A Study on Student's Opinion on Bicycle Sharing in Campuses with Respect to Bangalore City

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Abstract - Sustainability has become the need of an hour today. This is evident not only in businesses but also in cities. Even the universities are focusing on sustainability in the past few years like adopting energy saving initiative, using of renewable energy, environmental procurement, waste management etc. Bicycle Sharing is one among these initiatives. Bicycle sharing is a service where bicycle are made available to the individuals for a short period of time. Bicycles are not owned by any individuals but anyone in the community can have access to it. The main objective of the study is to know the opinion of students regarding the proposed Bicycle Sharing Program in their Campuses. It will be used by the students to travel within the campus and it also saves the time of the students

Keywords: Active Transport, Cycle, Sustainability, Sharing

I. INTRODUCTION

Bicycle sharing is a service where bicycle are made available to the individuals for a short period of time. It is an inexpensive mode of transportation. The idea of bicycle sharing was first implemented in Netherlands in 1965 where a fleet of bicycles were left in the streets of the city for public use and thanks to the technology a feasible format emerged in the mid 2000's. As of June 2014, this system was implemented in 50 countries including 712 cities with more than 806200 bicycles operating in 37500 stations. The main objective of this system is to provide affordable means of transportation by providing accessibility to bicycles for short trips. These systems exists typically in a limited geographical area such as college campus, central business district (CBD) and can be privately or publicly owned. Bicycle sharing system can be adopted in the campuses where students will be the beneficial. In this system students can use bicycles to travel within the campus. It is suitable for large campuses where students need to travel a lot from one place to another place. Here students can pick up the bicycles from one place say main gate and drop it off to another place say Canteen. It helps to save time of students as it is faster than walking.

Bicycle sharing is gaining global attention as an important climate smart transportation strategy to support sustainable cities. Public bicycle sharing programs or PBSP are low carbon alternatives that provide point-to-point mobility for short travels (Shaheen*et al.,* 2011; Midgely 2011). PBSP allocates a number of bicycles for shared individual use within a particular area, generally in relatively denser inner city areas. A person can take out a bicycle from one docking station for a short trip (usually taking between 30 and 60 minutes) and then return the bicycle to any other docking station, in lieu of using or complementing other transportation modes (e.g. car, public transit, taxicab and walking). Bicycle sharing business models vary depending on the operator, cost of usage, usage time allowance and operating times (Shu *et al.,* 2010).

II. LITERATURE REVIEW

Thomas Knipe (2010) conducted a study on "Bike Share-Summary Report" objective of which was to develop as set of recommendations for the university and limitations of various bike share programs. Personal interview with the independent bike share consultants and web based research was conducted. The recommendation of the study was user accountability is vital to the long term success of the program. User accountability is important due to theft, repair issues and tracking of inventory. Linking students ID card or credit card directly seemed preferred solution.

Sebastian Schlebusch (2010) in his study "Bicycle Sharing in Delhi–User Evaluation" purposed to evaluate bicycle sharing to offer mobility solution for individual to go from metro station to their places respectively. The research method used in this study is descriptive. Primary data is collected through questionnaire both in Hindi and English from 191 respondents. It was found that users can benefit from this but the trip has to begin and end in the same location. Besides, without any online, mobile phone, smart card based registration facilities, the process of registration is very inconvenient as the user need to deposit documents at station every time they use this service.

Shaheen, Camel and Velu (2011) have conducted a study on "California Department of Transportation, District 4 Employee Bike sharing Pilot Program Evaluation". The main purpose of which was to examine pilot employee bike sharing program at the 'California Department of Transportation District office' in Oakland, California. Online questionnaires were distributed: one before and after their participation in the program. This study concluded that bike sharing programs provide various benefits such as decreasing pollution, improving health and addressing traffic congestion. Most respondents favored for the continuation of shared bike program.

AshishHeda (2012) in his study "Implementation of a Bike Sharing Program on Washington University's Danforth Campus" tried to analyze the cost that is involved in implementing a bike sharing system, and to discuss what features to be modified or removed for a university campus. The changes were made on the basis of survey data collected from potential users who are students and interview of experienced communities of bicycle sharing communities. This data was then utilized to determine location and number of bike station and number of bikes that would be required. It is recommended that Washington University can invest in this program because of many benefits which includes reaching to wider population of students, requiring only few bikes on the campus, offering more part time on-campus jobs, taking a tangible and visible step towards healthier and greener campus.

