning needs for building smart cities

The "Survey on learning needs for building smart cities" is a questionnaire given to youngsters to understand, by self-assessment, what young people believe their understanding of smart cities is and how they can improve some knowledge or skills on the topic.

The survey can be divided into 7 areas: demographic information, interests and awareness, current knowledge and skills, learning preferences, contribution and engagement, barriers and challenges, and future aspirations.

The core questions of the survey were 15, and most questions were close-ended/multiple-choice, which helped gather quantitative data. Three questions were open-ended, which helped the research to understand youngsters' opinions better, and gave us some qualitative data to analyze.

The survey was available in English, Italian, Spanish, Romanian and Czech.

The data was collected from March 20th until May 22nd, 2024.

Posts were created and shared on social media to increase awareness of the youngsters' survey. However, word-of-mouth was also used to raise awareness and gather data.

Questionnaire for Experts

All project partners were given guidelines on how to conduct interviews with experts in the field of urban planning. It was strongly advised to have in-person interviews with the experts so that we could gain more insights on the matter, grasp nuances, and ask follow-up questions to clarify ambiguous statements. Nonetheless, if the experts did not have time for in-person interviews, it was contemplated for them to complete the online survey on their own accord on Google Modules, in the same way youngsters have.

The experts' questionnaire did not focus on general questions such as age or gender as they were not considered necessary for the scope of the research. The questionnaire focused on their field of expertise and their inputs on the topic at hand. Furthermore, considering the lack of time that the

main target of the survey (i.e. university professors) might have, it was decided to keep the interview questions to the minimum and solely target the research's specific matter. Unlike the youngsters' survey, this questionnaire was only available in English, but experts who did not feel comfortable answering in said language were allowed to fill in the form in their mother tongue. The questions were open-ended so the expert could be more free to explain their response. As we are dealing with open-ended questions, in this report we will analyze the most frequent data (or data we can group if in the same category) and compare answers based on their country of residence and field of expertise.

The questionnaire was sent out to university professors by email, but word-of-mouth was also another method used to gather information.

The data was collected from May 5th until June 1st, 2024.

Survey on learning needs for building smart cities for youngsters.

Data Analysis

Survey on learning needs for building smart cities (Risposte)

The total number of youngsters that participated in this survey is 140, but the distribution is not equal in all countries of residence of the respondents. Most respondents live in Turkiye (31) followed by Italy (27), and Portugal (25).

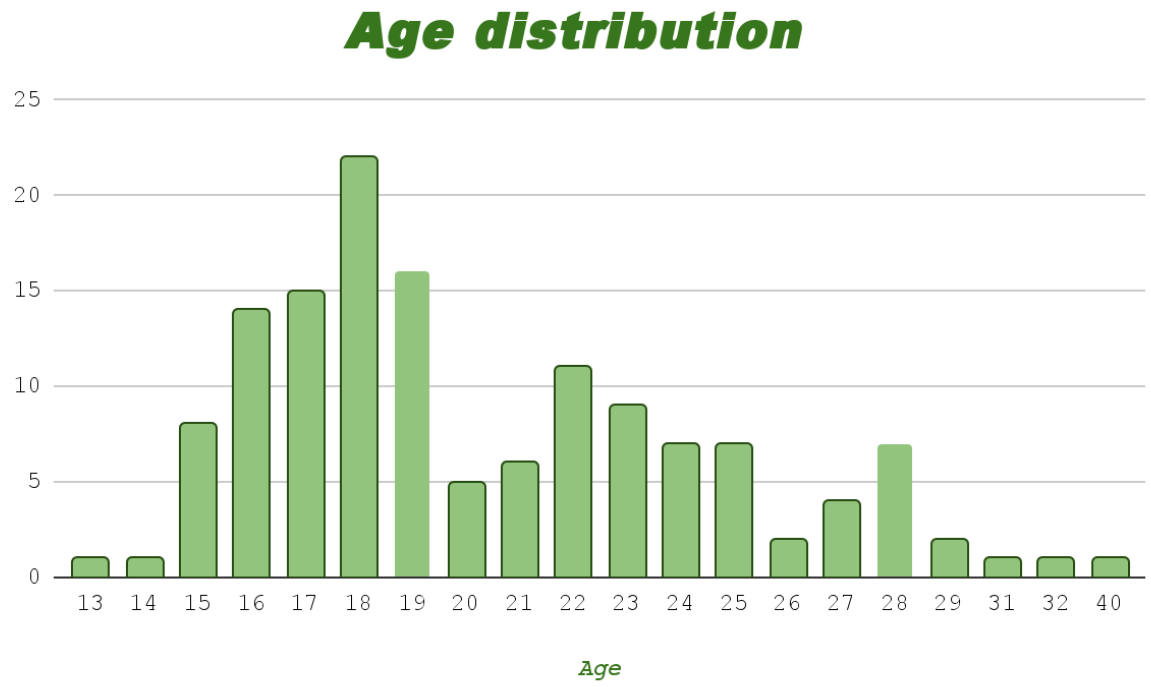
73 out of 140 respondents are women, making it the most represented gender of the survey, 65 are men and 2 are non-binary.

The following table sums up the number of respondents per country of residence and gender identity:

	Italy	Spain	Czechia	Romania	Turkiye	Portugal	Total

Men	8	11	7	11	16	12	65
Women	18	9	7	11	15	13	73
Non Binary	1	0	1	0	0	0	2
Total	27	20	15	22	31	25	140

The age of the participants is varied and it had a large range, even larger than previously considered for the purpose of the research. The youngest respondent is 13 years old, whereas the oldest is 40. The most represented age is 18, as twenty-two respondents are of that age, but teenagers (from 13 to 19 years) are the most represented age group as they make up more than half of the participants (77 out of 140). The following graph is a visualized representation of the participants' ages and frequency.



Due to the young age of most participants, the most prevalent title of academic achievement is "High school diploma", whereas, the prevailing field of study is in Social Sciences (foreign languages, psychology, art history, etc.), followed by STEM students/graduates. The highest percentage of STEM respondents per country of residence is Spain with 40%.

The main findings of this survey, which will be fundamental for the drafting of training units based on youngsters' needs, are summed up in the following tables.
The whole body of youngsters, regardless of their gender and country of origin, rated of higher importance "Understanding of social equity and inclusion", "Knowledge of sustainable transportation systems", "Cultural competency and understanding of diversity", and "Familiarity with green infrastructure solutions" as skills and knowledge that they wish to acquire to be able contribute to urban planning of their cities.

Rate how important you consider to acquire the following skills and knowledge to be able to contribute to the urban planning of your city

	Knowledge of urban planning principles	Understanding of social equity and inclusion	Skills in community engagement and stakeholder dialogue	Ability to analyze and interpret urban data	Familiarity with green infrastructure solutions	Knowledge of sustainable transportation systems	Capacity for interdisciplinary collaboration	Proficiency in sustainable development principles	Cultural competency and understanding of diversity	Leadership and advocacy skills
Italy	12	16	15	11	16	18	13	16	14	8
Spain	13	15	13	12	14	15	13	16	15	14
Portugal	19	18	18	14	19	20	18	17	21	19
Romania	13	18	19	17	16	15	15	16	16	17
Turkiye	20	24	22	21	23	18	17	22	21	19
Cesky	8	9	9	6	10	13	11	10	11	3

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 10 of the information contained therein.

Total	85	100	96	81	98	99	87	97	98	80

When asked about the learning methodology, the three practices that were most requested are "Practical hands-on projects", "Online courses/videos" and "Workshops and seminars".

How do you prefer to learn about smart cities and sustainable urban planning						
	Practical hands-on projects	Interactive webinars	Self-paced study materials (e.g., books, articles)	Online courses/videos	Workshops and seminars	Other
Italy	12	7	6	18	6	0
Spain	12	4	3	10	6	1
Portugal	15	7	7	14	11	0
Romania	13	9	6	6	18	0
Turkiye	13	9	9	15	18	0
Cesky	12	3	11	8	10	0
Total	77	39	42	71	69	1

Youngsters were also questioned about the challenges they perceive students may face when trying to acquire the aforementioned competencies. Most respondents agree that the main difficulties are "Insufficient support from educational institutions", "Lack of mentorship or guidance from experts in the field", and "Limited access to relevant courses or educational resources".

What do you perceive as the main challenges students face in acquiring these kinds of competencies?						
	Lack of mentorship or guidance from experts in the	Insufficient support from educational institutions	Limited access to relevant courses or educational	Time constraints due to academic workload	Financial constraints	Other

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

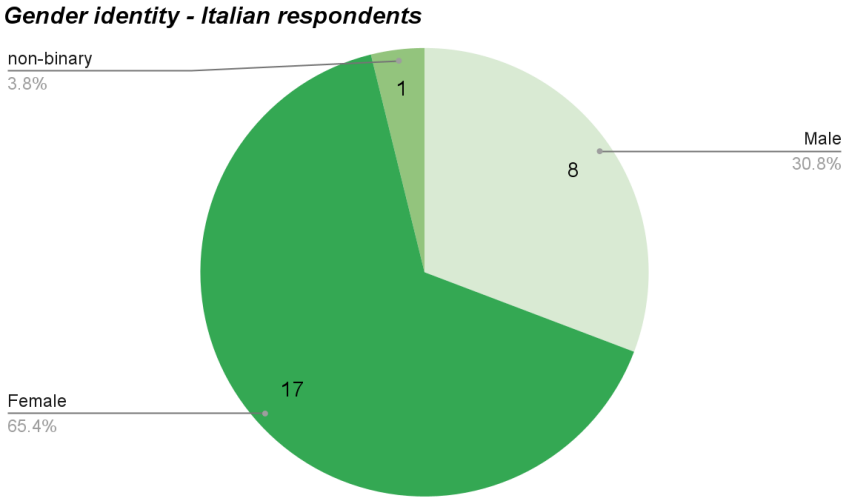
	field		resources			
Italy	12	18	12	13	11	1
Spain	15	13	10	10	7	0
Portugal	11	11	13	14	7	0
Romania	10	15	13	14	11	0
Turkiye	16	11	13	11	12	0
Cesky	14	11	12	7	7	0
Total	78	79	73	69	55	1

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 12 of the information contained therein.

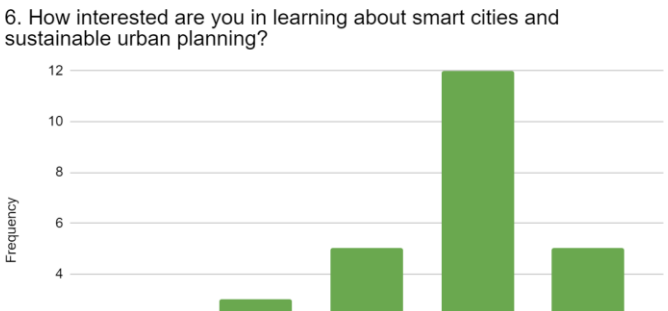
Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

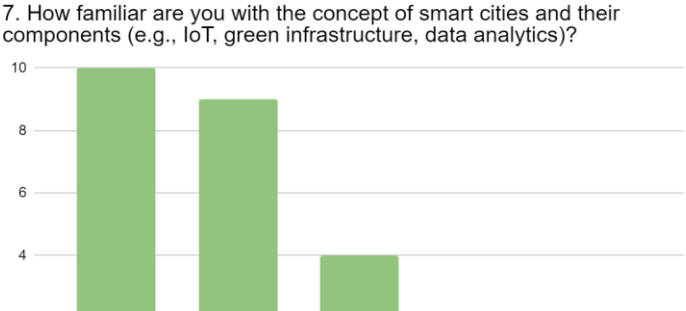
Italy

The total number of respondents from Italy is 27, with a majority being women (18 out of 27), followed by men (8 out of 27), with only one person identifying as non-binary. The age range goes from 16 to 40, the average age is 25,3, the median age is 27 and the most frequent age (mode) is 28.

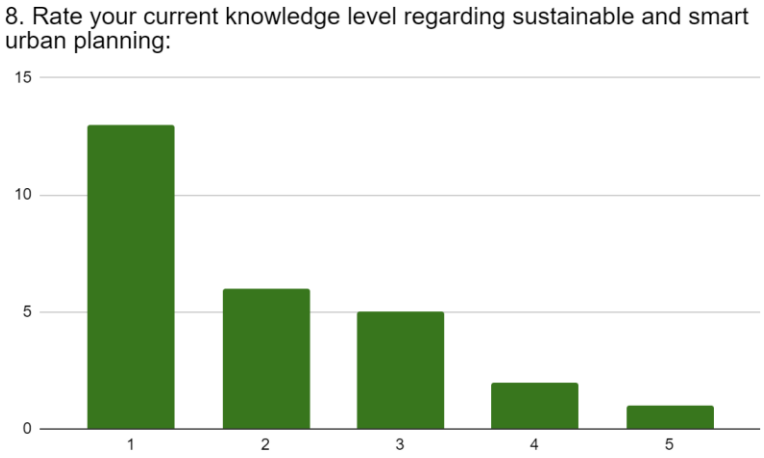


Italian youngsters' interest in learning about smart cities and sustainable urban planning (Q. 6) can be considered quite high as 5 people are somewhat interested, 12 are very interested and 5 are extremely interested, reaching a total number of 22 respondents out of 27 with an interest in learning about the topic at hand. The high interest may be correlated to the lack of familiarity with the concept of smart cities and their components (e.g., IoT, green infrastructure, data analytics (Q. 7). Most respondents (19 out of 27), as is evident in the following graphs, are not familiar with the concept of smart cities or their components.





