

Innovative Bike-Sharing Design as a Research and Educational Platform for Promoting More Livable Urban Futures

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Abstract: Studying the viability of innovative urban access design is the key to achieve optimum results when attempting to transform dogmatism referring to conventional car-orientation into a meaningful driver of modal change that is founded on the actual societal needs for future transportation. An efficient public bicycle scheme could be the very definition of a solution that could encourage and even facilitate, to a certain extent, such a transition. This paper discusses how a post-graduate course embraced, through the means of a service-oriented design exercise, the potential introduction of such a system. More specifically, seven research teams, closely guided by the three authors, were affiliated with designing a new hypothetical bike-sharing scheme in the city of Gothenburg, Sweden. The paper reports on: a) the novel educational approach the tutors employed, b) the taught experiences that helped the students utilize their potential as learners but also as inventive designers, c) the research in terms of design results and d) the overall transition from solely serving the needs of automotive mobility in urban environments to creating a knowledge platform that actually illustrates an improved design-innovation process to tackle future urban demands and eventually have a real-life context impact on the city of Gothenburg.

Key words: *Bike-Sharing, Public Bicycles, Urban Access, Sustainable Mobility Design, Design Education, Visual Branding*

1. Introduction

Car has been established as the dominant form of maintaining personal mobility to such a degree that it has transformed from merely being a popular transport medium to being the building block for the urbanization process that most cities around the world embraced as their development norm. The benefits of an automobile are powerful: it is a door-to-door transportation system, the means to gaining access to life necessities and employment, and a source of pleasure and social status. So are its disadvantages, including local air pollution, greenhouse gas emissions, road congestion, noise, mortality and morbidity from accidents, and loss of open space to roads, parking lots and urban sprawl [16]. Considering the change of the epicentre in design and product-service development, dictated by the realization that human life will be unsustainable if no precautions are taken to secure society's wellbeing and Earth's limited natural resources [1], the authors believe that there is a need of changing the current transport design paradigm by introducing more anthropocentric and ecospheric principles.

This new paradigm needs to be defined by its clear focus on urban access. It should be linked therefore, with the revitalization or introduction of alternative transport modes that could maximize a city's potential to offer satisfactory, yet sustainable, living standards to the people functioning within its premises.

More specifically, a shift of focus from catering solely for privately motorized mobility to providing all necessary means of access, is apparent, if the era of designing cities as if car access alone was sufficient, is to be eclipsed. This shift will facilitate the development of a thorough understanding of how more sustainable transport options can, under specific land use conditions (e.g. higher densities, more finely-tuned functional mix), provide a competitive degree of accessibility that matches less sustainable options [3]. The intention is not to prohibit the use of the car, as this would be both difficult to achieve and it would be seen as being against notions of freedom and choice. The intention is to design cities of such quality that people would have other concrete transport options besides car [2]. Launching a new or refining an existing public bicycle scheme could be the very definition of an example to this alternative approach to inspire voluntary modal change through design innovation.

Public bicycle systems, also known as bike-sharing systems, have been introduced as a method to extend the accessibility of public transportation systems to final destinations [9]. By providing free or affordable access to bicycles for city travel, the public bicycle systems can offer transportation that could substitute short car trips, thereby alleviating road traffic congestion and reducing problems associated with excessive car use. Bike-sharing is viewed as an inventive inner-city transportation mode designed to meet many of the road user needs associated with personalized mobility (i.e. mobility that supports autonomous route planning and scheduling).

At the same time nonetheless, bike-sharing is recognized as being part of the overall public transport system that a city can offer [15], and not solely as a means of encouraging interoperability in general, and intermodal travelling in particular. The basic idea behind this mode is that the commuters can take the bicycles whenever they need them and leave them behind when they reach their destinations, through a pick-up and drop-off point system across an urban area, without the vehicle costs and responsibilities affiliated with bicycle ownership [14].

Public bicycles have several advantages over other modes of public transportation for short-distance urban trips because of their capacity to: a) reach underserved destinations; b) require less infrastructure; c) be relatively inexpensive to purchase and maintain; d) not add to vehicular congestion; e) not create pollution in their operation; f) provide the user with the added benefit of exercise [4]. This is why bike-sharing schemes have evolved from being intriguing and small-scale urban mobility experiments to mainstream public transport options in 33 countries in almost every region of the world, using approximately 236,000 vehicles¹ to cater for the diverse and complex needs of million users [10]. Studies based on exploring how impactful bike-sharing systems, implemented recently across Europe, have been in practical terms, suggest that these schemes can indeed act as door openers for increased bicycle use [11]. More specifically, in cities lacking a good level of bicycle use, bike-sharing could be an investment that could increase the road users' acceptance of cycling as a means of personal mobility, redefining in a positive sense bicycle's overall value as a realistic transport option. In cities where a good cycling mentality is already in place, a well-designed public bicycle system could provide a valuable add-on to existing urban access services.

