# Cycling Acceptability Investigation among University Students in Athens, Greece

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**ABSTRACT**

The objective of the present paper is to investigate the current trend of bicycle acceptability as the main access transport mean through a case study among the university students population within Athens, a large city presenting very limited cycling culture. The Technological Educational Institute (TEI) of Athens is positioned 15 minutes by foot from the closest metro station, which is the second most popular transport mean for students to access TEI, following the car access. The perspective of students' access via cycle to the TEI from the nearest metro station overcomes several of the above barriers since the TEI is located at an area with mild street grades and during the summer period there is no need for access. A specially designed questionnaire was used to identify the students' willingness to use bicycle as their main transport mean during their access at the TEI from the metro station. The results showed a remarkable enthusiasm, since over 65% of the student using the metro and over 30% of the student car users were expressed positively in such a perspective. Furthermore, the analysis of the questionnaire revealed the need for specific actions for the promotion of cycling to and from the TEI, including the design of a safe as well as functional cycle road path, taking under consideration several traffic calming measures. Therefore, a proposal for an efficient bicycle path was developed, which is fairly safe as well as rider friendly, since over 95% of the proposed route passes via low-volume streets and a nearby park and is currently under examination by the local municipality. Furthermore, in terms of familiarizing other road users with cycling, a set of additional cycling promotion measures is under preparation, including traffic calming measures, shared space areas and 30 km/h zones, publicity and enforcement campaigns.

**Keywords:** bicycle acceptability, questionnaire, cycle path.

## 1 INTRODUCTION

Cycling holds a key role at urban mobility management schemes as well as inhabitant areas with sustainable development [1]. In such environments, bicycle acceptability is warmly embraced and is considered among the main transportation means. Cycling attracts more and more city inhabitants with its charm, sense of pleasure, vitality but mostly freedom.

In general, cycling is quite popular in medium sized cities worldwide, where in large cities bicycle use fails to attract large shares of trips on a daily basis. The main reason is that trips in major cities are longer, and eventually, this may partially explain the difference in bicycle acceptability as a transportation mean between US and Canadian cities versus European cities. In the first case 1%-3% of the trips are made via bicycle [2], where in certain European States such as Germany, The Netherlands, Denmark, Finland and Sweden the relevant percentage is estimated between 10%-27% [3]. Moreover, in Europe about 30% of trips with cars cover distances less than 3 km and 50% less than 5 km, a 15 minute bicycle ride [4].

Besides the well-known and widely accepted health and social benefits offered by cycling, the bicycle use as a transportation mean offers additional benefits in terms of reducing traffic congestion and improving quality of life in cities, reducing carbon emissions, and lowering costs of transport and parking [5].

However, in order to promote cycling, the provision of cycling infrastructure as well as safety considerations consist a major prerequisite and should be examined as a component of broader urban and transportation planning policies. Furthermore, based on the concept of connectivity, the cycling network should be related with other modes of transport. Coordinating bicycling with public transport is mutually beneficial, enhancing the benefits of both modes and encouraging more bicycling as well as more public transport use [6].

In Greece, cycling is continuously expanding in medium-sized cities. A recent survey in one of these (city of Volos) revealed the advantages of the bicycle in terms of pleasure, vitality but mostly freedom. Furthermore, the citizens of Volos express a strong intension to use the bicycle for their daily activities [7].

In Athens the degree of cycling acceptance in terms of transport mean is relatively low compared to other European cities and safety considerations, imposed due to limited cycling infrastructures, are definitely among the top reasons. However, the design of bicycle infrastructures is slowly entering in the priorities of local Authorities, despite several barriers which are needed to overcome. For example, vehicle parking imposes space limitations for new cycle paths, and the other road users are not fully familiar with cyclists' behaviour and vulnerability, which are sometimes considered even as intruders in the traffic system [8]. At many municipalities of Athens with increased parking demands, such as shopping areas, the existence of cycling infrastructure, even against the parking lots, would contribute positively in reducing vehicular traffic in terms of delays as well as drivers' irritation. However the most important benefit would be the general improvement of the citizens' quality of life.
Moreover, bicycle expansion in Athens is constrained by two additional reasons. On one hand, the topography in most areas is rather hilly and thus the mid-aged and aged public are discouraged from incorporating bicycle for their transport needs on a daily basis. On the other, in the Summer time, and especially during the peak period months, the high temperatures prevent cycling, at least during the working hours.

