4I4U CONCEPT CITIZEN ENGAGEMENT OF ENGINEERING STUDENTS AND HIGH SCHOOL STUDENTS

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ABSTRACT

The 4I4U project[2], which runs through 2022, aims to engage the community of citizens made up of students between the ages of 15 to 23 in the urban mobility of the future while empowering them to become actors of change who can participate in the development and evolution of their city. Led by a European Consortium composed of two cities, Barcelona in Spain and Toulouse in France, as well as education entities from high school to universities and clusters of companies in the field of urban mobility, and co-funded by the EIT Urban Mobility, the main objectives of 4I4U focus on raising awareness among young citizens in the context of urban mobility, developing their capabilities to become actors, highlighting their needs and finally creating a

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methodology and an environment that help students from ideation to action for the mobility of the future. The objectives of 4I4U are achieved by planning a set of seminars, round tables and brainstorming sessions to raise awareness or understanding of different aspects of urban mobility. To move from ideation to action, small groups of students design and produce a first ideation to understand and be able to project themselves into the proposed solution. This activity will be carried out under the mentoring of cities and industrialists, using the means of training institutions.

1   INTRODUCTION

1.1 Citizen Engagement of young people

The aim of citizen engagement is to ensure that users are part of the ideation process by achieving social and gender inclusion and stakeholder engagement, creating an opportunity to experiment and share information on urban mobility. 4I4U focuses on students aged 15 - 23 as they are rarely involved in the ideation process. Moreover, one of the added values compare to previous experiences for example in India-ICT standardization European project [1] on the smart city part is that they do not just experiment new products, system of services and try to create a new one by themselves as done in cities of Delhi, Kanpur, Bangalore, Chandigarh, Pune, Goa. In 4I4U, they not only try to develop an idea, they also have a phase of improving skills and exchange ideas in urban mobility with a strong connection with researchers, city services, and mobility companies. This allows them to advance in urban mobility and feel included.

1.2 Context

Partners of the project in both cities were willing to involve young students in the area of urban mobility, including university students, not necessarily from the civil engineering field, and high-school students. The common goals are to rise awareness and empower them as citizens to act and be part of the solution for future mobility in our cities. Barcelona and Toulouse have some historical ties in both sides of the Pyrenées, also a common focus in teaching students who could work in the automotive or urban mobility sector with a sustainable mindset.

1.3 Goals and Scope of the 4I4U Project

The community of citizens made up of students aged 15 to 23 has and will have a growing impact on urban mobility. Making students aware of this issue as early as possible will have an important effect for the future, both in everyday life but also in the following generations.
We believe that young citizens are not involved in this issue because they think they cannot have an impact on the city. They do not master the process that goes from the awareness of a need, the formalization of an idea, the integration of the right actors and contacts to finally have impactful results. However, it is necessary to adapt the tools that are put in place to interest them and put them in a position to be protagonists of the necessary changes and innovations.
More specifically, the objectives of 4I4U are:

- OB1 Raise awareness of young citizens on the context of urban mobility with the help and expertise of teachers and trainers, city services and industrialists in this field.
- OB2 Develop the capacities of students to become actors of future urban mobility with the creation of networking between students, city and industry on this topic.
- OB3 Be able to highlight the needs and hope of this class of citizens.
- OB4 Create a methodology and an environment to help students from ideation to action in this field.

The scope of the activities focus on

- Propose, implement and evaluate a methodology based on a set of tools (seminars, round tables, workshop) addressed to the student population between 15 and 23 years old in a co-creation process tutored by city services, industrialists and academics. The use of these tools and, above all, the fact that they are part of the ideation process, will allow students, not only to be informed about science and innovation with different classes, but to be empowered and feel actors of urban mobility projects.
- The proposed methodology and activities are developed in two cities with specific and common events. The development of skills through access and exchange with experts, the identification of levers through the presence of city services and industrialists in this field, the networking to bring together all the players around the same approach should enable this population of citizens to understand and change their thinking and behavior in terms of urban mobility.

1.4 Towards a new future in engineering education

The 4I4U project includes some elements that can contribute to the future of engineering as it tries to engage engineering students in city challenges by involving them in the ideation of solutions and at the same encouraging younger students, who are currently in high school, in this design thinking approach. The focus is on citizen engagement and urban mobility and bringing together two cities close enough but from two different countries. The methodology of the process is explained below.

2   METHODOLOGY

2.1 Implementation of the Project

The project is divided in three tasks. The first task aims to understand and increase students' competencies in the field of urban mobility. It creates transdisciplinarity groups of students. This task specifically addresses objective OB1. The second task aims to create, produce ideas and think about their implementation. It addresses objective OB2 of the project. Finally, the third task creates a synthesis of the methodology implemented and the results in terms of ideas and proposed actions. This task integrates the dissemination of the events and the results of the activities. It addresses objectives OB3 and OB4 of the project.