¹ These numbers refer to estimates based on detailed research [10] dated to October 2010.

2. A Novel Educational Approach in Urban Access Design with Applied Merit

2.1 Visual Brand Identity and Product Design Course

In order to make transparent the research origins, the educational orientation and the design motivation of the scientific efforts negotiated herein, it is important to introduce the knowledge transfer institution that hosted this design-innovation process. Chalmers University of Technology launched in 1999 an entirely autonomous five-year taught programme in Industrial Design Engineering. This was a move that denoted the educational emphasis that the University attributed in creating the right academic environment to foster its students' analytical, creative and strategic skills when designing new products. A pioneering course called *Visual Brand Identity and Market Analysis* (7.5 ECTS) was established in 2004 aiming to give strategic design and branding a more prominent position in the design education at Chalmers [13]. The course name was changed a few years later to that of *Visual Brand Identity and Product Design*, something underlying the increasing need to embrace design in wider terms than the ones defined by solely concentrating on market demands. This shift of focus is in accordance with the authors' goal of introducing more anthropocentric and ecospheric justice considerations in the design process, in general and the design education process, in particular. The goal of the *Visual Brand Identity and Product Design* course is to provide students with a learning experience that will allow them to build an understanding of: a) how the symbolic and aesthetic qualities of products can be used to support and develop the visual identity and potential for success of brands and vice versa and b) how product design could become an effective apparatus in providing viable, but yet appealing, solutions to some of the society's most urgent development problems.

The course is based on a series of carefully selected lectures but its most important part is a research-driven group project. During the lectures, students are introduced to a range of design and branding theories, which are complemented with hands-on insights from distinct design practitioners. This knowledge transfer process is also supported from the provision of an up-to-date literature package of the field which, among others, is designed to allow students to understand in depth the theme negotiated by each academic year's selected group project. The project's key objective is to enable the students to use their taught experience (which also reflects an early term analysis exercise on automotive brands) as a starting point for designing and branding new products; in this particular case, a new bike-sharing scheme for the city of Gothenburg.

2.2 Presenting the Concept of the Group Project in Bike-Sharing Design

The course is founded on a group project upon the realization that the designer of tomorrow needs to be equipped with the ability to work effectively as a team-player; appreciating that design innovation is a multi-task arena that need numerous contributors to be well-rounded. Seven teams of four to five students were formed from the very first day of the two-month course that took place during Autumn 2012. Each team was affiliated with a particular automobile brand in a pre-project exercise. The purpose of this exercise was to assist the students: a) in gaining an empirical understanding of the product design tools available on the field of transportation today and b) in eventually employing some ideas from a tested transport-related branding background. This helped the students in developing their own design strategy in delivering a study about an innovative hypothetical bike-sharing scheme for the city of Gothenburg. The project's basic requirement had a twin dimension of linking a brand building process with product-service system design. First, a new fictive brand (which could have been a branch of the group's hypothetically affiliated automobile company) that specialized in alternative to car transport design

had to be created. Successively, teams were asked to design a new product-service solution that had to be an upgrade of the current Gothenburg's bike-sharing scheme.

The theoretical framework to support the development of this specific group project, which was formulated by the authors of this article, was founded on the principles of sustainability, in general, and urban access, in particular. Sustainability is defined for the means of this work as “a design axiom looking forward to support development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [17]. Urban access in turn, was introduced to the students as a “trans-disciplinary design notion aiming to ensure that every member of the society has access to those locations and resources one needs to achieve a sustainable standard of living and productivity without limiting other people's rights of access” [12]. The overall design was specifically aiming at the delivery of a reality related design proposal for a product-service system; one that could make the case for a more balanced modal split within Gothenburg by establishing bike-sharing as a more prevalent transport mode than what currently is. This is an intriguing challenge considering that Gothenburg has particularly rough topographical characteristics and weather conditions and a decent bike-sharing system already in place.