However, bicycle is gradually becoming more popular, especially among the young population and especially university students. The objective of this research is to investigate the current trend of bicycle acceptability as the main access transport mean through a case study among the university students population. On that purpose a questionnaire based stated behavior survey was developed in order to identify the students' willingness to use bicycle as their main transport mean during their access at the University from the metro station. Subsequently, a proposal for a rider friendly bicycle path was developed.

## 2 THE CASE STUDY AREA

The case study took place at the Technological Educational Institute (TEI) of Athens, which is located at the municipality of Egaleo, 10km distance west of Athens downtown . The TEI is positioned 15 minutes by foot, or 5minutes by bus from the closest metro station, which is the second most popular transport mean for the students access, following the car access.

The topography at the TEI consists of rather mild grades and during the peak summer period there is no need for student access. Therefore, the perspective of students' access via bicycle to the TEI from the nearest metro station overcomes the barriers mentioned previously.

Initially the study was assessed by estimating the arrival patterns, having in mind that they are more or less spread out in terms of time. Based on the data of a similar project which is implemented currently (Walk to School Day, coordinated by G. Lovegrove), between 08.00 – 08.30 where most of the staff and faculty personnel arrive, 1360 pedestrians and 220 cars were observed arriving. This averages to roughly 16% of TEI commuters using cars, or more importantly over 80% walking/using public transit. On-site parking for both students and staff seems to be more or less adequate, where current parking capacity includes 268 staff/faculty and 532 student parking stalls. Moreover, although TEI students are offered free on-site parking, approximately 50% of students that drive at TEI, park off-campus due to cumbersome paperwork procedure to get a (free) student parking permit. Generalizing the above figures, it seems that more than 5000 students/faculty/staff arrive at TEI on a daily basis from which over 4000 on foot or using public transit. Based on observations, the current figure of bicycle usage as an access transport mean at TEI is less than 30 (<1%).

## 3 THE STATED BEHAVIOUR SURVEY

Subsequently, a questionnaire was developed in order to identify the students' willingness to use bicycle as their main transport mean during their access at the TEI from the metro station. An effort was made the questionnaire to be concise, but at the same time address the students' attitudes towards bicycle use, identify potential barriers, and besides conventional solution approaches express their opinion on innovative, at least for Athens, practices such as bike-sharing and its potential embracement.

The survey took place during the spring period of 2013. A sample of 200 students was randomly selected at the entrances of TEI, from which 40 car drivers and 160 pedestrians (from the metro station), in order to keep pace with the raw arrival percentages in terms of transport mean, as stated above, all evenly distributed in terms of sex. The questionnaire included 4 sets of questions.

The first question intended to investigate whether the students are familiar with cycling, by asking if they own a bicycle. 3 questions followed next in order to evaluate the cycling fre-

quency, the purpose of cycling, the cycling environment and average cycling time per week. The most important finding was that nearly 75% of the questioned students did not own a bicycle. None was found to use bicycle as his/her main transport mean. This finding is very important and at first glance it can be interpreted as determinant in terms of cycling acceptability. However, based on the following questions it was confirmed that the students are more than friendly towards cycling.

The second question was addressed to the above 75% by asking them the reason. Approximately 85% were feeling unsafe due to lack of bicycle infrastructure, and cycling policy in general. This finding was not surprising and rather expected, since both issues stated above are widely acknowledged among the inhabitants of most residential districts in Athens.

The third question was focused in the present case study and explored their willingness to use bicycle as their main transport mean during their access at the TEI from the metro station. Furthermore, they were asked to estimate their intention in terms of days per week as well as point out the most important requirement. The results revealed a remarkable enthusiasm, since over 65% of the students using the metro and over 30% of the student car users were expressed positively in such a perspective, at least 3 times per week. Regarding the requirement almost all converged towards the design of a safe and user friendly bicycle infrastructure as well as cycling promotion activities. The final question addressed on one hand the bike share prospect and on the other a potential fair charge. Once again over 80% of the students were positive in such a prospective, where approximately 2.5€ per route was defined as the mean fare.