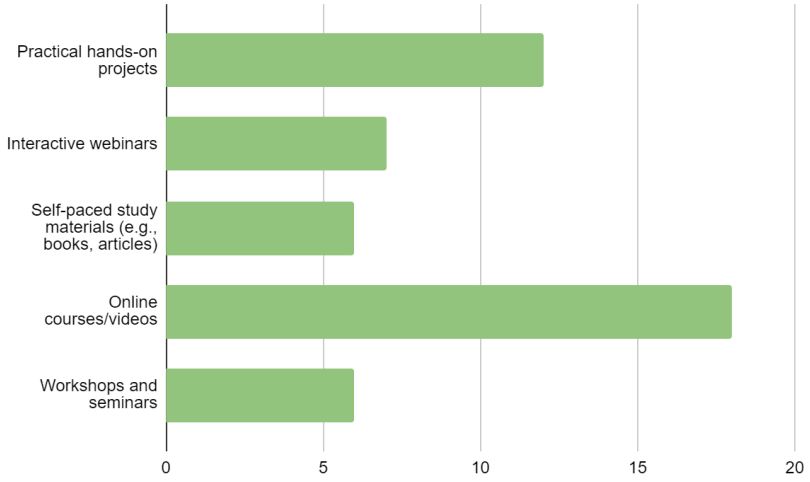
The results of question n. 8 were similar to those of the previous one. The current knowledge regarding sustainable and smart urban planning is quite low, as 19 out of 27 of them have either low knowledge or know nothing at all.



Question n. 9 asks to rate how important the respondent considers acquiring specific skills and/or knowledge; considering its structure, a multitude of sub-questions are related to this main question. The skills/knowledge Italian youngsters rated high ("Extremely important" and "Very important") are, in the order of importance, "Knowledge of sustainable transportation systems" (with 11 respondents considering it "extremely important" and 7 "very important"), followed by "Familiarity with green infrastructure solutions" (with 8 "extremely important" and 8 "very important"), "Proficiency in sustainable development principles" (with 8 "extremely important"

and 8 “very important”), “Understanding of social equity and inclusion” (with 8 “extremely important” and 8 “very important”), “Cultural competency and understanding of diversity” (9 “extremely important” and 5 “very important”), and, lastly, “Skills in community engagement and stakeholder dialogue” (6 “extremely important” and 9 “very important”). The topics that respondents considered of moderate importance are “Leadership and advocacy skills” (10 “Moderately important”), “Ability to analyze and interpret urban data” (9 “Moderately important”), and “Capacity for interdisciplinary collaboration” (9 “Moderately important”).
Only one was rated with a lower degree of importance (“slightly important” and “not important) and it is “Knowledge of urban planning principles” (7 “Slightly important” and 2 “Not important”).

Question n.10 was about the learning preferences, from the options provided, and youngsters were free to choose multiple learning methods. Most Italian respondents were interested in online courses/videos (18), followed by practical hands-on projects (12).

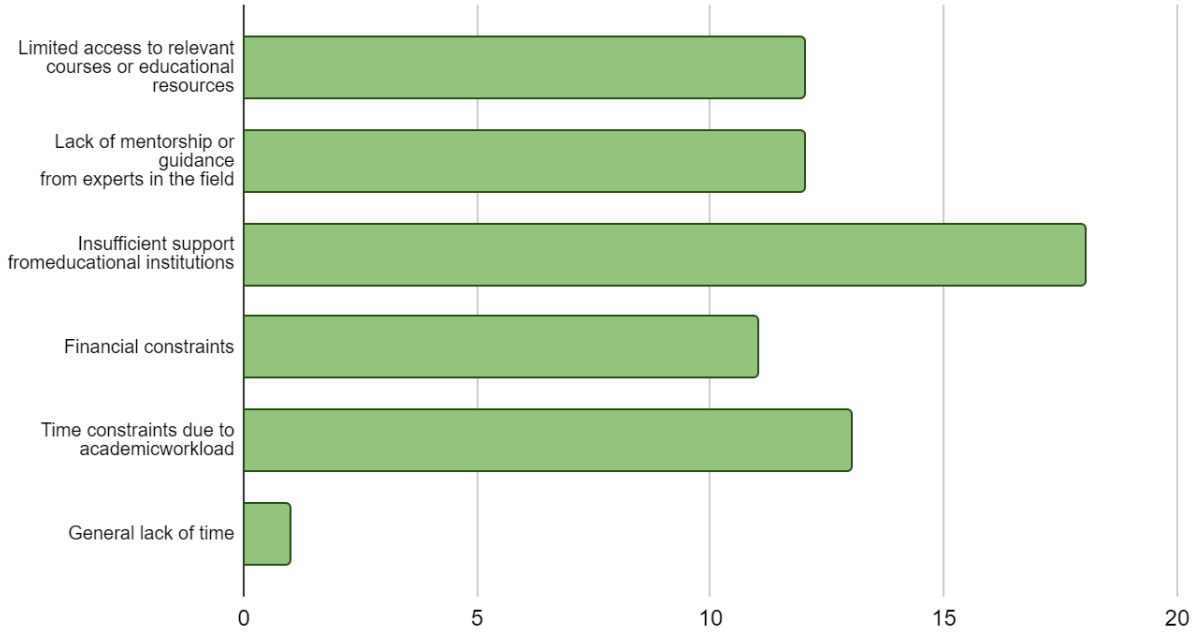


The last section of the survey contains open-ended questions. Question n. 11 about youngsters' contribution to planning green and sustainable cities had varied outcomes, despite most respondents agreeing that it could be through projects (including school projects for high-

schoolers). One respondent answered that young people should only be informed of sustainable policies but it is an institutional job to be proactive in this field. Three responses were about participation and how institutions should incentivize and promote youth participation.

Question 12 asked how youngsters like to actively engage in projects or initiatives related to smart and sustainable urban planning. The reception could have been more varied as some respondents seemed unsure of how to become involved in this matter. Other answers were on active participation in specific projects.

The last survey question was on the challenges students and young people may face to acquire the above-mentioned skills or knowledge.



As evident from the graph above, the main challenge is the insufficient support from educational institutions and time constraints due to academic workload. Nonetheless, limited access to relevant courses or educational resources, a lack of mentorship/guidance, and financial constraints are also extremely relevant challenges that should not be overlooked.

Co-funded by the
Erasmus+ Programme
of the European Union

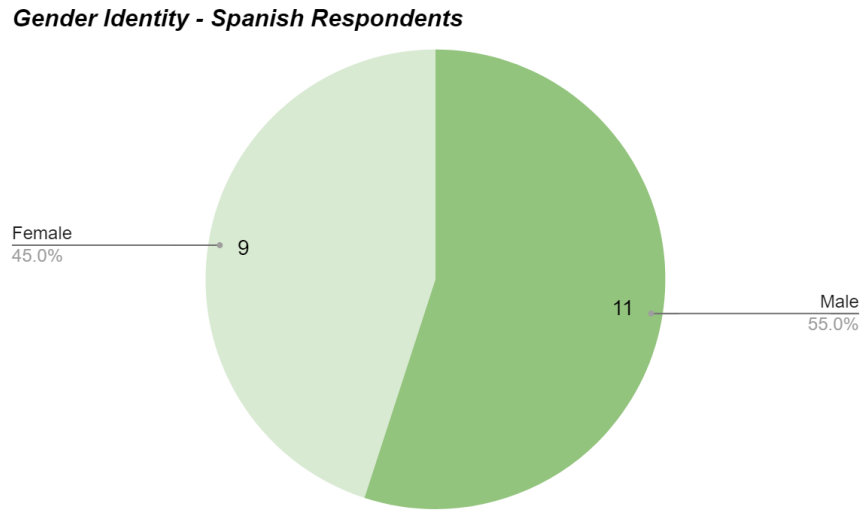
Youth &
THE CITY

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

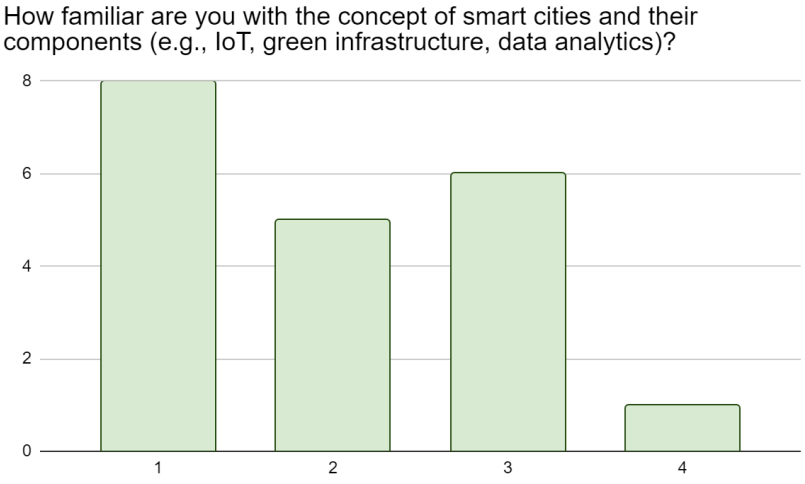
Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Spain

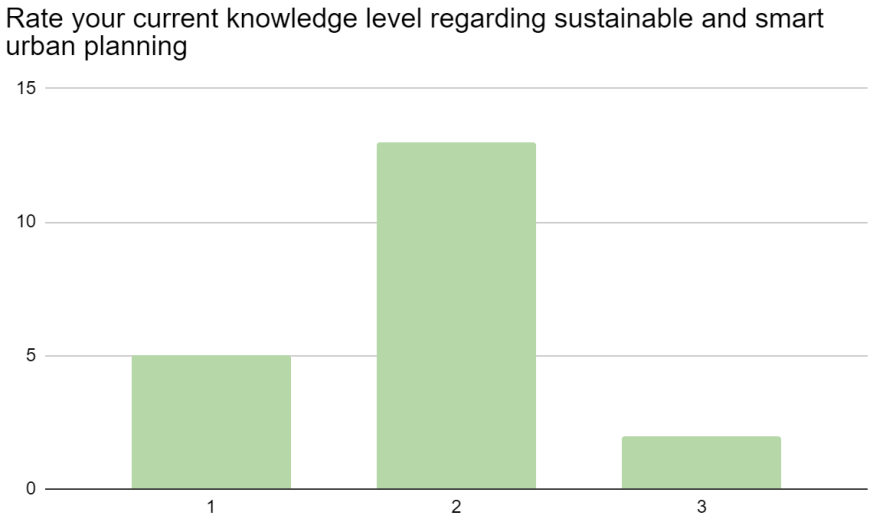
The Spanish interviewees were 20, with a slight majority of them being male (11). The age range goes from 18 to 25, with the median age being 22 and the average age 21,55.



The interest in learning about smart cities and sustainable urban planning (Q. 6) for Spanish youngsters is fairly positive: two people are extremely interested, six are very interested and nine are somewhat interested. On the familiarity with the topic (Q.7), 65% of respondents have declared being either unfamiliar or not particularly familiar.



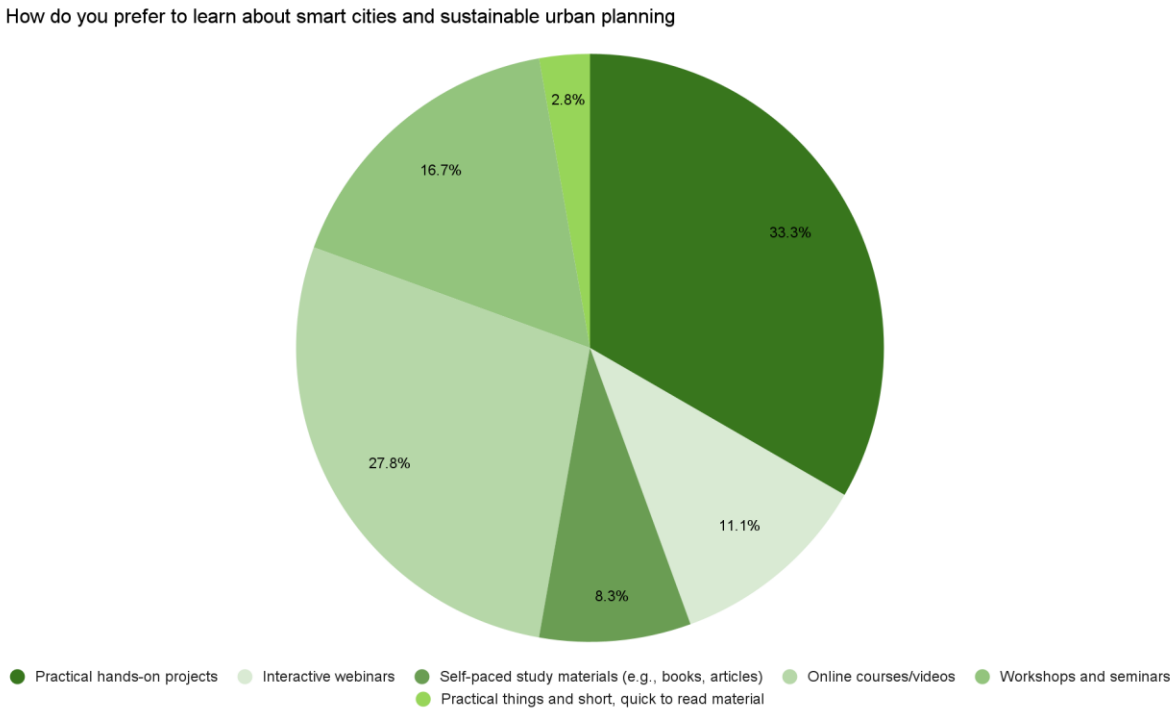
The current knowledge of the interviewees about smart cities is rather low as 18 out of 20 expressed knowing either little (13) or nothing (5) about the topic at hand.