3. Gothenburg: the Current Situation

3.1 The Local Context of Gothenburg

Gothenburg is the second largest city in Sweden by population and the fifth largest in the Nordic countries covering an area of 3,718 km². It is situated on the Southwestern coast of Sweden, and has a city-based population of 519,400 residents [6]. The population of Gothenburg's broader metropolitan area is almost one million. Gothenburg has a strategic geographical position in Scandinavia, being approximately half way between Copenhagen and Oslo. The main characteristic of the topography of Gothenburg is the unusually high amount of hills and slopes often drawing comparisons with San Francisco. In terms of climate conditions, because of the moderating influence of the warm Gulf Stream, Gothenburg enjoys milder weather than other cities with similar high northern latitude. Summers have an average temperature range between 10 to 20 °C. Winters are cold and windy with average temperatures of around -5 to 3 °C, even though temperature could sometimes drop significantly more. Precipitation is regular but generally moderate throughout the year, while snowfalls mainly occur from December to March, but are not rare in November and April. In terms of daylight conditions, in summer daylight extends up to 18 hours, but lasts only around seven hours in late December [6].

3.2 A Synopsis of Gothenburg's Transport System

Gothenburg is a city with a relatively good level of public services in place, providing a wide range of transport options to its commuters. An example of this well-rounded public transit philosophy regime is the existence of a one-for-all public transport card (i.e. the Västtrafik card). This is a ticketing integration apparatus, which supports interoperability and multimodal traveling, making public transportation in Gothenburg to some extent more homogeneous and versatile and thus more accessible and competitive. With over 80 km of double tracks, the blue iconic tram of the city is the largest tram/light rail network in Scandinavia [6]. The bus network, however, forms the basis of the public transport system since it can serve even more destinations. There are also some daily boat and ferry services catering the needs of a city that is defined (even in terms of its own name) by river Göta. There is no subway for the time being in Gothenburg, due to the soft ground on which the city has been founded on.

However, the local authority is planning, through a vast transport innovation funding package, to build a new train tunnel under the central city of Gothenburg, with three new stations to connect the commuter trains that also serve the city with other public transportation options. Gothenburg’s Traffic Office [8] has published the following table to provide information about the modal share over the last few years in the city.

Table 1. Modal Split in Gothenburg*

Mode	2011	2010	2009	2008	2007	2006	2005
Car	47%	48%	47%	48%	49%	50%	50%
Bus/Tram	31%	29%	28%	28%	27%	26%	26%
Bicycle	9%	9%	10%	10%	9%	10%	9%
Walking	14%	14%	14%	14%	15%	14%	15%

*The percentages do not sum in 2009 and 2011 to 100 due to rounding effect.

In early 2013, a road pricing scheme was introduced in the city centre of Gothenburg, something that meant to regulatory enforce in some respect modal change, while parking pricing is another travel demand measure that has been spread to all central and residential areas of Gothenburg for many years now.

3.3 Describing the Existing Situation in Terms of Bike-Sharing in Gothenburg

Gothenburg advocates that the choice of riding a bicycle within the city premises saves time to road users. With over 600 km cycling routes, Gothenburg provides an extensive bike road network that takes commuters to each and every main destination in and around the city [6]. This makes cycling a valid transport option in terms of basic road infrastructure, at least, that if supported with the right mechanisms, has the potential to engage more road users than what its current modal share denotes.

Gothenburg has already in place a bike-sharing scheme. Styr & Ställ is a self-service bike rental system spread across 54 stations throughout the city centre of Gothenburg with approximately 600 bicycles. The system can be accessed 24 hours a day and seven days a week. It is available between 1st of April to 31st of October. Technical support is open at working hours every weekday. In order to access the system, customers have to subscribe to a 3-day pass (10 SEK), a season pass (250 SEK) or special business subscription. The usage price is free for the first 30 minutes then 10 SEK and 20 SEK for the second and third 30-minute rental periods respectively. Subsequent half-hour rental periods after that cost 40 SEK [7]. JCD Decaux finances the system through building commercial billboards placed throughout the city, besides the revenue generated from the scheme’s users. Approximately 50,000 annual users signed up in 2012 for using this service; this number includes a large number of tourists and is not restrained only to daily commuters. Styr & Ställ representatives suggest that a minimum of 70,000 movements take place on a weekly basis. A movement according to them is defined as a broad term that reflects any case a bike is rented, returned or moved by the service staff from one station to another.