The main conclusions from the above questionnaire are the expressed safety concerns due to lack of cycling infrastructure and cycling policy. Safety seems to hold a key share in cycling acceptability. Similar are the findings from related research studies [e.g. 9, 10] where cycling safety is regarded as a mostly critical issue. Especially in [9], where a similar case-study in the city of Volos (located 350km north from Athens, on a levelled landscape) is outlined, it is concluded that a main barrier in terms of cycling acceptability is the lack of proper cycling infrastructure.

In general, a common practice followed by many European cities aiming to encourage their citizens to change their transport habits, is to provide appropriate conditions. Therefore, speaking of cycling, besides infrastructure, other facilities are also implemented (e.g. bicycle parking, separate traffic signals etc.), and the role of education in terms of training and developing cycling skills is crucial. However this is not the case for other European cities since these conditions simply do not exist. Such an example [11] is experienced in Patras, the third largest city of Greece (220km west from Athens), where although the terrain topography is once again mild, there is a rather poor cycling level mainly due to lack of cycling infrastructure. However during the past decade, an increasing effort can be seen which aims at introducing cycling in middle-sized Greek cities. [12].

## 4 CYCLE PATH DESIGN

The analysis of the questionnaire revealed a strong necessity of designing a functional cycle path, where safety should be easily perceived. Therefore, by addressing several traffic calming measures, a bicycle path was drafted which is fairly safe as well as rider friendly. Figure 1 outlines the general layout of the cycle path of which the total length is approximately 1.6km.

The most part of the cycling route, over 900m, bypasses a peaceful and beautiful park (Figure 2). Moreover the rest of the route consists of low-volume streets and only a distance of less than 70m is close to a busy street, thus delivering over 95% of the proposed route on a mostly decent environment for cycling. Among the intentions of the design was to raise the awareness of the local residents as well to use the path as a safe cycling corridor between the metro square and the park. The authors believe that such an assessment will most effectively contribute in promoting cycling.

For every street before vs after cross sections were provided. In general the cycling route was designed along the sidewalk by narrowing the existing width of the pavement. Such an example is shown through Figure 3. Although vehicle parking is a high priority for every local municipality in Athens, the present design affects less than 20 parking stalls. Moreover the above mentioned trade-offs deliver benefits definitely more important and therefore such a parking shortage is not expected to jeopardize the whole concept.

The proposed route is in line with the approved street plan of the city, and will improve significantly the quality of movements around the area of the metro station, but mostly motivate the other residents as well to adopt cycling in their local transfers. At the present time the design is handed over to the local municipality for further actions. Besides the design, a set of additional cycling promotion measures is under preparation, including traffic calming measures and 30km/h zones as well as publicity and enforcement campaigns.