When asked to rate the importance of acquiring specific skills and knowledge to be able to contribute to the urban planning of one's city, "Understanding of social equity and inclusion" received the most "Extremely important" (11) out of all skills/knowledge. Other skills/knowledge that Spanish youngsters rated high ("Extremely important" and "very important) are "Proficiency in sustainable development principles" (10 "Very Important" and 6 "Extremely important"), "Cultural competency and understanding of diversity" (10 "Very important" and 5 "Extremely important"), "Knowledge of sustainable transportation systems" (8 "Very important" and 7 ("Extremely important), followed by "Familiarity with green infrastructure solutions (8 "Extremely important" and 6 "Very Important") and "Leadership and advocacy skills" (8 "Extremely important" and 6 "Very important"). Other skills/knowledge that Spanish respondents

rated with a lower degree of importance are "Urban planning principles" (10 "Very important" and 3 "Extremely important"), "community engagement and stakeholder dialogue" (8 "Very important" and 5 "Extremely important"), "Capacity for interdisciplinary collaboration" (8 "Very important" and 5 "Extremely important"), and, lastly, the "ability to analyze and interpret urban data" (7 "Very important" and 5 "Extremely important").
None of the skills/knowledge presented to the interviewees was perceived as not important.

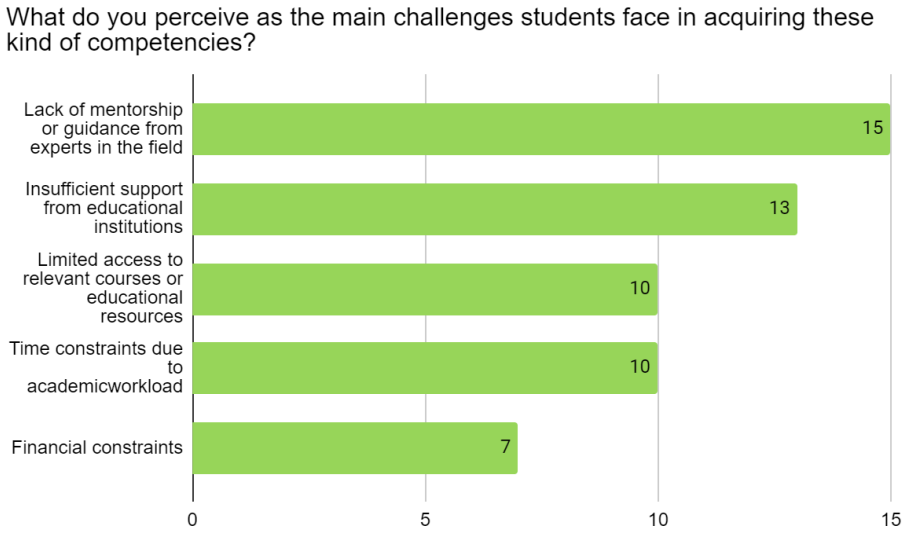
Once asked about their learning methodology preferences, most Spanish youngsters revealed that they prefer practical hands-on projects (33,3%) and online courses/videos (27,8%). A small number of them are more inclined to learn through workshops and seminars (16,7%), but an even smaller number prefer interactive webinars (11,1%) and self-paced study materials (8,3%). Only one person chose "Practical things and short, quick-to-read material".



Questions 11 and 12 are open-ended; the first one asks, in general, what young people can do to contribute to planning green and sustainable cities, and the latter asks, specifically to the interviewees, what they are willing to do to actively engage in projects or initiatives related to smart and sustainable urban planning. On question 11, most interviewees agreed that awareness is fundamental. In contrast, other interesting inputs were about allowing young people to express and share their ideas through MUNs (Model United Nations) or other channels. One respondent suggested that youngsters should be "proposing innovative ideas without a scientific basis that can then be adapted by specialists".

On a more practical, and personal, level, when answering question n. 12, most interviewees were inclined to join projects, to various degrees, and some wanted a channel to share their ideas with their local government.

The main challenge the group of respondents faces is a lack of proper mentorship or guidance from experts in the field (75%), followed by insufficient support from educational institutions (65%), limited access to relevant courses or educational resources (50%) and time constraints due to academic workload (50%). Only 35% of the group sees financial constraints as a challenge.

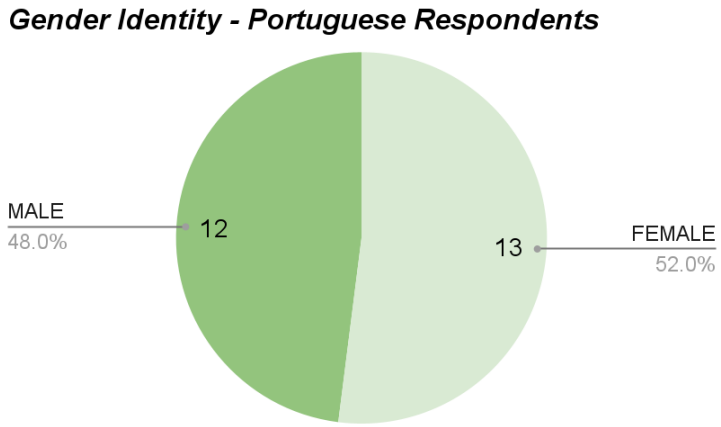


Lastly, Spanish respondents believe that, whenever the time comes, they can adapt the acquired knowledge to their professional endeavors.

Portugal

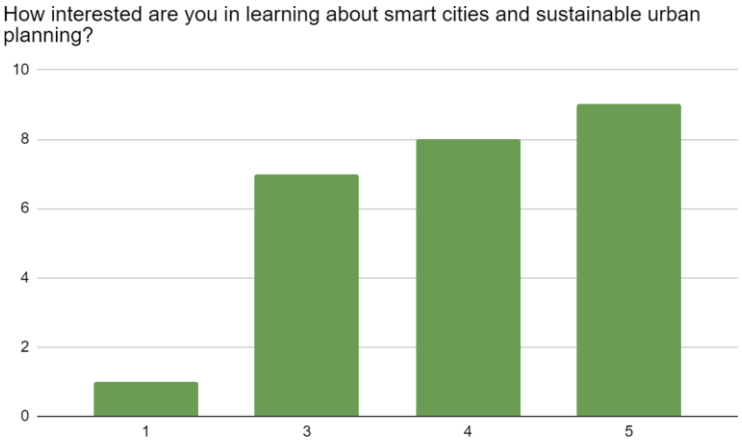
The Portuguese group counts a total of 25 interviewees, and it is composed of a female majority (52%). The average age is 19,92, the median age is 19 and the most frequent age is 18. The youngest persons in this group are 17, the oldest is 25.

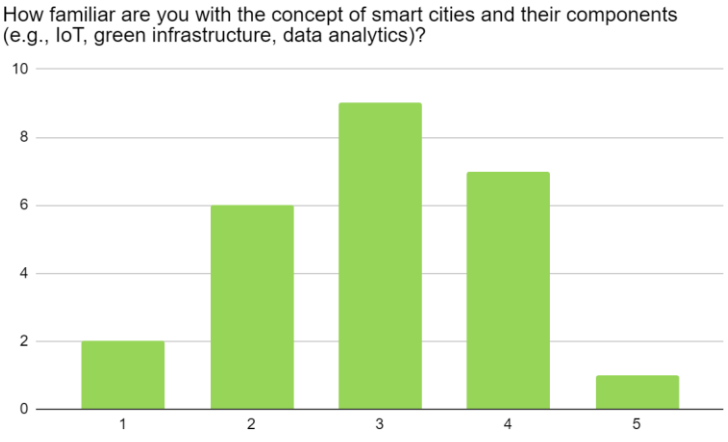
Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426



Portuguese respondents have rated their interest in learning about smart cities and sustainable urban planning positively, as the chart below shows. 9 youngsters out of 25 were "Extremely interested", 8 were "Very interested" and 7 have declared a moderate interest in the matter.

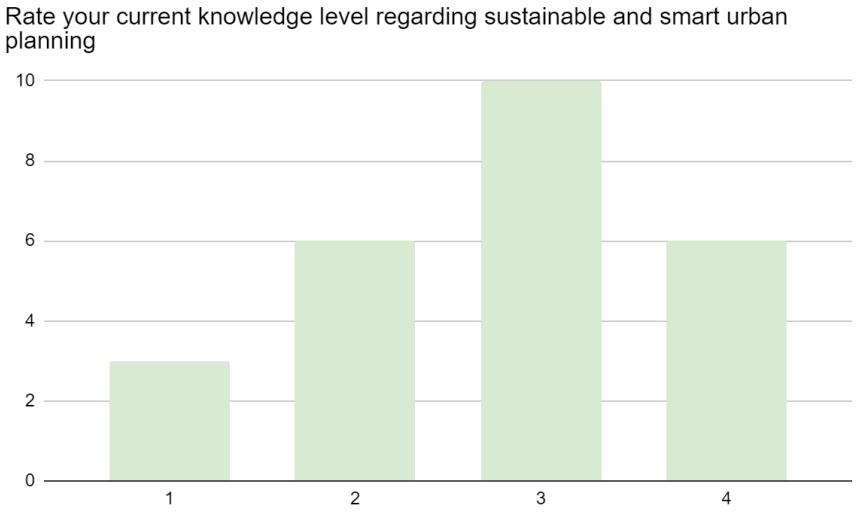
On familiarity with the topic, Portuguese interviewees are among the ones who rated a high level of knowledge of smart cities compared to the overall international body of interviewees. 7 respondents were very familiar, 9 were moderately familiar and one was extremely familiar with the concept of smart cities and its components.





Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 23 of the information contained therein.

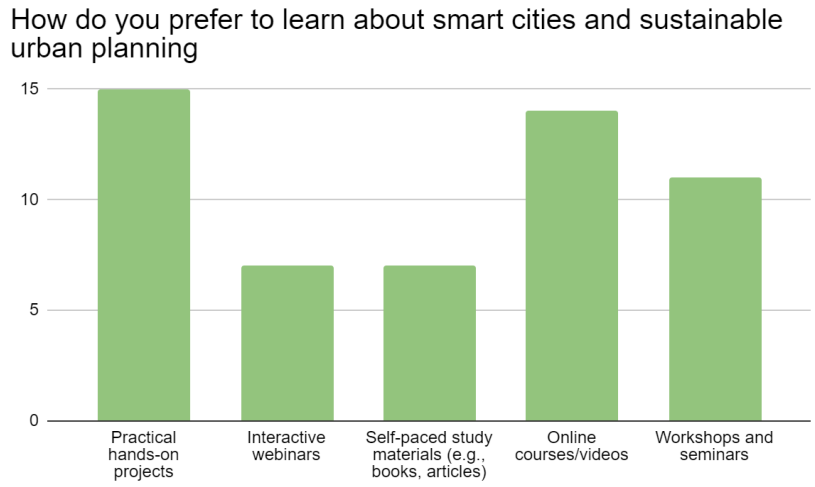
Question n. 8, where respondents were asked to rate their current knowledge level regarding sustainable and smart urban planning, has received similar answers as question n. 7. Most respondents (16 out of 25) have rated either an intermediate (10 respondents) or higher (6 respondents) level of knowledge on the matter.



On question n. 9 about rating the importance of acquiring specific skills and knowledge to be able to contribute to their cities' urban planning, on average Portuguese respondents have rated "extremely important" most of the proposed topics. The topic that has been rated "Extremely important" by most has been "Knowledge of sustainable transportation systems with 14 "Extremely important" and 6 "Very important". "Cultural competency and understanding of diversity" is another one of the highest rated in order of importance with 13 "Extremely important" and 8 "Very important", followed by "Leadership and advocacy skills" received 13 "Extremely important" and 6 "Very important" and "Understanding of social equity and inclusion" with 13 "Extremely important" and 5 "Very important". Skills and knowledge with slightly lower ratings were "Proficiency in sustainable development principles" with 12 "Extremely important" and 5 "Very important", "Skills in community engagement and stakeholder dialogue" with 11

"Extremely important" and 5 "Very important", "Familiarity with green infrastructure solutions" with 10 "Extremely important" and 9 "Very important", "Capacity for interdisciplinary collaboration" with 10 "Extremely important and 8 "Very important". Lastly, the ones that received lower ratings were "Knowledge of urban planning principles" with 8 "Extremely important" and 11 "Very important", and "Ability to analyze and interpret urban data" with 10 "Extremely important" and 4 "Very important".