Task 1. Networking debate and problem finding

This task concerns the sharing of information and the networking of the various participants at the beginning of the project. Its objective is to share information on the existing situation and the solutions envisaged around the world, but also to report the problems perceived by people in each partner city. The goal is to have well-informed and motivated students. It takes the form of events with focused seminars, discussion forums that can be shared or specific to each partner city. The events require of setting up the necessary structures, organizing the recruitment of external speakers, managing students and creating a space of physical and virtual conviviality conducive to exchanges. We rely in particular on a digital tool called DecidiUM and social networks to fuel and maintain exchanges. Seminars for example on the evolution of cities, the challenges of mobility, the city and the citizen, the industrial perspectives on mobility.

Task 2. Ideation phase and selection of proposals

This task is dedicated to the ideation phase by each group of students to propose a solution to an open problem that has been debated in the previous phase with citizens and stakeholders. The problem solved could be specific for Toulouse or Barcelona or for both/any cities. Educational establishments provide their equipment and fablab. The objective is to obtain a prototype demonstrating the philosophy of the proposed solution without having a level of operational maturity.

During a **final workshop at the** end of the year, each group will demonstrate their solutions and obtain various feedback to improve their proposal. They will present their idea and prototype in front of a jury bringing together different actors: users, cities, manufacturers, incubators, etc. The jury selects the best solutions. Each city together with the stakeholders decides about the future of the proposals.

Task 3. Assessment of the ideation and engagement process

During the beginning of the project, the program has been refined in terms of events and communication [2].

At the end of the project a summary of the process implemented and the results obtained will be made. CARNET experience in other projects [3] will help develop and assess the methodology for evaluating the ideation and the engagement of students in urban mobility. Partners will collaborate in the drafting of the good practices guide. This guide will produced and distributed on the Erasmus platforms, the EIT Urban Mobility community, and in the multiplier events organised by each partner for dissemination purposes.

2.2 Expected Impact

Environmental:
The methodology of working will raise awareness of young generations of students to the need that future urban mobility should be sustainable and active. The approach is to imagine that the project ideations that the students are going to be involved in are sustainable. We estimate that at least 3 of the ideas selected by the jury will have an impact on the environment. The change of scale in production will allow for the development of local employment but above all will avoid the transport of semi-industrialized parts around the world.
Economic:

The expected outcomes and impacts are the possible creation of products on the domain of the future mobility, an opportunity given to ideate in the city an innovative solution and help to argue for finding founds, the production of forms with easily shared techniques, the perception of which is easily understood by all thanks to a work of popularisation of information and maintenance and finally sharing new ideas with industry. We expect at least 2 ideas that have a real impact and economic potential for commercialisation.

Social:
We expect more than 200 students involved in 4I4U in different degrees of implication. So far around 21 posters and videos have been created by ISDAT students, as explained in section 3.5, and 10 telecom engineering students have develop an app, as explained in section 3.4. The hackathon organized in Barcelona in December will gather around 150 students from Toulouse and Barcelona. Activities with high-schools in Barcelona are planned for the fall semester involving engineering students as "ambassador" of the project. We have to add to this numbers other students that have attended the seminars so far.They will become well-informed and increase their capacity to become actors of the future urban mobility and more generally actors of the city. Moreover, connection will be made between the different visions of the city from: learners, citizens, city management, companies and teaching entities. Furthermore, common work for high school students, undergraduate and postgraduate students can encourage high school students to project their future as citizens engaged in sustainable activities in their cies. Finally, teachers will also increase their knowledge on this topic and be able to integrate this experience in their courses.

3   ON-GOING RESULTS AND EXPECTED RESULTS

3.1 Seminars shared between the two cities the First Semestrer

Twelve hybrid events are held simultaneously in Toulouse and Barcelona. These seminars, round-tables and brainstorming sessions have taken place in order to understand different aspects of urban mobility and raise awareness on the subject as it can be seen in the topics of the events that follow.[3]

1. "Draw me the Automobile of the Future for Urban Mobility" by Jean Luc Maté on February 15th 2022 4PM.
2. "Project Design from the perspective of city services for citizens" by Ángel López on March, 3rd 2022 5PM.
3. "Non-Financial Report of ICT projects" by Eva Vidal, on March, 8th 2022 at 2PM.
4. "Autofiction, a biography on the automobile object" by Olivier Peyricot on March 9th 2022 at a6PM

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[3] All seminars could be found on the following link:
https://engage.eiturbanmobility.eu/processes/Project4I4U/f/41/meetings?filter%5Bsearch_text%5D=&filter%5Bdate%5D%5B%5D=&filter%5Btype%5D%5B%5D=&filter%5Bactivity%5D=&filter%5Bactivity%5D=all

5. "The role of Technology Innovation in Urban Mobility" by Jordi Ortuño on March 17th 2022 at 5PM

6. "Challenges for sustainable urban logistics" by François de Bertier on March 24th 2022 at 4:30 PM.