Sustainability Committee (2012) conducted a study "Bicycle Sharing Feasibility Study" where all documents related to bicycles use on campus was collected in order to understand the problems faced in the campus. Recent international literature was researched in order to discover new technologies available and articles related to programs started at other campuses provided relevant case study comparisons. It was found that the campus is not yet prepared to implement more complex sharing of public bikes. The major problem faced is the physical bicycle pathway network and associated unsafe behavior of the campus cyclists.

III.RESEACH METHODOLOGY

The scope of this study covers Bangalore city only. It focuses on Bicycle sharing concept that can be applied in the campuses of various colleges. This study is mainly concentrating on students to know their opinion and acceptance of this new service. Only 150 respondents have been chosen for the study. The study is undertaken by me to understand the student's opinion regarding introduction of Bicycle sharing in their campuses.

IV. OBJECTIVES OF THE STUDY

1. To know the opinion of students about introducing bicycle sharing system in Campus.
2. To identify factors that influence students while availing Bicycle Sharing Program.

V. RESEARCH DESIGN

Exploratory study, the research methodology used in this study is exploratory research. Exploratory research design is used when there are no or very few studies available on a particular problem. It is very helpful for the researcher as it will detail even when small amount of information is available. It is conducted when the researcher has some bit of idea but wants to know/explore about it more. Exploratory research design helps us to understand the subject of the study in preliminary way.

VI. SAMPLING PLAN

1. *Sampling Unit:* College Students belonging to Bangalore city
2. *Sampling Size:* 150 students
3. *Sampling Technique:* Non probability sampling within which convenience sampling have been selected
4. *Sampling Instrument:* Structured questionnaires were distributed to the students directly to know their opinion.

VII. LIMITATIONS OF THE STUDY

1. The study is carried out only in Bangalore city.
2. The responses given by the students may be biased.
3. Because of the time constraint the study is only conducted on a small population and only some campuses are selected.
4. Few people might have filled the questionnaire casually because of the busy schedule which might have affected the conclusion.

VII. ANALYSIS AND INTERPRETATION

A. College Name

TABLE I COLLEGE NAME

S. No.	College Name	No. of Respondents	Percentage (%)
1	RNSIT	43	28.67
2	DayanandSagarCollege of Engineering	14	9.33
3	Christ University	39	26
4	Acharya Institute of Technology	47	31.33
5	Alliance School of Business	07	4.67
	Total	150	100

Source: Survey Data

From the table, we can say that 31.33% (47) of the respondents are from Acharya Institute of Technology, 26% (39) of the respondents belong to Christ College, 28.67% (43) of the respondents are from RNSIT, 9% (14) of the respondents are from DayanandSagar College, 4.67 % (7) are from Alliance School of Business.From the information available we can say the majority of the respondents belonged to Acharya Institute of Technology i.e. 47 (31.33%) and least to Alliance i.e. 7 (4.67%).

B. Current Mode of Commute within the Campus

From the below table, it is observed that 91.33% (137) of the respondents walk, 8% (12) use motorbike and 0.67% (1) use bicycle to commute within the campus. So from the above information we interpret that majority of the respondents use walking as their in-campus medium of commute. Bicycle is the least preferred mode of travel within the campus. We can see that most of the people don't use bicycle to travel within the Campus.

TABLE II CURRENT MODE OF COMMUTE WITHIN THE CAMPUS

S. No.	Current Mode of Commuting within the Campus	No. of Respondents	Percentage (%)
1	Walking	137	91.33%
2	Bike	12	8%
3	Bicycle	1	0.67%
4	Others	0	0%
	Total	150	100%

Source: Survey Data

C. Distance Travelled by Students withinthe Campus

TABLE III DISTANCE TRAVELLED BY STUDENTS WITHIN THE CAMPUS

S. No.	Kilometers	No. of Respondents	Percentage (%)
1	Less than a km	54	36%
2	1 km	42	28%
3	2kms	23	15.33%
4	3kms	9	6%
5	More than 3kms	22	14.67%
	Total	150	100%

Source: Survey Data

From the survey information, it is observed that 36% (54) of students travel less than a Kilometer, 28% (42) travels 1 kilometer, 15.33% (23) travels 2 kilometers, 6% (9) travels 3 kilometers and 14.67% (22) of the respondents travels more than 3 kilometers. From the information it is known that majority of the students travels less than 1 kilometer within the campus.

D. Likeliness of Using this Program

TABLE IV LIKELINESS OF USING THIS PROGRAM

S. No.	Responses	No. of respondents	Percentage (%)
1	Certain	26	17.33
2	Likely	37	24.67
3	Probably	64	42.67
4	Unlikely	12	8
5	Never	11	7.33
	Total		100

Source: Survey Data

From the data, it is found that 17.33% (26) of the respondents will certainly use this program, 24.67% (37) of respondents are likely to use this program, 42.67% (64) will probably use this program, 8% (12) of the respondents are not likely to use this program and remaining 7.33% (11) of the respondents will never use this program. From the information, it can be interpret that majority of the respondents will probably use this program and there are less respondents who have said Unlikely or Never to this program.