After rating, in order of importance, subjects that might be included in the MOOC curriculum on smart cities, Portuguese respondents were asked about some learning methodologies that they would prefer (they had the chance to choose multiple answers). Most youngsters would prefer "Practical hands-on projects" and "Online courses/videos"; however, workshops and seminars were also a moderately chosen method, whereas "Interactive webinars" and "Self-paced study materials (e.g., books, articles)" were the least preferred learning methods.

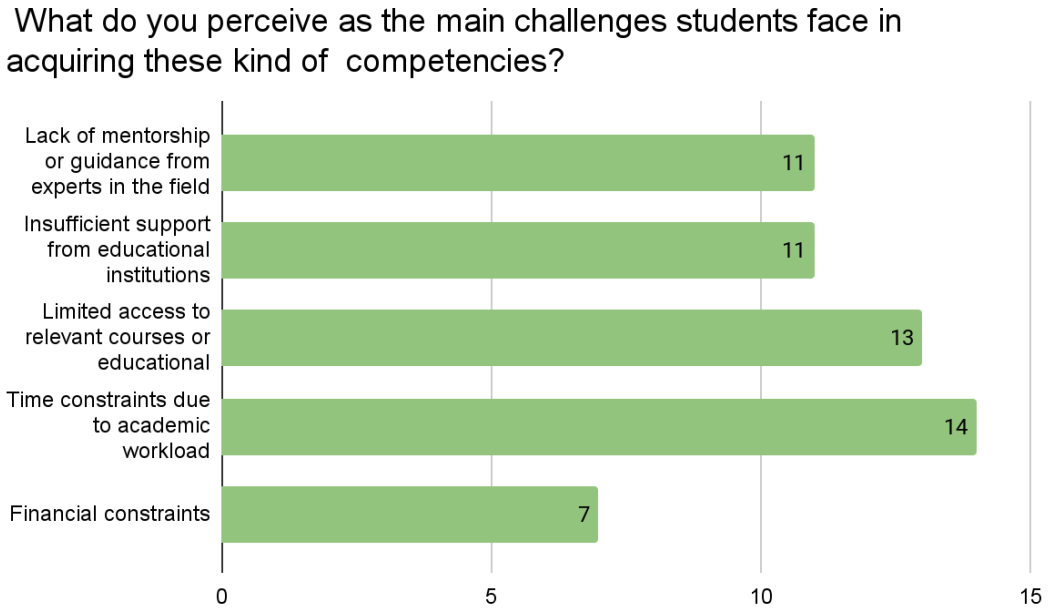


On the first open question (Q.11), about how young people can contribute to planning green and sustainable cities, a recurring theme for Portuguese young respondents has been being digital

natives and using such advantage to teach older generations, spread awareness through social media (as well as other offline media), and by being more proactive.

When asked about how they would like to contribute (Q.12), the most frequent answer was by raising awareness, declined in different forms. One respondent said that they "would like to organize training sessions, such as small meetings, to raise people's awareness of the issue of sustainable cities, as well as the adoption of more technological means". On the other hand, other respondents would love to be aware of workshops or seminars on the topic so that they can be informed on what is going on around them before deciding in what way they want to participate. However, around 7 individuals have either abstained from answering or admitted to not knowing how to contribute and engage in initiatives related to smart city and/or urban planning.

According to the Portuguese group of interviewees, the perceived challenges (Q.13) in acquiring the aforementioned skills are attributed mainly to time constraints due to academic workload and limited access to relevant courses or educational resources. However, "lack of mentorship or guidance from experts in the field" and "insufficient support from educational institutions" also play an important role. "Financial constraints" appear to be an issue only for 7 respondents out of 25.

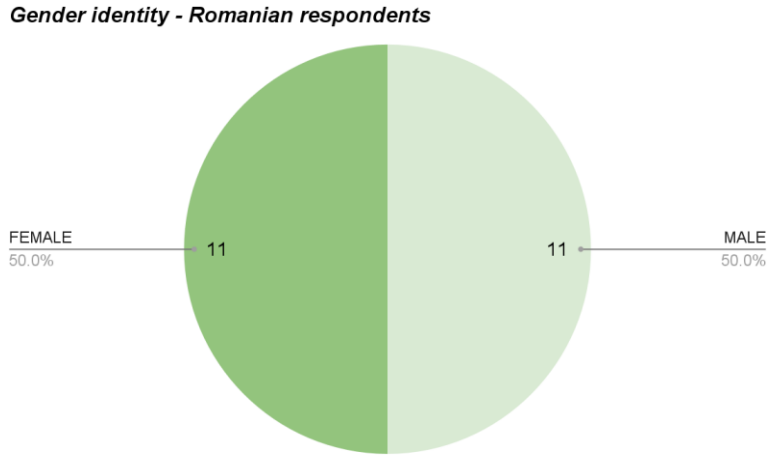


The last question on how the respondents envision themselves utilizing the acquired knowledge and skills in smart and sustainable urban planning in their future careers or endeavors received similar responses as the previous questions. Most youngsters believe that awareness is key and that is one element that they are keeping, others are unsure about the actual impact on their future lives and careers. One respondent stated that "through the redefinition of digital transition processes and through small changes in day-to-day behavior, which allow for resource savings and more efficient management", another respondent was more interested in "integrated conservation (with cultural heritage, environmental, social and economic) in projects of urban planning and heritage safeguard".

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

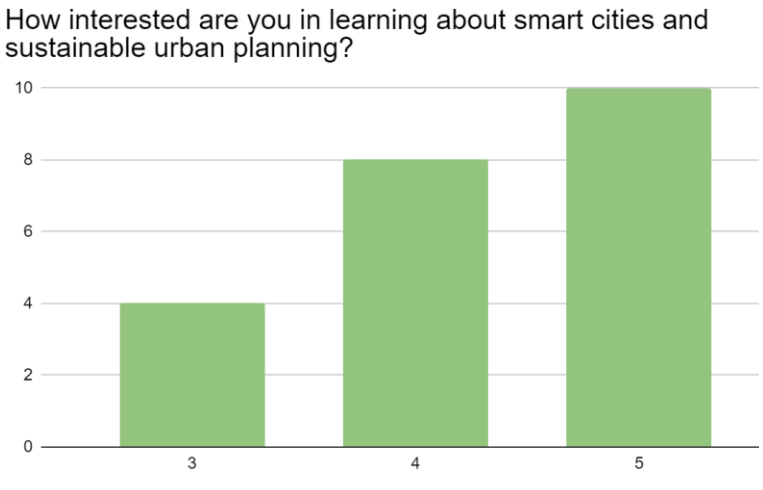
Romania

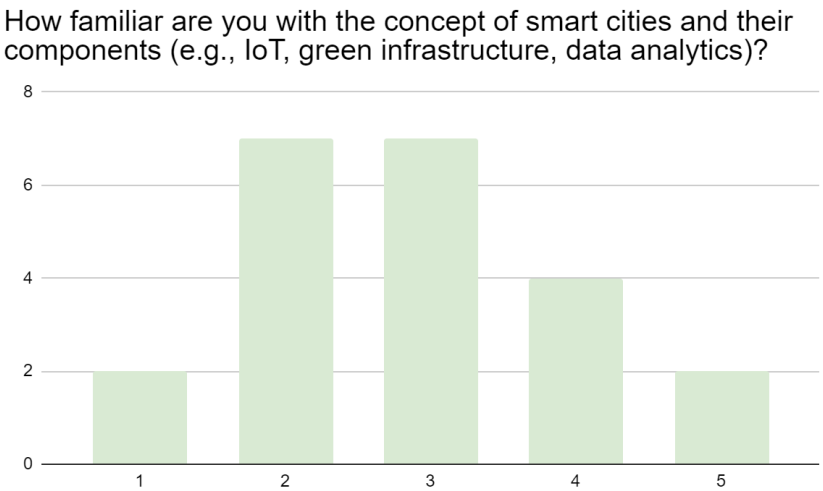
Romanian interviewees' gender is equally distributed as there are exactly 11 male respondents and 11 female respondents. The most frequent age of the body is 16, the median age is 17 and the average age is 17,86. The age range of the group is from 15 to 31.



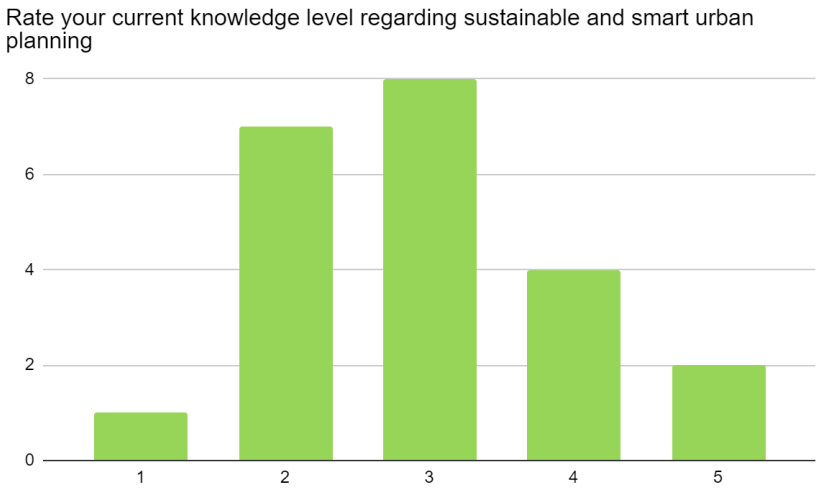
The body of young interviewees responded positively to the question on rating their interest in learning about smart cities and sustainable urban planning as 10 of them rated it as "Extremely interested", 8 of them "Very interested" and 4 of them "Moderately interested". No one was "Not interested" or "Slightly interested".

Despite the high interest level, most had a very low familiarity with the topic of smart cities and their components, as evident from the chart below.





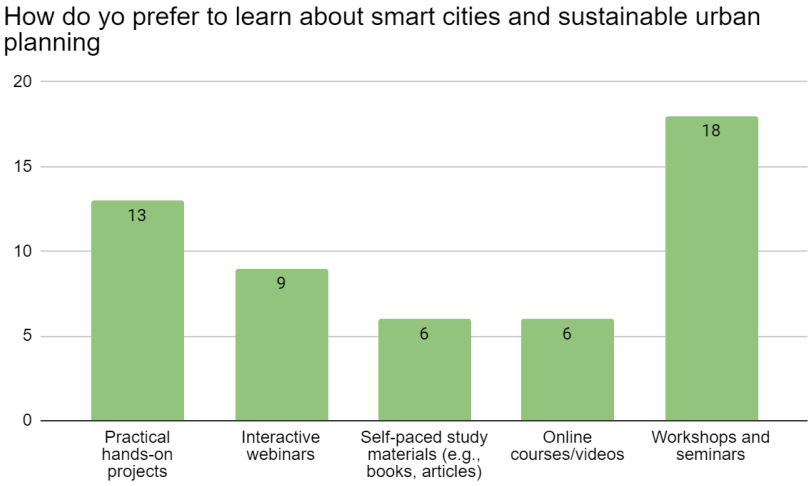
Similar to the previous response, the respondents' current knowledge level of sustainable and smart urban planning is not the highest. Only 6 individuals are highly knowledgeable on the topic, 8 have regular knowledge, and 8 have low (or no) knowledge of sustainable and smart urban planning.



When asked to rate skills and knowledge that they consider important to contribute to the urban planning of their city, Romanian respondents rated "Skills in community engagement and stakeholder dialogue" the highest with 15 "Extremely important" and 4 "Very important". In order of importance rating, we can find in the top "Understanding of social equity and inclusion" 14 "Extremely important" and 4 "Very important", "Leadership and advocacy skills" with 14 "Extremely important" and 3 "Very important", and "Cultural competency and understanding of diversity" with 14 "Extremely important" and 2 "Very important". Then, with mid-tier ratings, we can find "Knowledge of sustainable transportation systems" and "Capacity for interdisciplinary

collaboration" both with 9 "Extremely important" and 6 "Very important", followed by "Ability to analyze and interpret urban data" with 8 "Extremely important" and 9 "Very important", and "Proficiency in sustainable development principles" with 8 "Extremely important" and 8"Very important". Lastly, "Knowledge of urban planning principles" and "Familiarity with green infrastructure solutions" received the lowest ratings of "Extremely important" (just 6), the first received 7 "Very important" and the latter 10 "Very important".