A comparative study utilizing all the primary data collected from the seven different student teams, through the means of ethnographic studies and interviews with Styr & Ställ representatives and users, and with Gothenburg commuters in general, enables us to report a synopsis of the advantages and disadvantages of the current system. Identifying the problems, which restrain the scheme’s potential to achieve wider societal acceptance, is the basis of producing an improved design approach that could attract more users.

Table 2. Styr & Ställ: Advantages and Disadvantages List

Advantages: Positive design aspects to build on	Disadvantages: Identified problems that need innovative design solutions
The bicycles offered are of decent quality	The bicycles are rather uncomfortable to ride
Adjustable height of saddle	There is no footbrake (sense of insecurity)
Inclusion of basket in the vehicle design to provide a storage facility for shoppers	The bicycles are not visually appealing to a large audience
Use of distinct design to prevent bicycle theft	Three-gear bicycles are insufficient for a hilly city
The '30 minutes for free' rule is a good promoting mechanism to attract first time users	Bike light operation confusing (automated or not?)
Use of unique parts that are not compatible with ordinary bicycles to prevent theft of loose parts	Buying a short term ticket is time-consuming and complex since the system is pin-code operated
The service is operating 24 hours per day	The service operates only for certain months
The number of bikes at the stations is monitored 24 hours a day	The system does not promote information or ticketing integration with public transit for intermodal travelling
The stations serve the city centre extensively	The large surrounding residential areas are not served
The stations are located in close vicinity of each other	Styr & Ställ is difficult to pronounce for tourists
The stations are placed close to bus/tram stops	The stations are not integrated with car usage
The stations are well-lit creating a feeling of safety	The stations are not distinctive enough
Information is provided in both Swedish and English	Information in English is of much smaller font size
Simple and informative safety instructions	Information of how the system works is not sufficient
Availability of suggestions for special bicycle routes for tourists that want to explore the city	The system does not offer helpline services on weekends (a peak time for tourism) or after 17.00
The paying system is secure and is unaffected by technical disruptions	The system is far too complex and sensitive to technical problems
Helmets can be borrowed at Styr & Ställ's office	The interface on the ticket vending machine is confusing and difficult to use
There is little to no vandalism; only one incident ever	The terminals only accept certain credit cards making the service inaccessible to some users
The damaged bicycles are usually quickly repaired	There is a need for introducing more subscription options in terms of time duration
Easy to report faults on bikes	No electrical bicycles available

4. Designing the Bike-Sharing System of Tomorrow for Gothenburg

The work hereafter is set to present a summary of each of the seven hypothetical public bicycle schemes designed for the means of the course. The richness of the results produced was overwhelming but this paper, due to length restrictions, reports only a fraction of this wealth.

4.1 ByBike

ByBike is a public bicycle scheme hypothetically affiliated with Volkswagen, since the team producing it, had as a case study of the pre-project exercise the German automobile industry giant. The scheme aims to connect with every road user (e.g. daily commuters, tourists, families, students, residents) employing a design-for-all philosophy and basing the brand identity values on the dual foundation of fun and innovation. It is a solution that will be addressing the accessibility problems that congestion charges mean to bring upon to road users especially during peak hours and thus will be positioned in proximity to the road pricing stations. The vehicle design introduces a lightweight bicycle from aluminum that is appropriate for the hilly orientation of Gothenburg. The

fault button meaning to enable users to dynamically report damaged vehicles, the tires that have a reflective orange surface making bicycle visible from distance and during night and a particularly generous storage basket made partly from reused seat belts are the trademarks of the bicycle design. Bike stations are designed to be roof-protected and recognizable, using the latest technological advancements. ByBike proposes the introduction of two more types of subscription passes on top of the ones already in use; a weekly and a 6-month one.



Figure.1 ByBike Bike-Sharing System (Designed by Sørensen, Dong, Fellin, Lejon & Wallsten)

4.2 eGO

eGO is a fictive eco-brand referring to an innovative electric bike-sharing scheme that means to promote an active lifestyle in European university cities such as Gothenburg. eGo is created by the student group initially linked to Audi and this is why it shares some of the key design philosophy values that are attributed to Audi: such as progressiveness, creativity and commitment. The brand name eGO is built up on two parts: “e” that stands for electricity and “GO” that denotes the status of being on the move. eGO also refers to the word ego meaning to emphasize the personal dimension of using the scheme since cycling as a whole is a way to transport oneself to another location; an individual and autonomous move. This however does not symbolize a self-centred attitude entirely disengaged from pro-social behaviour; on the contrary, using this bike-sharing scheme is a way to make a personal statement about actively doing something for a more sustainable future.