E. Reasons for Using this Program

TABLE V REASONS FOR USING THIS PROGRAM

S. No.	Reasons	No. of Responses	Rank
1	Quicker than walking	56	2
2	Improved health & fitness	74	1
3	To support environmental causes	42	4
4	It's fun	50	3
5	Quick access to bicycle wherever I am	17	5
6	Provide affordable transportation	11	6
7	Others	1	7

Source: Survey Data

From the above table, it is found that 56 of the respondents will use this service as it is quicker than walking, 74 respondents will use this to improve their health and fitness, 50 respondents will use this because it's fun to use, 42 will use this to support environmental causes, 17 will use this as it provides quick access to bicycles wherever they are, 11 will use this as it provides affordable means of transportation and 1 respondent will use because of other reasons. All these reasons have been ranked based on the number of responses. So it can be interpreted that most of the students join this program for health and fitness and least preferred benefit is that it provides affordable transportation. Health is very necessary for students nowadays because students don't get time to do exercise.

F. Where do the Students Want to Travel

TABLE VI WHERE DO THE STUDENTS WANT TO TRAVEL

S. No.	Options	No. of Respondents	Percentage (%)
1	Only within the campus	24	16
2	To nearby places	55	36.667
3	B/w hostel and college	8	5.333
4	All of the above	48	32
5	Neither	15	10
	Total	150	100

Source: Survey Data

From the survey data, it is found that 16% (24) of the respondents would like to travel within the campus, 37% (55) of the respondents would like to travel to places nearby campus, 5.33% (8) of the respondents have would like to use bicycle for travel from hostel to college and vice versa and 32% (48) would like to use this to travel within the campus, nearby places and from hostel to college, 10% (15) of the respondents would not like to travel at all. From the information, it can be interpret that most of the respondents would like to use this bicycle sharing to travel to nearby places around campus.

G. Features tobe in Bicycle Sharing Program

TABLE VII FEATURES TO BE IN BICYCLE SHARING PROGRAM

Particulars	V.I	I	M.I	L.I	U.I	Total	W.M	Rank
Flexibility to return to any station	83	53	10	2	2	150	4.42	1
Multiple Location	51	70	22	2	5	150	4.07	2
No responsibility of Maintenance	40	46	33	17	14	150	3.54	6
24 Hours access to Bicycles	51	50	23	19	7	150	3.93	4
GPS technology to track Bicycles	53	44	23	16	14	150	3.71	5
Both long term and Short term usage	48	58	23	16	5	150	3.85	3

Source: Survey Data

From the above information, we have calculated weighted mean for the various features and respondents have assigned their importance. We have got weighted mean 4.42 for flexibility to return bicycle to any station, 4.07 weighted mean for multiple location, 3.85 for both short term and long term usage, and 3.93 for 24 Hours access to bicycles, 3.71 for GPS technology and 3.54 for no responsibility of maintenance. We have ranked these according to their weighted mean. From the information we can interpret that almost all the features are have got good ratings.

H. Preferred Way of Using the Program

TABLE VIII PREFERRED WAY OF USING THE PROGRAM

S. No.	Basis	No. of Respondents	Percentage (%)
1	Hourly basis	50	33.333
2	Daily basis	51	34
3	Monthly	31	20.667
4	Semi annually	10	6.667
5	Annually	8	5.333
	Total	150	100%

Source: Survey Data

From the above information, it is seen that 33% (50) prefer hourly basis, 34% (51) of the students prefer daily basis, 21% (31) of them prefer monthly basis, 7% (10) of them prefer semi-annual basis and 5% (8) of the students prefer to use this program on an annual basis. It can be interpreting that students want bicycle for shorter period.

I. Major Locations for Bicycle Stand

TABLE IX MAJOR LOCATIONS FOR BICYCLE STAND

S. No.	Place	No. of Responses	Rank
1	Near main gate	91	1
2	Near canteen	42	3
3	Near hostel	30	4
4	Near library	16	6
5	Near classrooms	48	2
6	Near auditorium	20	5
7	Near sports club	15	7
8	Others	4	8

Source: Survey data

From the data, it is observed that 91 of the respondents want cycle stands to be near the main gate, 42 near canteen, 30 near hostel, 16 near library, 48 near classrooms, 20 near auditorium, 15 near sports room and 4 of the respondents want at other places. The places have been ranked on the basis of number of responses. Cycle Stands/Stations near Main Gate is Ranked 1, 2nd rank to near Classrooms, 3rd rank to near canteen, 4th rank to near Hostel, 5th rank to near Auditorium, 6th rank to near Library, 7th rank to near sports room and 8th rank to other places. Thus, we came to know that the major locations for cycle stands will be near main gate and the respondents are least interested in keeping stands near Library and sports room.