7. "Smart mobility. Urban Mobility challenges" by Ángel López on March 31st 2022 at 5PM.

8. "When smart mobility means smart infraestructures" by Pierre Emmanuel Maire on April14th 2022 at 5PM.

9. "Female mobility patterns" by Imma Ribas on April 28th 2022 at 5PM

10. "5G technology and smart mobility" by Bruno Pouget, Frederic Gardes, Stéphane Vialle and André Bottaro on May 12th 2022 at 4PM.

11. "Mobility 4.0. and cognitive ergonomics: thinking about the human in an autonomous and connected environment" by Céline Lemercier on May 16th 2022 at 4PM.

12. "Urban mobility and Pollution Citizen Maps. Young Population study in Barcelona" by Universitat Politècnica de Catalunya on May 19th 2022 at 5PM.

3.2 Barcelona Activities (current and to be done)

A core group of 10 final year undergraduate students in the area of Telecommunication Engineering, not related to urban mobility, automotive or environmental studies, are taking a 12 ECTS challenge-based course during the first semester of 2022. The proposed challenge is to develop a product/service with the following requirements: to estimate the exposure to pollutants while moving around the city in their daily life, especially when they go to study; to raise awareness among the young population between 15 and 23 years old about the carbon footprint caused by the means of transport they use; finally, to use the knowledge in their own studies as a way to see that urban mobility is a transversal field where any professional can contribute. As a product they decided to create an app that shows three alternative routes to go from one place to another in the cities of Barcelona and Terrassa, that is, the fastest route and two alternatives with less pollutant exposure. The app also shows the carbon footprint generated according to the chosen route and depending on the mode of transport. The app contains projections of carbon footprint estimates for 1, 5 and 10 years. Finally, a ranking, as a game between friends from the same high school to see who is the "champion" generating less emissions in their daily mobility around the city. This project has required them, first of all, to become aware themselves of the environmental, social and economic impact of pollution through their own research study and by attending parallel seminars organized by 4I4U. Thanks to this awareness of the magnitude of the consequences of pollution, they are now ambassadors and together with 4I4U partners they visit high schools to show students younger than them their own experience in acquiring knowledge and on the other hand in their contribution by developing an application that can help this awareness and at the same time have fun. The university students also want to get feedback on the product they are developing.

Some results of their own work are presented to the university community at the last 4I4U seminar in Barcelona.

3.3 Toulouse Activities (current and to be done)

Following the networking phase, a first set of solution proposals in the form of posters and videos was produced by ISDAT. This material will be exhibited and shown to other students from other establishments to give them a first ideas of solution (idea0) and allow them to co-construct either from this first batch of ideas or from new ideas, their will propose their final proposal of idea (idea1) for the end of June. We will then begin the mentored implementation phase of the various ideas (idea1) by industrialists, city services and teachers. In December, groups will finalise their first prototypes (proto1). A jury will evaluate these prototypes and select those that can have a real impact and a possibility of deployment in the city. Students will then be able to gather around these few selected prototypes to improve them and move on to a prototype version (proto2) that can be deployed and used by a subset of citizens in real-life situations in the city.

3.4 Common Activities and Assessment for the Second Semester

Common Activities for the Second Semester

Beyond the sharing that takes place in the first semester, during the seminars, we wanted the students to also benefit from the richness of their different cultures between Toulouse and Barcelona. For this, a 2-day event will allow them on the one hand to attend together at a conference and exhibition on urban mobility in Barcelona and on the other hand to share the knowledge they have acquired during the project 4I4U on a one-day and night hackathon on short projects on urban mobility involving technologies of connected objects, communication and design (see for example A humanitarian technology hackathon [4] and some good practices in [5]).

Assessment

The 4I4U assessment of the ideation and engagement process includes the quantification of three main aspects: 1) Social impact 2) Environmental impact and 3) Feasibility .

1) Regarding the social impact the assessment will focus on how university students from 18 up to 23 years old understand and increase the transversal fields related to urban mobility. Considering the students of secondary school and University the assessment is focused on building the awareness of sustainable mobility for the youngest and increasing it for the oldest taking into account the effects of a non sustainability mobility.

2) Regarding the environmental assessment, for instance, in one of the projects it is based on pollutant parameter measurements of the students' mobility patterns. This is achieved by an app created by a group of students.

3) Feasibility assessment is based on how this project can be repeated in time or how the environment and the social impact can be reproduced through the outputs of the project and thanks to citizen associations which are aligned with 4I4U values.

4   CONCLUSIONS AND PERSPECTIVES

The first results of the project show that the choice to have developed an offer of face-to-face seminars, streaming and recording makes it possible to adapt to this audience of 15-25 year olds who consume information at their own rythm. The final conclusions will have to wait until the end of the project with the implementation phase done and the final feedback from the partners involved and the students on the whole of what they have learned and achieved. Nevertheless, the first presentations of the concept to college, and undergraduate school outside the project have aroused an interest in this type of approach with a desire to participate in future editions.

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