Figure.2 eGO Bike-Sharing System (Designed by Axelsson, Kääpä, Pukala, Olsson & Olsson)

The futuristic design elements of the single-sided front fork and the lack of extra supportive bars for the back wheel, together with a unique bicycle alert system that is based on a chip addition, are some of the key design features of the vehicle. The inclusion of the bicycle basket in the design makes the eGO bicycle a vehicle that could be shopper-friendly. A smartphone holder placed on the basket is an addition meant to promote a mobile application, designed to provide dynamic information to the system user, something that denotes the attempt to make this electrical vehicle an intelligent vehicle that goes far beyond than being just another bicycle.

4.3 E-motion

E-motion is a design solution that its main focus lies on maximizing the benefits of bike-sharing in Gothenburg in terms of both exploration and user experience. It is hypothetically linked with BMW brand values. The asymmetrical design of the vehicle, the use of an electric motor that together with a pedal assist sensor, provide comfort to wider (not particularly athletic) audiences and the intelligent technology touches, such as the GPS/Smartphone holder that allows on-board charging from the vehicle's battery resource, are the details that differentiate e-motion. The larger-than life bike stations that provide visibility of the scheme and automated bike off the ground storage are two very bold design ideas that mean to make the system overall an attraction for the city's transport. Free two-hour travel cards are proposed to attract first-time users, while e-motion will heavily invest on integration with other modes of public transport by becoming part of the Västtrafik card package.



Figure.3 E-motion Bike-Sharing System (Designed by Andersson, Engelshove, Epp, Knutsson & Li)

4.4 Go:places

Go:places is a bike-sharing design proposal that has a name inspired by the city's own brand Go:teborg and the new Toyota (which is the hypothetical mother company of the brand) tagline "let's go places". Its mission is to provide the most flexible option of Gothenburg's public transportation, encouraging a healthier lifestyle and a healthier environment. The use of a significant number of electric bicycles is designed to allow the scheme to be appropriate for wider road user audiences. Soft organic lines have been used as natural forms to make bicycles look more user-friendly, while using a minimal amount of materials and mostly recyclable steel enhances the system's sustainable value. A special lock mechanism placed on the bicycle basket is designed to improve the pick-up and drop-off processes and to improve security. The stations are designed to give a welcoming impression, providing clear auidal, visual and haptic interaction with the users through non-complex smart technology but at

the same time are built with durable materials and anti-vandalism principles. Information is provided in six different languages, while four subscription options namely: annual, monthly, 3-day and 10-hour are offered.



Figure.4 Go:places Bike-Sharing System (Designed by Emfors, Lindahl, Mårdsjö & Rolfö)

4.5 Smarter

Smarter is a brand name linked through the course-based hypothetical affiliation scenario with Mercedes Group's Smart brand. The name denotes that using this scheme is a smarter personal mobility choice in terms of benefiting environment, health, economy and even the city's accessibility levels. It is a scheme designed to serve the vision of encouraging responsibility for the future of Gothenburg as a "sharing" process. The bike has a minimalistic approach using straight lines and a simple frame shape that is constructed from aluminum to enhance the agility factor of the vehicle. However, some futuristic design touches like the three spoke wheels mean to attract the user's attention by making the bicycle noticeable and different from what is currently on market. The bicycle is equipped with a five-step gear range and an electrically powered pedal assistance system to attract more physically limited users that could be put off by Gothenburg's hilly landscape. The little electrical engine powers the front and rear lights of the bicycle. The station facilities are based on a modular approach. A typical module consists of two docking stations with a room for two bikes each and a protective roof. Modules can be placed side by side, opposite to each other or in any other configuration that suits the specific location. The logo is displayed in each stationary facility to support recognition. Apart from season passes, the scheme has 1-, 3- and 7-day tickets. Mobile applications and advertising events are an integral part of the scheme's promotion strategy.