J. Willingness of Students to Pay

TABLE X WILLINGNESS OF STUDENTS TO PAY

S. No.	Response	No. of Respondents								Percentage (%)
1	Yes	Amt likely to pay	Less than Rs.50	Rs.50-Rs 100	Rs.100-Rs.150	Rs.150-Rs.200	Rs.200-Rs.250	More than Rs.250	107	71.33%
		Total	33	32	10	13	16	3		
		Percentage	30.84%	29.91%	9.35%	12.15%	14.95%	2.8%		
2	No	43								28.67%
	Total	150								100%

Source: Survey Data

From the data, it is found that 71% (107) of the respondents are willing to pay for this service and 29% (43) are not willing to pay for this service. Out the 71%(107) of the respondents who are willing to pay, 30.84% (33) of the respondents are willing to pay less Rs. 50, 29.91% (32) are willing to pay Rs.50 to Rs. 100, 9.35% (10) are willing to pay Rs.100 to Rs. 150, 12.15% (13) are willing to pay Rs.150 to Rs. 200, 14.95% (16) are willing to pay Rs. 200 to Rs. 250 and 2.80% (3) of the respondents are willing to pay more than Rs.250. It is found that majority i.e. 71.33% (107) of the respondents are willing to pay for this service. So, it found that majority of the respondents are willing to pay in the range of Rs.50 to Rs.150 and less people are willing to pay the price more than Rs. 250(2.80%). We come to know that students are not willing to spend more.

K. Willingness of Students to Attend Events

TABLE XI WILLINGNESS OF STUDENTS TO ATTEND EVENTS

S. No.	Response	No. of Respondents	Percentage (%)
1	Yes	97	64.67%
2	No	53	35.33%
	Total	150	100%
If yes, What program			**Rank**
a.	Awareness Programs	38	2
b.	Demonstration	26	3
c.	Guest Talk	8	4
d.	Cyclethon	46	1
e.	Others	1	5
	Total	119	

From the data collected, it is observed that 65% (97) of the respondents were interested in attending events regarding Bicycle Share and 35% (53) of the respondents were not interested in attending events related to Bicycle sharing.Ranks are assigned on the basis of number of responses, Cyclethon have got 46 response and hence it is ranked 1st, Awareness programs have got 38 response so it is ranked 2nd, Demonstration have got 26 responses so it is ranked 3rd, guest talks have got 8 response and hence it is ranked 4th and other events have got only 1 response so have ranked 5th. We understand that most of the respondents were interested to attend events related to bicycle sharing and most of the respondents are most interested in Cyclethon and least interested in Guest talk.

VIII. SUGGESTIONS

1. It is known that majority of the respondents walk to travel within the campus and they don't have any quickest mode of commute other than walking. I would suggest colleges to implement this Bicycle Sharing program as it will be useful for the students.

2. Most of the students will use this program as it will keep fit and healthy so the colleges can focus on the theme 'Fitness' or 'Health' while implementing this program.

3. The colleges should make sure that students can return the bicycles to any cycle station rather than pickup point and the main locations for cycle stations should definitely include one near main gate, classrooms and canteen. This program should allow students to take bicycles for shorter durations as well like hourly basis.

4. The college should implement this program for free or should charge a minimal fee. The colleges should look for alternate means of generating revenue.

5. Colleges should conduct events like cyclethon to stimulate student's interest.

IX. CONCLUSION

Bicycle sharing system can be adopted in the campuses where students will be the beneficial. In this system students can use bicycles to travel within the campus. It is suitable for large campuses where students need to travel a lot from one place to another place. Here students can pick up the bicycles from one place say main gate and drop it off to another place say canteen. It helps to save time of students as it is faster than walking. This study reveals that majority of the respondents are likely to use this program when implemented. The major reason for the respondents availing this service will be for health and fitness purpose and also because it is quicker than walking. The major features this program should have is to have an arrangement to return bicycles to any cycle station and to have multiple cycle stands at various locations in the campus. The major location would be near main gate, classroom, and canteen.
The colleges in order to achieve success in this bicycle sharing program should charge the students very nominally and bicycles should also be made available for shorter duration of time. The college should stimulate the interest of the students by conducting cyclethon from time to time and should encourage students to have a cycling habit.

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