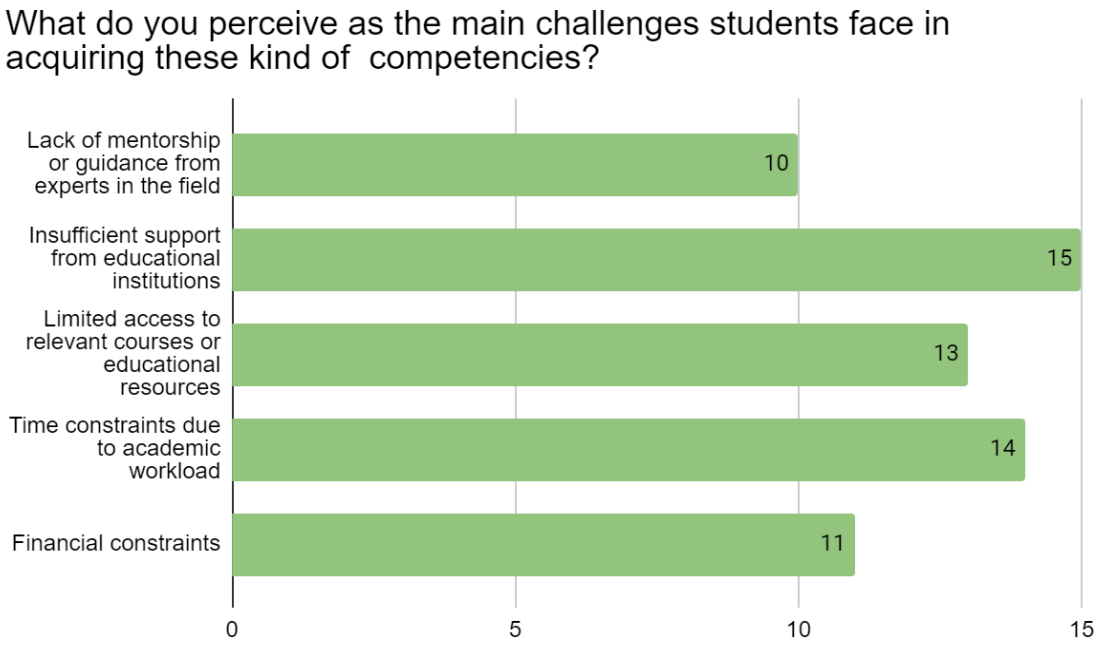
The preferred learning methodology of Romanian respondents' is without a doubt "Workshops and seminars", followed by "Practical hands-on projects".



The recurring theme on the first open question (Q.11), about how young people can contribute to planning green and sustainable cities, was learning and putting into practice what youngsters learn about these topics. Some respondents were more into active contribution, one, in particular, responded: "by planting flowers/trees, by cleaning parks, by using public transport".

When specifically asked in what ways they would like to actively engage (Q.12), the most frequent theme of Romanian respondents is that they want to be included in projects, seminars, or workshops on the matter, and help by volunteering, brainstorming ideas, or by giving some general support.

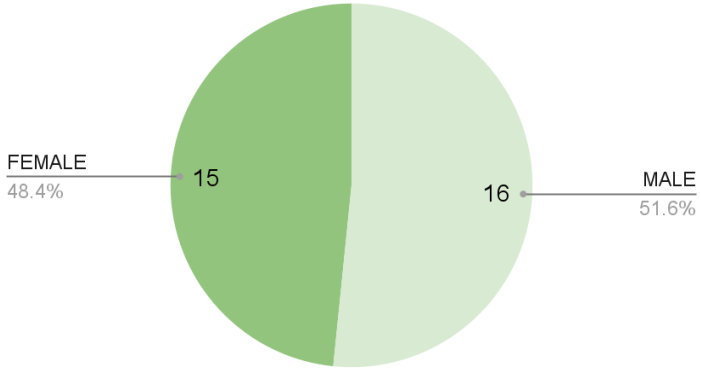
When asked about the main challenges students face in acquiring the above mentioned competencies (Q.13), most respondents blamed it on insufficient support from educational institutions, time constraints due to academic workload, as well as limited access to relevant courses or educational resources.



Türkiye

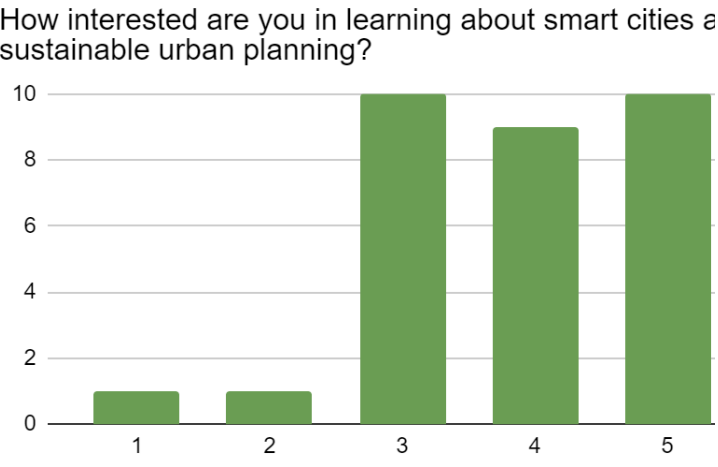
Turkish youngsters are the highest body of interviewees, with a total of 31 respondents: 16 male and 15 female. The youngest respondent is 13 and the oldest is 22; the average age is 17,6, the median age is 17 and the most frequent (mode) age is 15.

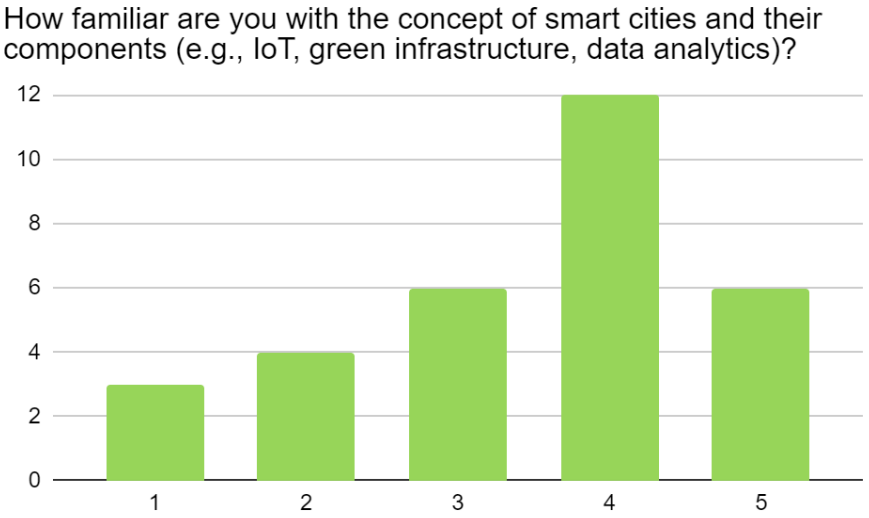
Gender Identity - Turkish Respondents



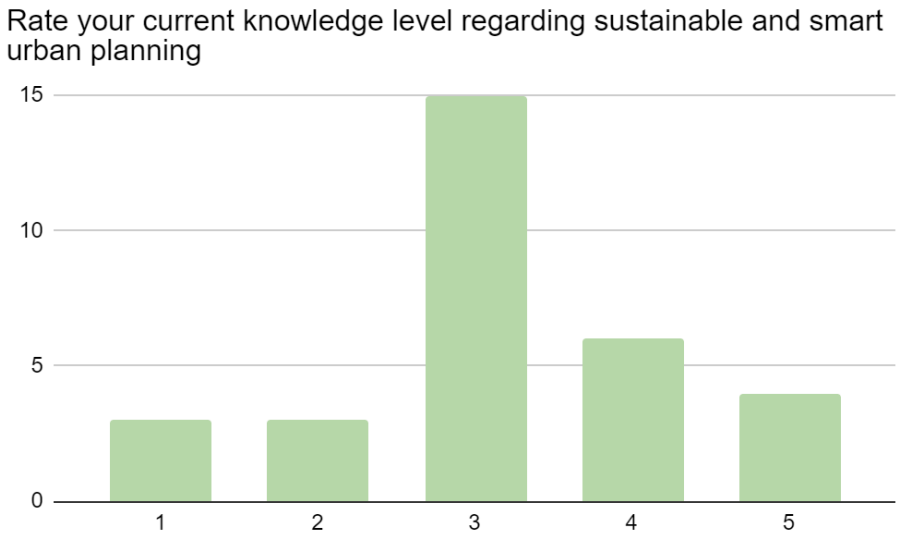
29 out of 31 respondents have a high interest in learning about smart cities and sustainable urban planning as is clear in the chart below.

This body of interviewees has a high familiarity with the concept of smart cities and their components (e.g., IoT, green infrastructure, data analytics) as 25 out of 31 respondents have self-assessed mid to high familiarity.





Turkish respondents have clearly shown a moderate to high level of knowledge of sustainable and smart urban planning as 15 out of 31 interviewees declared having a moderate knowledge, 6 have a high level of knowledge and 4 rated the maximum level of knowledge.



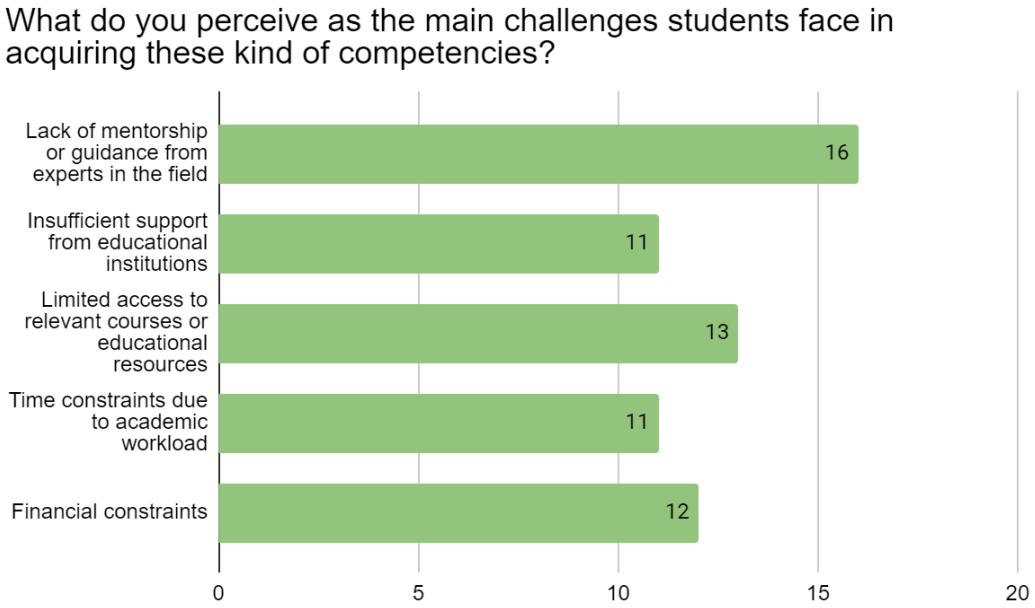
"Cultural competency and understanding of diversity" is what the group of Turkish interviewees rated highest in the needed competencies to contribute to their cities' urban planning, with 16 "Extremely important" and 5 "Very important". "Leadership and advocacy skills" also placed quite high with 15 "Extremely important" and 4 "Very important, followed by "Understanding of social equity and inclusion" with 13 "Extremely important" and 11 "Very important", and "Ability to analyze and interpret urban data" with 12 "Extremely important" and 9 "Very important". Other competencies that were rated mid to low importance are "Proficiency in sustainable development principles" with 11"Extremely important" and 11 "Very important", "Familiarity with green infrastructure solutions" with 10 "Extremely important" and 13 "Very important", "Capacity for interdisciplinary collaboration" with 10 "Extremely important" and 7 "Very important", "Skills in community engagement and stakeholder dialogue" with 9 "Extremely important" and 13 "Very important", and "Knowledge of sustainable transportation systems" with 9 "Extremely important" and 9 "Very important". The lowest rated one is "Knowledge of urban planning principles" with 7 "Extremely important" and 13 "Very important".

The first open question on how young people can contribute to planning green and sustainable cities (Q.11) received interesting and creative answers. The recurring theme for the Turkish respondents is idea contribution, which is only possible if there are ways for youngsters to express themselves. One respondent suggests conferences like MUNs (Model United Nations), in which young people can creatively contribute to policy-making.

When asked how they would actively engage in projects or initiatives related to smart and sustainable urban planning (Q.12), respondents' answers were in line with what they stated in the previous question. Most respondents are interested in being included in projects, workshops, or meetings and sharing their ideas.

The main challenge perceived by Turkish interviewees (Q.13) is "Lack of mentorship or guidance from experts in the field", followed by "Limited access to relevant courses or educational resources

and "Financial constraints". "Insufficient support from educational institutions" and "Time constraints due to academic workload" also received a high rating as a perceived challenge.

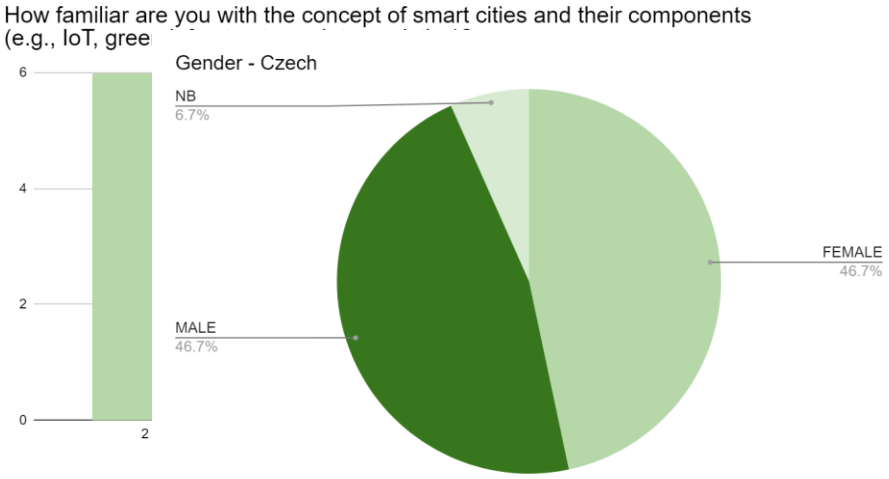


The most frequent answer to the last question (Q.14) is that sustainability is now in different fields of life, which means they can incorporate what they might learn into their future career regardless of which one it will be. However, only some are sure how to implement the skills and knowledge mentioned above in their daily lives.