Figure.5 Smarter Bike-Sharing System (Designed by Hjort, Salquist Landin, Sandberg, Sjöstrand & Tangnavarad)

4.6 Pedale

Pedale is a design proposal that means to hypothetically deliver a greener means of transportation by providing an affordable, innovative and easy-to-use bike-sharing system that works towards a unified vision of transport, where Pedale together with its customers could co-create sustainable behaviours as inherent acts. This sub-brand was initiated from the team that studied Renault, so there are design influences from this background relation. Pedale's design strategy is all about creating a complete service experience that goes beyond the bike-renting phase of the journey by having formidable pre- and post-service phases strongly supported by social media and intelligent technology. For example a reflect-phase will be introduced when Pedale users, long after they have returned the bike, could be eligible to "get something in return" for using the system through a point-collecting application. Integration with Gothenburg's public transport will be achieved by subscribing this service to the Västtrafik card becoming part of the all-in-one public transit package. Payment options through mobile applications will make the service more flexible. The most innovative design element that Pedale has to offer, nonetheless, is the use of virtual stations. This is a strategic choice, set to abandon the idea of building costly stationary facilities exclusively for bike-sharing and instead use existing public bike-racks integrating the system into the current landscape in a sustainable and unique manner that maximizes the benefits of the city's already existing valuable assets. This could give amazing flexibility to system users, allowing them through advanced bike positioning technology to park almost everywhere within the city. Stainless steel and recycled plastic are the materials used for manufacturing the bicycle. A battery that could be recharged through kinetic energy, a GPS-device, a GSM-transmitter and receiver and a gyroscope to ensure that bikes are always parked in an upright position are unique features of the vehicle design.



Figure.6 Pedale Bike-Sharing System (Designed by Alvenby, Rehnmark, Rodriguez, Tsang & Wahnström)

4.7 We:bike

We:bike is hypothetically linked with Fiat. The scheme means to be founded on the use of electrical bicycles in an effort to make the journey experience more pleasant and easier for people that could be less-abled cyclists. Background research revealed that 80% of the current system users are male and for this reason, we:bike is set to make an effort to attract female users by incorporating some "more feminine" features in its vehicle design. The vehicle has a spacious basket, five gears, a battery with independence for 50 km and an adjustable seat. The bike frame, terminal and docks will be constructed from recycled aluminum, reducing energy used to process and manufacture these components. The we:bike tyres will be sustainable; not produced by petroleum but instead by

orange oil. We:bike aims to make the signing up process less challenging; cards will be available almost in every shop in Gothenburg, besides the bike-sharing stations and the online purchasing option. The interface of the terminal touch screen is improved to become more user-friendly and informative. Audio information is dictated alongside visual information to make the cognitive effort lesser. An after-use experience will be supported from the brand's web-page, providing information to interested users regarding the distance they travelled, the time they cycled and the CO₂ emission savings they contributed for. Building a virtual community will promote motives for more sustainable behaviours. To actively promote sustainable mobility with particular respect to Gothenburg and its distinctive landscape, phrases such as 'We love uphill' and 'We love sustainability' denoted with a red heart enclosing an electric plug symbol, will be placed on the back of terminals around the city.



Figure.7 We:bike Bike-Sharing System (Designed by Adams, Capellan, Forsaeus, Jonsson & Joshi)

5. Conclusions

Bicycling is a non-regulatory way to “explicitly privilege the goals of social and environmental justice as part of a more robust vision of transportation equity” [5]. Bike-sharing schemes could be a promoting mechanism of this very vision by bringing together all the advantages of private bicycle use with the added benefit of disengaging cycling from all the hurdles of vehicle ownership. Furthermore, public bicycles could be utilized as an adequate modal platform that connects cutting-edge green public transport for short trips with a very personalized mobility option that offers a great extend of travel autonomy, in terms of routing and scheduling, which conventional public transit cannot usually offer. Thus, shifting the focus of a new generation of designers, via this novel educational approach, from merely catering for the automobile dictated needs of a city to designing attractive bike-sharing options that could facilitate a balanced modal split, is indeed a timely and meaningful task. The work summarized herein proposes a number of substantial upgrade design options for the bike-sharing scheme of Gothenburg that have been based on the real design problems and inefficiencies of the Styr & Ställ system. The paper makes the case that by: a) employing intelligent technology applications for improving the pre-service, on-board and post-journey experience, b) introducing fully electrical or pedal-assisting bicycles of environmentally friendly design, and c) integrating the scheme not only with a city's public transit or landscape but with its very own urban identity, bike-sharing can eventually transform to an inspiration for sustainable living. Ultimately, by practically embracing design as a “co-production process”, where designers and users come together to decide on how to craft the bike-sharing of tomorrow, this work covers a wide spectrum of human-oriented and green design solutions that could captivate road users acceptability and potentially loyalty.

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