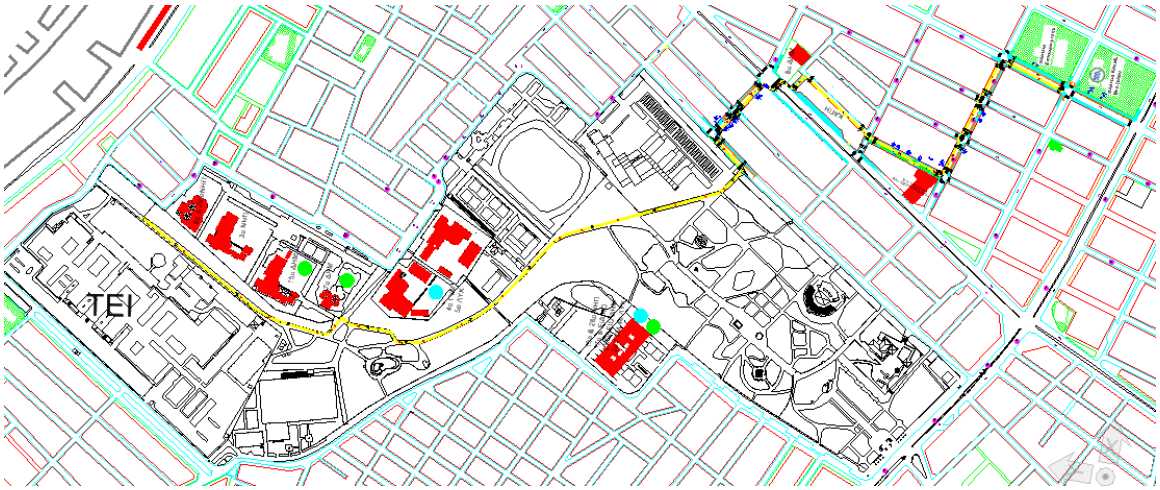
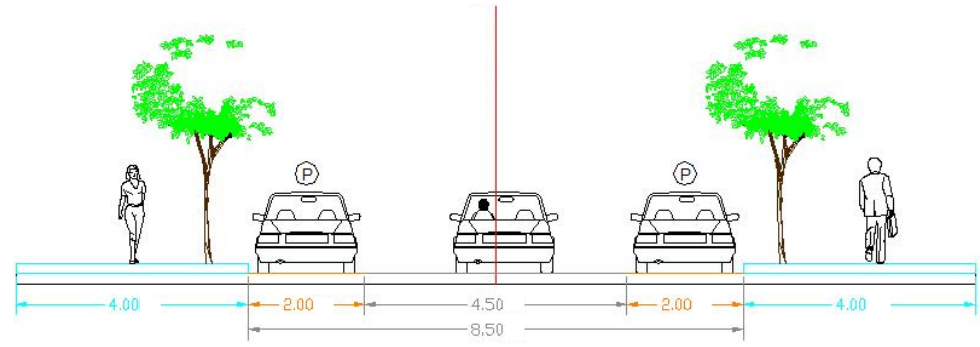
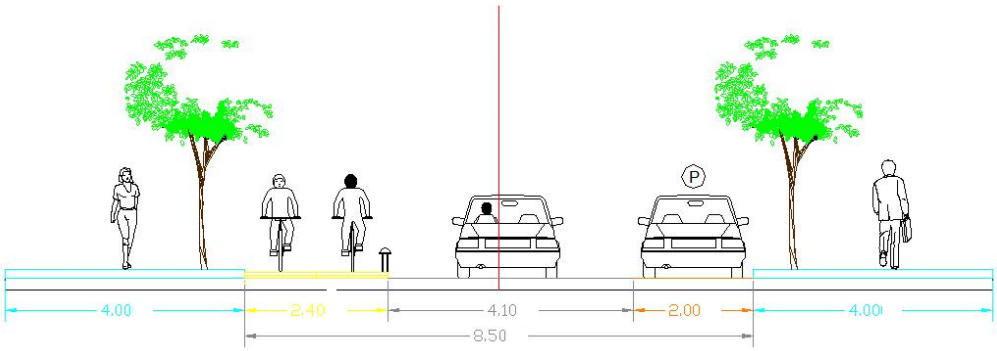



**Figure 1.** General layout of the proposed cycle route.

**Figure 2.** View of the park.




(a)




**(b)**

**Figure 3.** Plastiras Str. (a) before, (b) after.

## 5 CONCLUSIONS

Bicycle use as the main transport mean on a daily basis is random in Athens and further methodical actions from broader involved authorities seem necessary in order to promote cycling. Within the framework of the assessed case study, this issue was pointed out by the students. However, based on the questionnaire, cyclists' safety was found to be the most critical prerequisite. In other words, the cyclists at all times should feel safe, protected and not exposed to their vulnerability. Towards this direction, a number of studies in the Netherlands with a comparable study approach have focused specifically on the factors explaining the high level of cycling safety [10]. These have concluded that the following policies are critical to the high level of cycling safety in the Netherlands: safe infrastructure (in particular separated cycle paths), traffic calming and intersection treatments, comprehensive traffic education and training of both cyclists and motorists, traffic regulations that favor cyclist and pedestrians, and particularly strict liability (i.e. drivers are almost always liable when they crash into a cyclist or pedestrian) [13-15].

Through the assessed study the authors intend to point out the cycling acceptability degree among the young population, although there is no evidence that finally the students (potential cyclists) shall embrace the proposed cycling path as their main access mean. There is no doubt that, the students' willingness to adopt cycling at least as a partial transport mean is revealed. This finding is very important in terms of motivating the stakeholders to launch similar initiatives in a more broad and methodical process and forcing them to realise the necessity of improving their citizen's quality of life. Such a preliminary approach is very guiding to municipalities or local communities aiming to introduce proposed design interventions through cycling acceptability (e.g. connecting a shopping district to a parking area via a bike sharing scheme, etc.).

Therefore, urban areas in Athens must be redesigned, talking under consideration general traffic calming measures, assessment of shared space areas and 30 km/h zones. Education and enforcement seem also necessary actions as to familiarize other transport system users with cyclists in terms of safety.

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