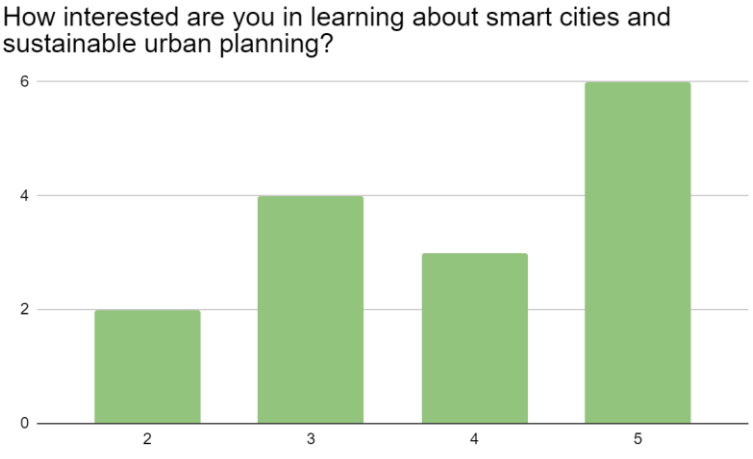
Czechia

Czech youngsters were the body of interviewees with the least amount of participants as only 15 respondents were recorded. Of the 15 respondents, 7 identify as male, 7 as female, and one as non-binary. The average age is 20,6, the most represented age is 18, and the median age is 20. The youngest respondent is 18, the oldest is 25.

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

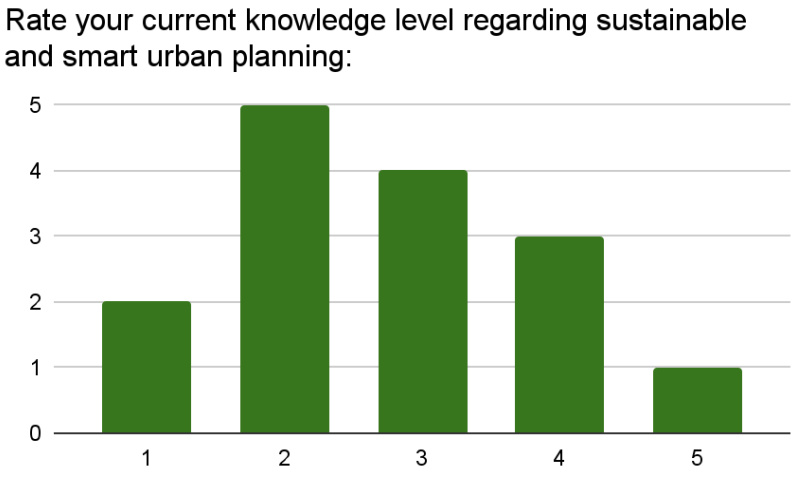


Most Czech interviewees (9 out of the 15) responded positively to learning about smart cities and sustainable urban planning. However, when asked about their familiarity with the topic at hand, only a handful declared having familiarity with the issue, whereas, the vast majority (10 out of 15) expressed little to moderate familiarity.



Youth & the City – This project has been funded with support fr
views only of the author, and the Commission cannot be held re
of the information contained therein.

The current knowledge level on sustainable and smart urban planning for Czech youngsters can be considered overall moderate as 5 (out of 15 total) declared having lower knowledge of the issue, 2 declared having no knowledge on sustainable and smart urban planning, and 4 declared having moderate knowledge.



Czech youngsters rated as the most important piece of knowledge to acquire in order to contribute to the urban planning of their cities "Knowledge of sustainable transportation systems" with 13 positive ratings (7 "Extremely important" and 6 "Very important"). Following, there is a tie between "Capacity for interdisciplinary collaboration" and "Cultural competency and understanding of diversity" with 11 respondents rating them of higher importance. More specifically, both measures received 9 "Extremely important" and 2 "Very important". On a scale of importance, "Familiarity with green infrastructure solutions" and "Proficiency in sustainable development principles" follow the previous skills and knowledge with a tie of 10, with 8 "Extremely important" and 2 "Very important" for the first and 6 "Extremely important" and 4

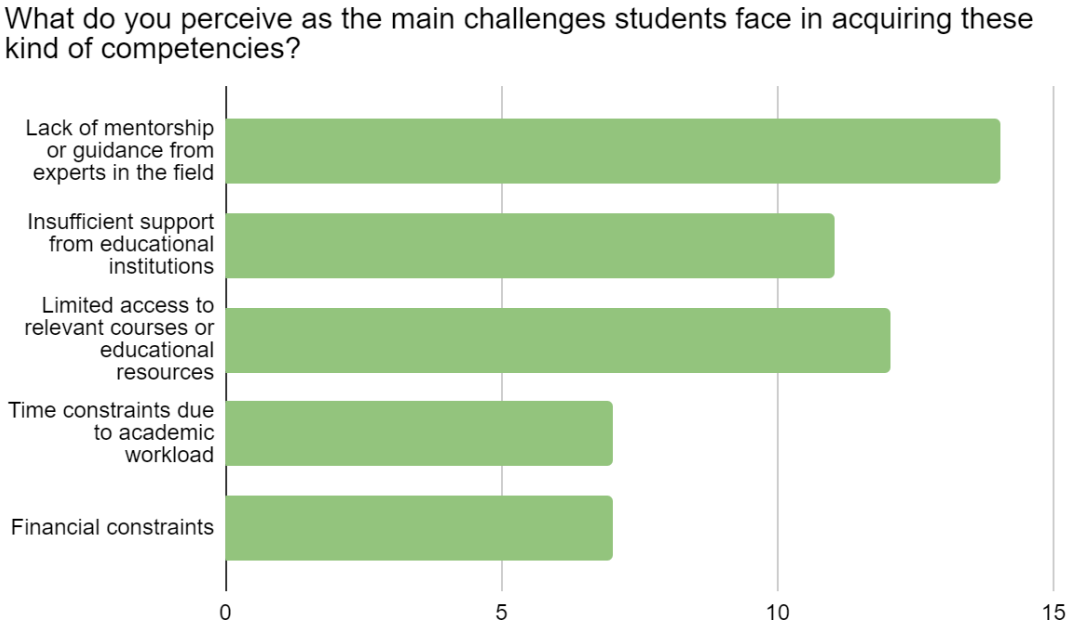
"Very important" for the latter. "Leadership and advocacy skills" has received the lowest ranking with 2 "Extremely important", 1 "Very important", 7 "Moderately important", 2 "Slightly important" and 3 respondents that defined it as "Not important".

When questioned about their preferred learning methodology, Czech youngsters' top 3 favorite educational methods were "Practical hands-on projects" with 12 respondents choosing such form of studying, closely followed by "Self-paced study materials" with 11 preferences, and "Workshop and seminars" with 10 preferences.

Czech young respondents believe young people can contribute to planning green and sustainable cities by raising awareness about the issue and by being actively involved in one's city "civic life". Similarly to other body of young respondents from other countries, Czech youngsters believe that they should be included in a a brainstorming process (many responses were about "giving ideas" or "opinions") through an institutional liason (one respondent specifically stated "through activities mediated primarily by schools, associations and also through various available activities promoted by the city", whereas others were believed it was a task that should be put forward by town halls/municipality).

Once the interviewees were asked about their own contributions and engagement in projects or initiatives related to smart and sustainable urban planning, most responded with a proactive sentiment; part of them wanted to learn more about the ways to actively contribute (also by being mentored by an expert in the field), others were interested in having a stronger connection with their municipalities so that they could be included in projects. Another interesting finding is that 3 out of 15 respondents did not know how they could personally contribute.
The main challenges that students might face in acquiring the aforementioned skills, according to Czech young interviewees, are "Lack of mentorship or guidance from experts in the field",

followed by "Limited access to relevant courses or educational resources" and "Insufficient support from educational institutions". The chart below explains in detail the number of respondents that indicated the specific statement on the perceived challenge.



Questionnaire for experts. Data Analysis

The total number of respondents is 10, and it is perfectly distributed by 2 respondents per country that is part of this research: Italy, Turkey, Czechia, Spain, and Portugal. Unfortunately, there was no contribution from Romanian experts in this survey.

6 of the experts work in an Environment-related field (i.e. ecology, waste management, etc.), 2 in a tech-related field (automation systems and control systems engineering), and of the 2 remaining experts, one works in Cultural Heritage, and the other is a science teacher.

As will be evident by reading the following paragraphs, most experts agree that younger generations should understand how to use AI and other emerging technologies as part of the course, as well as know how to use them for their personal knowledge.

Italy

The two Italian respondents have different professional backgrounds: an Ecology professor and an Architect specializing in Cultural Heritage.

Some of the key concepts that these two professionals believe young people should understand to fully appreciate the idea of Smart Cities (Q.1) are sustainability (e.g. green spaces, green mobility), connectivity, and citizen engagement. Similarly, they believe that the contents that should be included in a basic course aimed at youngsters on smart, sustainable, and inclusive urban planning (Q.2) are ecology, sustainable mobility, biodiversity, smart infrastructure (IoT applications and AI), and renewable energy solutions. Furthermore, one Italian expert suggests using case studies of existing smart cities to provide practical insights.

On a more pragmatic note, according to the two Italian experts, the skills that youngsters should acquire during the course (Q.3) should be to evaluate the effects of different management actions, and how to mitigate environmental impacts through the use of smart technologies.

Emerging technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and sustainable mobility (Q.4) should play an important role in the course, according to the experts, taking into account, however, how they integrate with our cultural heritage.

Question n. 5, on how the concept of environmental and social sustainability be integrated into the course, was met with an adamant answer from one of the experts that suggested that "the difference between environmental and social sustainability doesn't exist" as "sustainability is a concept that includes both of them". The other expert suggested using case studies and project-based learning, so that "young people can better understand these concepts in real-world scenarios".

Lastly, on the format or teaching methodology to be used for a course aimed to involve young people in the topic of smart cities actively, one of the experts proposed using "a blended learning approach, by combining interactive lectures, field visits, and workshops", whereas the other suggested using an interactive approach.

Spain

The two Spanish professionals work in the tech sector. One is the Head of Management and Automation Systems Department, whereas the other one is the Group Leader in Automation and Management Systems.

They believe that the key concepts that young people should understand to fully appreciate the concept of Smart Cities are energy resource management, atmospheric emissions control, mobility management, and real-time data management.

Due to their technical background, when asked what specific contents or topics they believe should be included in a basic course aimed to youngsters on smart, sustainable and inclusive urban planning, they replied that young people should be taught about control systems used in smart city

management, efficient lighting systems (e.g. smart lighting), computer applications for smart city management, and types of energy used in mobility (advantages and disadvantages).

According to one expert, when asked about practical skills that youngsters should acquire during the course, one of the fundamental points is to make young people aware of the existence of technologies and exploit their potential. The expert believes that the course should help them implement management systems for smart cities and recommends practical experience with simple programming environments, in order to understand the potential of new technologies (IoT, AI, etc.).

As might be expected, both experts agree that IoT, AI and other emerging technologies should play a key role in the course.

When asked how the concept of environmental and social sustainability could be integrated into the course, one expert replied that it could be done by "teaching the usefulness of the actions that the system takes to reduce the impact on the environment and improve the lives of citizens". The other expert believes that "each of the sources of energy production, storage and supply used for mobility, lighting, air conditioning, etc. must be analyzed", but by also making a pros and cons list "in terms of emissions, environmental impact, cost,".

Both experts agree on the format and teaching methodology of the course as they recommend having a practical part per each theoretical topic. One expert proposes that "small practices that allow children to understand how to manage a smart city should be considered. For example, create a model of a city in which lighting, traffic, etc. are managed with small IoT-based boards and simple programming environments such as Scratch".

Portugal

The two Portuguese experts are a Science teacher and the Secretary to the Environment Councillor of Gondomar's municipality.

Some key concepts that young people should understand to fully appreciate the concept of Smart Cities are Sustainability, mobility, environmental issues (i.e. environmental pollution, climate change), quality of life, and internet security.

Some of the course topics should also include concepts such as climate change, environmental pollution, mobility but also urban planning, and sustainable resource management.

Practical skills that young people should acquire during the course, according to Portuguese experts, are learning how to use the internet safely, especially when online shopping, refusing to buy unnecessary products. Nonetheless, youngsters should also grasp the project management life cycle and how to reduce their carbon footprint.

Both Portuguese experts agree that emerging technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and sustainable mobility play a "priority role", as "it is already the present and will be the future".

According to one expert, the concept of environmental and social sustainability could be a subject to the course; however, " students already study that concepts in science class".

On the format and teaching methodology, the two experts have different opinions. On the one hand, one expert suggests informal or non-formal education. On the other hand, the other expert believes that the course "could be created in the form of a project with a strong relationship with society" and with a multidisciplinary pool of professionals.

Lastly, when asked for any additional suggestions, the specialists suggested avoiding too much theory as we are overloaded with information on these topics every day, so it would be fundamental to "prioritize concrete cases and solutions". Furthermore, it is essential to show how smart cities can benefit citizens and what can be achieved through them.

Czechia

Both Czech experts are educators: one specialized in environmental education, the other in ecology education.

According to Czech specialists, the key concepts that young people should understand to fully appreciate the concept of smart cities are sustainability and how much smart cities impact our daily lives.

The specific contents and topics that the experts believe should be included in such a course are surface and water regime (water storage and retention in the landscape/city landscape), green roofs, and smart and sustainable solutions in our cities (waste management, smart infrastructure etc.).

As practical skills that young people should acquire by the end of the course, the Czech experts suggest being able to debate (as they need to learn how to present their great ideas), critical thinking, and problem-solving.

Emerging technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and sustainable mobility should play a key role as the tools are a practical way of "showing examples since not many people know about them or don't know how they work". One expert added that "new emerging technologies should not be scary" but we should put more emphasis on how much they are facilitating our daily life.

Environmental and social sustainability be integrated into the course by visiting or showing good practices of other cities. Another way to do so is through storytelling "and specific examples applied to our daily life".

Using an interactive and practical approach is the format/teaching methodology suggested by the two Czech experts. Furthermore, when asked if they wanted to add any suggestions, one expert recommended having trainings "based on good examples which already work".

Romania

No feedback was received from Romanian experts by June 1st.

Türkiye

The professional backgrounds of the Turkish experts are in Ecology and Environment Protection, and Environment and Waste Management.

Some of the key concepts that young people should understand to fully appreciate smart cities are sustainability (smart mobility, material efficiency, waste management), environmental awareness, and technology (e.g. artificial intelligence).

Contents that should be included in the course, according to Turkish experts, should be the implementation of green infrastructure, urban farming, public transportation, renewable energy sources, waste management, and water conservation.

Practical skills that young people should acquire during the course should be tech-oriented, specifically on the use of artificial intelligence, and how it applies to environmental issues.

Following up on the previous answer, Turkish experts agree that emerging technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and sustainable mobility should play a crucial role in the course as they are fundamental tools for understanding how smart cities work.

The Turkish experts believe that it is necessary to integrate the concept of environmental and social sustainability into the course as "sustainability is not only an investment in the well-being of the planet but also a testament to the enduring impact of education as a force for positive global transformation".

Lastly, when asked for advice on the course's most appropriate format or teaching approach, the Turkish specialists suggest integrating youngsters into the decision-making processes so that their needs and preferences are considered. In addition, a joint study with local governments (municipalities, provinces, or regions) should be considered, as well as a simulation of smart city management so that youngsters can better grasp what a smart city is and how it is managed.

Co-funded by the
Erasmus+ Programme
of the European Union

Youth &
THE CITY

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

Discussion and conclusion

As evident from the research, both youngsters and experts agree that the course should be focused on a more practical sphere, by giving young people the tools to understand smart cities and how they work truly. Experts underlined the importance of learning how to use AI and emerging technologies applied to sustainability to predict and improve efficiency in local governments and urban planning.

Moreover, a frequent need that emerged from the youngsters' survey was that younger generations want a seat at the table and they are asking to be heard by local governments and institutions. Youngsters from all surveyed countries expressed their necessity to be actively involved in the brainstorming as well as the decision-making processes.

An interesting finding is that the vast majority of experts agree that youngsters should be equipped with the right tech skills to face future life, especially if they want to work in urban planning, or if they want to just better understand smart cities.

Further research should be made on the subject matter with a larger body of youth interviewees and by giving more emphasis on whether the youngsters live in a capital, big city, medium-sized city, or a town. These pieces of information could give the research more insight into the specific needs of young people based on their place of origin.

PART B - Definition of the Training Program

Introduction

By analysing the results of the survey submitted to a sample of 140 young people from the organisations countries, it emerges that although their interest in the topic of smart cities and urban planning is quite high, their level of knowledge of the smart city concept and its main components, as well as their familiarity with the concept of urban planning, is on average low or very low. This result can also be explained considering the very young age group in which half of the survey participants fall (13-19 years) and who presumably will be the main beneficiaries and users of the educational resources that will be developed as part of this project.

These circumstances therefore indicate to us the need to develop training resources that are easily usable by a young audience that may lack any prior knowledge and therefore need to acquire the basics on the topics of smart cities and urban planning in a clear and concise manner. At the same time, an attempt can be made to modulate the didactic contents so as to provide a greater level of depth and complexity for any learners who are already familiar with these topics (e.g. first-year university students).

With respect to what should instead be the specific **learning objectives** of the project, some indications are given to us again through the survey submitted to the young people when they list what they consider to be the most relevant knowledge and skills for them to acquire among those suggested by the survey. It should be noted that although there are no very marked

differences in terms of preference between one skill and another (which makes us assume that almost all of them are considered useful and important), it is clear that apart from the more strictly technical ones, young people are very interested in the aspects of social inclusion and equity, community engagement and participation, and those cultural skills that enable them to bring into dialogue the cultural diversities that exist within a community.

The particular propensity for the aspects of **inclusion, participation** and **social equity** in relation to the topics of smart cities and urban planning that emerged through the young people's answers to the survey perfectly matches what were the original intentions of the organizations consortium with respect to the project, so we believe that the particular emphasis placed on human rather than merely technological aspects represent the peculiar perspective of this initiative and therefore particular emphasis will be placed on this in the development of the training resources.

With regard to the **teaching strategy** and the **format** that the educational resources developed through the project should have, we can highlight an alignment in the preferences and indications that emerged from both the survey submitted to the young people and the questionnaire addressed to subject matter experts. In fact, the young people ask for the theoretical parts to be reduced to a minimum, especially in the textual format, and prefer rather to be able to practice developing and implementing innovative solutions to the real problems their cities are facing, especially as a consequence of the effects of climate change. Alternatively, or in a complementary manner, they prefer the educational content to be conveyed via videos or in an interactive manner.

The experts on their side propose using “a blended learning approach, by combining interactive lectures, field visits, and workshops”, whereas others suggested using an interactive approach.

Another aspect that is highly emphasised by both the results of the survey conducted among young people and the questionnaire submitted to the experts is the importance of the role that emerging technologies such as **artificial intelligence (AI)** and the **internet of things (IoT)** should play in a course on smart cities and urban planning for young people. The theme of emerging technologies should be developed both as a learning point, with a possible in-depth study of the most common applications of artificial intelligence in the urban context, and as a tool to be used in the practice and implementation phase, including through the use of simple coding environments, as suggested by some experts.

The training course program and the learning objectives

On the basis of the preliminary research carried out by the partners and on the basis of the answers provided by our main target group through the survey, the partners agreed on a set of competences that will constitute the learning objectives of the Youth & the City learning experience. The competences include a broad spectrum of transversal but topic-relevant skills as well as more sector-specific ones.

For each competence or skill, the expected learning objective was identified using Bloom's Taxonomy (see table below):

Erasmus+ K2 Strategic Partnership
Project title: YOUTH & THE CITY
PROJECT No. 2023-1-CZ01-KA220-YOU-000166426

YOUTH & THE CITY PROJECT COMPETENCE TABLE	
SKILLS/COMPETENCES	**Skills descriptor and learning objective by Bloom's Taxonomy Levels**
I. TRANSVERSAL SKILLS	
1. Creative thinking	**Applying:** Use creative techniques like brainstorming or mind mapping to generate ideas.
2. Innovative thinking	**Applying:** Use creative techniques to generate new ideas for a problem. **Analyzing:** Break down the elements of successful innovations to understand them. **Evaluating:** Assess the feasibility and impact of new ideas or creative solutions. **Creating:** Invent novel ideas, products, or strategies that address real-world needs.

3. Critical thinking	**Applying:** Use critical thinking skills to solve problems or analyze situations in real-life contexts. **Analyzing:** Break down complex arguments or situations into their component parts to assess their structure and validity. **Evaluating:** Make judgments about the value, credibility, or effectiveness of an argument, theory, or solution based on criteria or standards. **Creating:** Generate new ideas, arguments, or solutions by synthesizing information and applying critical thinking skills.
4. Working in team	**Applying:** Use teamwork skills in real-world situations by participating actively in a group and contributing to collaborative tasks.
5. Problem Solving	**Applying:** Apply problem-solving techniques (e.g., flowcharts, decision trees) to tackle real-world issues**.**

6. Mobilizing others	**Applying:** Use techniques and strategies to influence and mobilize others in real-world contexts. Examples: · apply motivational techniques to inspire a group to take action on a project. · Use communication strategies to persuade stakeholders to support a cause or initiative. · Implement leadership techniques (e.g., setting clear goals, offering support) to mobilize a team toward achieving a shared objective.
7. Decision making	**Applying:** Use decision-making strategies and techniques in real-world situations. Examples: · Apply a decision-making framework (e.g., Pareto analysis, decision matrix) to solve a business or personal problem. · Use critical thinking to choose between several potential solutions to a specific challenge. · Implement a structured decision-making process in a group setting to reach a consensus.

8. Public communication	**Applying:** Use public communication techniques to deliver clear and effective messages in real-world contexts. Examples: · Deliver a public speech or presentation using clear structure, engaging language, and appropriate tone. · Apply storytelling techniques to captivate and inform an audience during a presentation. · Use visual aids (e.g., slides, charts) to enhance the clarity and impact of a message during a public presentation.
9. Leadership and conflict management	**Applying:** Use leadership and conflict management techniques in real-world scenarios. Examples: · Demonstrate effective leadership by facilitating a team meeting and guiding discussions to reach a decision. · Apply conflict resolution strategies to mediate a disagreement between team members, aiming for a constructive outcome.

	· Implement feedback mechanisms to assess team dynamics and identify potential conflicts early.
II. SMART CITIES COMPETENCES	
10. Concepts of smart cities	**Remembering:** Define urban planning and smart cities **Understanding:** Explain the importance and benefits of urban planning in the context of smart cities
11. Sustainable and inclusive urban planning	**Remembering:** Recall fundamental concepts and terminology related to sustainable and inclusive urban planning. Examples: - Define key terms like "sustainable urban development," "inclusive cities,"

	"green infrastructure," and "urban resilience." - Identify global initiatives and frameworks (e.g., UN Sustainable Development Goals, Paris Agreement) relevant to urban planning. - List common challenges in urban sustainability (e.g., pollution, traffic congestion, social inequality). **Understanding:** Explain key concepts and the relationship between sustainability, inclusion, and urban planning. ● **Examples**: ○ Explain how sustainable urban planning integrates environmental, social, and economic factors. ○ Describe the importance of public spaces and affordable housing in creating inclusive cities. ○ Summarize the role of urban green spaces in improving environmental sustainability and public health. **3. Applying:** Use sustainable and inclusive urban planning principles in practical, real-world scenarios. ● **Examples**: ○ Apply concepts like mixed-use development or public transportation integration to improve urban livability.

	○ Develop a plan for a neighborhood that addresses social inclusion, accessibility, and environmental sustainability. ○ Implement strategies for reducing urban sprawl and promoting walkable, compact city designs.
12. Main components of a smart city	**Remembering:** Define key components of a smart city and list the technologies used. **Understanding:** Explain the functions of smart city systems like transportation and energy management. **Applying:** Apply smart city technologies to solve specific urban challenges.
13. Participatory processes & Inclusion	Skills related to "Participatory processes & Inclusion" involve the ability to engage diverse stakeholders in decision-making, ensuring that all voices, especially marginalized groups, are heard and considered in policy, planning, and implementation processes. **Remembering:** Recall basic terms, methods, and principles of participatory processes and inclusion. ● **Examples**:

	○ Define key terms like "participatory democracy," "stakeholder engagement," "inclusion," and "public participation." ○ Identify different participatory methods (e.g., focus groups, public consultations, participatory budgeting). ○ List marginalized or underrepresented groups commonly targeted in inclusion efforts (e.g., minorities, people with disabilities, low-income communities). **Understanding:** Explain the importance of inclusion and participatory processes, and how they contribute to better decision-making and governance. ● **Examples**: ○ Explain the role of participatory processes in empowering communities and ensuring equitable decision-making. ○ Describe the barriers to participation that marginalized groups might face (e.g., language, accessibility, cultural differences). ○ Summarize how inclusive decision-making leads to more equitable and sustainable outcomes in urban or policy planning.

	Applying: Use participatory and inclusive methods in practical situations to engage diverse stakeholders in decision-making. ● **Examples**: ○ Apply participatory methods like workshops or community meetings to involve local stakeholders in a planning process. ○ Facilitate discussions in a diverse group setting, ensuring that all participants have equal opportunities to share their views. ○ Use digital tools or social media to broaden participation and reach marginalized or disengaged communities.
III. CLIMATE CHANGE COMPETENCES	
14. Climate change concepts, effects on the cities, adaptation and mitigation strategies	**Remembering:** Define climate change and list its major causes; Identify the effects of climate change on urban environments. **Understanding:** Explain how climate change affects cities differently than rural areas; Describe the concept of urban heat islands and their impact.
IV. DISRUPTIVE TECHNOLOGIES COMPETENCES	
15. Artificial intelligence (AI)	AI skills include knowledge of machine learning, data processing, neural networks, and ethical considerations.

	Remembering: recall fundamental AI concepts, terminology, and tools. **Examples**: ● Define terms such as "machine learning," "neural networks," "deep learning," "natural language processing (NLP)," and "algorithm." ● Identify key AI tools and platforms (e.g., TensorFlow, PyTorch, OpenAI). ● List various applications of AI (e.g., autonomous vehicles, recommendation systems, facial recognition). **Understanding:** Explain AI concepts, methods, and how they are used in different contexts. **Examples**: ● Explain how machine learning algorithms learn from data and improve over time. ● Describe how neural networks model the human brain in learning and decision-making. ● Summarize the differences between supervised, unsupervised, and reinforcement learning. **Applying:** Use AI tools and techniques to solve specific problems or implement projects. **Examples**:

	● Apply machine learning algorithms to classify data (e.g., recognizing images or predicting trends). ● Implement a simple AI model to perform a task such as sentiment analysis on social media data. ● Use a neural network to detect patterns in a large dataset.
16. Data Analytics	**Remembering:** Recall fundamental data analytics concepts, terminology, and tools. ● Examples: ○ Define key terms such as "data analytics," "data mining," "machine learning," "big data," and "business intelligence." ○ Identify types of data (structured, unstructured, semi-structured) and common file formats (CSV, JSON). ○ List common tools and programming languages for data analysis (e.g., Excel, Python, R, SQL, Tableau, Power BI). **2. Understanding:** Explain data analytics processes, techniques, and methodologies. ● Examples: ○ Explain the difference between descriptive, predictive, and prescriptive analytics.

	○ Describe how data is cleaned, transformed, and stored before analysis (e.g., data wrangling, ETL processes). ○ Summarize the basic steps in building a data analytics workflow, from data collection to reporting. **3. Applying:** Use data analytics tools and techniques to solve specific problems or perform analyses. ● Examples: ○ Use Python or R to perform basic data cleaning, manipulation, and analysis on a dataset. ○ Apply statistical methods (e.g., regression, hypothesis testing) to analyze relationships between variables. ○ Create data visualizations using tools like Tableau, Power BI, or Matplotlib to communicate insights from a dataset.
17. Internet of things (IoT)	**Remembering:** Define key IoT terms (sensors, actuators, protocols) and list IoT devices.

	Understanding: Explain how IoT systems function and describe their applications. **Applying:** Set up and configure IoT devices for specific tasks or projects**.** **Analyzing**: Examine data sets and analytical models to identify patterns, trends, and insights. ● **Examples**: ○ Analyze a large dataset to identify outliers, missing values, and correlations between variables. ○ Compare different analytical models (e.g., linear regression vs. decision trees) to determine the best fit for a specific problem. ○ Break down the results of a predictive model to understand how input variables influence the outcome.
18. Smart sensors	**Remembering**: ● Objective: Recall key terms, definitions, and concepts related to smart sensors. ● Examples: ○ Define what a smart sensor is and differentiate it from traditional sensors.

	○ Identify different types of smart sensors (e.g., temperature, motion, pressure, chemical sensors). ○ List the common communication protocols used by smart sensors (e.g., Bluetooth, Zigbee, Wi-Fi). **Understanding:** Explain how smart sensors function and how they are used in real-world applications. ● Examples: ○ Explain how smart sensors collect, process, and transmit data to other devices or cloud platforms. ○ Describe the role of smart sensors in IoT ecosystems, smart cities, or industrial automation. ○ Summarize the advantages of using smart sensors over traditional sensors (e.g., data processing capabilities, real-time communication, automation).
19. Blockchain	**Remembering:** Recall fundamental blockchain concepts, terms, and components. ● Examples:

	○ Define blockchain-related terminology, such as "blockchain," "distributed ledger," "cryptography," "smart contracts," and "consensus algorithms." ○ Identify different types of blockchain (e.g., public, private, consortium). ○ List common blockchain platforms (e.g., Bitcoin, Ethereum, Hyperledger). **Understanding:** Explain how blockchain technology works and its applications. ● Examples: ○ Describe how a blockchain functions, including blocks, hashing, mining, and the consensus process (e.g., Proof of Work, Proof of Stake). ○ Explain the differences between public and private blockchains and when each is used. ○ Summarize the key applications of blockchain in industries such as finance (cryptocurrencies), supply chain management, and healthcare.

The Training course structure

The Learning Modules

1. What is a smart city?

Objective:

- Understand the fundamental concept of smart cities.
- Learn how cities evolve into smart cities over time.

Content:

1.1 Definition of smart cities.

1.2 Overview of key elements: technology, infrastructure, sustainability, and people.

1.3 Evolution from Smart City 1.0 to 3.0:

- 1.0: Technology-driven, industry-led (technology dictates solutions).
- 2.0: Government-led initiatives, still top-down.
- 3.0: Citizen-driven, co-creation with the public.

Resources

- Video introduction to smart cities and their evolution.

- Infographic of Smart City 1.0, 2.0, and 3.0 stages.

Interactive quiz (5 close-ended questions: multiple choice or true/false)

2. Core Components of smart cities 3.0

2.1 Technology: IoT (Internet of Things), AI, data analytics, and sensors.

2.2 People: Civic engagement, inclusivity, and co-creation.

2.3 Sustainability: Renewable energy, waste management, smart grids.

2.4 Governance: Open data, transparency, citizen participation in decision-making.

2.5 Mobility: Electric vehicles, autonomous transport, and smart traffic management.

Resources

- Diagrams showcasing technologies in a Smart City 3.0
- Links to real-life examples of Smart City 3.0 initiatives (Barcelona, Helsinki, Seoul).

Interactive quiz

3. The Role of technology in smart cities 3.0

Objective:

- Understand how specific technologies impact smart city development.
- Learn about the use of data, IoT, and AI in urban management.

Content:

3.1 IoT and Sensors: How interconnected devices collect and share data to improve city services (traffic lights, parking, environmental monitoring).

3.2 **Big Data and AI**: Data analytics and machine learning to optimize city operations and services.

3.3 **Blockchain**: Transparency in governance, data security, and decentralized applications for public services.

Resources

- Video explaining how IoT works in cities.
- A short article on AI's role in urban management.

Interactive quiz

4. Sustainability and Green Solutions in Smart Cities - Portugal

Objective:

- Explore how Smart City 3.0 integrates sustainable practices.
- Understand the environmental benefits of smart technologies.

Content:

4.1 Green buildings and smart energy systems (e.g., solar energy grids).

4.2 Waste management and recycling innovations.

4.3 Water conservation through smart water systems.

4.4 Urban farming and vertical gardens for food sustainability

4.5 Climate resilience: How cities use tech to combat the effects of climate change.

Resources

- Interactive map showing sustainability initiatives in global smart cities.
- Videos on smart energy and water systems in cities.

Interactive quiz

5. Inclusivity and Civic Engagement in Smart Cities 3.0

Objective:

- Learn how Smart Cities 3.0 emphasize inclusivity and citizen participation.
- Explore ways technology can make cities accessible to everyone.

Content:

5.1 Citizen-driven innovations: Co-creating services with the community.

5.2 Social inclusion and equity in smart city planning.

5.3 Technology for the differently-abled: Accessible urban design (smart walkways, voice-controlled services).

5.4 Participatory governance: Citizens' involvement in city decisions through platforms like crowdsourcing, voting apps, and open data.

Resources:

- Examples of participatory platforms used in cities like Amsterdam and Seoul.
- Videos of citizens co-creating urban services (e.g., using online platforms to vote on city issues).

Interactive Quiz

Project-Based Learning Activity Sheet: Real Case Scenarios

- **Objective:** Engage students in practical projects to apply their knowledge.
- **Structure:**
  - **Project Selection:** Students choose a project from a list of projects that their municipality is currently implementing at city level.
  - **Research Phase:** Students gather data and research existing solutions.
  - **Solution Development:** Using AI and coding, students develop their solutions.
  - **Implementation and Testing:** Simulate or prototype their solutions.

With regard to the platform's learning pathway, it will be set up both to give learners the opportunity to consult the theoretical learning units independently and according to their own needs in order to acquire a complete basic knowledge of smart and sustainable urban planning issues, or to directly access the extra hands-on-project unit based on a real case study, i.e., a public project of the municipality chosen by the young people themselves.

This extra unit will be set up as a guide sheet divided into several steps that will allow the young people on the one hand to familiarise themselves with the mechanisms by which national and European institutions finance projects with a public purpose, and on the other hand to concretely confront the challenges faced by cities, finally arriving at the formulation of their own proposal for a solution that can for example bring an improvement in efficiency, user experience or increase in the level of accessibility and inclusiveness of an initiative of their municipality.

However, this practical unit will refer to a number of basic concepts and knowledge, linking directly to the relevant in-depth study contained in one of the previous units.

The learning outcomes evaluation and monitoring strategy

The evaluation process will be divided into an *ex ante* evaluation and an *ex post* evaluation.
The *ex ante* evaluation is given to the participant before taking part in the learning units, in order to have a clear understanding of the participant's knowledge of the content of the unit. This data can help us understand the participant's familiarity with the topic and track its progress.
At the end of every unit, an *ex post* evaluation is to be filled by the participant. The data collected from this evaluation form is to be compared to the *ex ante*'s data so that there is an understanding of the progress made by the participant. In order to make sure that the participant fills in the evaluation form, it is strongly suggested that the participation certificate is linked to the *ex post* evaluation (e.g. the participation certificate only recognizes the hours of "study" of the units that have the *ex post* evaluation filled).

The *ex post* questionnaire should not only focus on the learning outcomes but it should also include a few questions on the quality of the units and what they believe can be improved. This way, the training can be improved by participants' suggestions.

Bibliography

In order to have coherent unit structures and reliable resources, we strongly suggest the following bibliography for the definition of the courses.

Academic bibliography:

Albino, Vito, Berardi, Umberto, Dangelico, Rosa Maria, Smart Cities: Definitions, Dimensions, Performance, and Initiatives, Journal of Urban Technology, 22:1, 3-21, 2015;

Garrido-Marijuan, Antonio, Pargova,Yana, Wilson,Cordelia, "The making of a smart city: best practices across Europe", European Commission, GOPA Com. Printed in Belgium, 2017;

Giordano, Silvia, Patrizia Lombardi, Hend Farouh, and Wael Yousef., "An Analytic Network Model For Smart Cities." Proceedings of the International Symposium on the Analytic Hierarchy Process, 2011. doi:10.13033/ISAHP.Y2011.084 ;

Giffinger, R., Fertner, C., Kramar, H., & Meijers, E., Smart Cities Ranking of European Medium-Sized Cities, Vienna, UT: Centre of Regional Science, 2007;

Kuguoglu, B.K.; van der Voort, H.; Janssen, M. The Giant Leap for Smart Cities: Scaling Up Smart City Artificial Intelligence of Things (AIoT) Initiatives. Sustainability 2021, 13, 12295. https://doi.org/10.3390/su132112295 ;

Pellegrin, J, Colnot, L & Delponte, L, Research for REGI Committee – Artificial Intelligence and Urban Development, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels, 2021;

Piscitello, Laura S.M., "Breve excursus sul Codice dell'Amministrazione Digitale e sui nuovi diritti "digitali"", GIURETA - Rivista di Diritto dell'Economia, dei Trasporti e dell'Ambiente, Vol. VIII, 2010.";

Russo, F., Rindone C., Panuccio, P., The process of smart city definition at an EU level, The Sustainable City IX, Vol. 2, WIT Transactions on Ecology and the Environment, 2014;

Ševčík, M., Chaloupková, M., Zourková, I., Janošíková, L., Barriers to the Implementation of smart projects in rural areas, small towns and the city in Brno metropolitan area, European Countryside Journal, volume 14, n. 4, January 2023;

S. Hosseini et al., Do Not Forget About Smart Towns, Bus Inf Syst Eng 60(3), 2018;

Institutional references:

Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions on Artificial Intelligence for Europe, Brussels, 25.4.2018 COM(2018) 237 final;

European Commission, "Cork 2.0 Declaration - A Better Life in Rural Areas", Luxembourg: Publications Office of the European Union, 2016;

Reports:

Youth & the City – This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made 73
of the information contained therein.

URBAN AI GUIDE - URBAN AI. (2023, April 9). URBAN AI. https://urbanai.fr/our-works/urban-ai-guide/

The Smart City Observatory, "IMD Smart City Index Report 2023", IMD World Competitiveness Center, 2023;

Verizon, "Data Breach Investigation Report", Giugno 2023, accessibile: https://www.verizon.com/business/resources/Te44/reports/2023-data-breach-investigations-report-dbir.pdf

Training Framework Report bibliography

Toolkit for smart city competencies Framework, The Smart Skills for Smarter Cities [Skills4Cities] Project No. 2020-1-BG01-KA202-079071, funded through Erasmus+ program of the EU, 2021. https://online.fliphtml5.com/khox/uuns/#p=1

Shabatura, J. (n.d.). *Using Bloom's taxonomy to write Effective Learning Outcomes | Teaching Innovation and Pedagogical support*. https://tips.uark.edu/using-blooms-taxonomy/#gsc.tab=0