

		<p>Project title: Development of sensor-based Citizens' Observatory Community for improving quality of life in cities</p> <p>Acronym: CITI-SENSE Grant Agreement No: 308524</p> <p>EU FP7- ENV-2012 Collaborative project</p>
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Deliverable D3.4

Evaluation of the performance of the user cases: Public Places Annex

Work Package 3

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Dissemination level:	PU (Public)

ANNEX X: ANALYSIS OF DATA COLLECTED

i. General Results



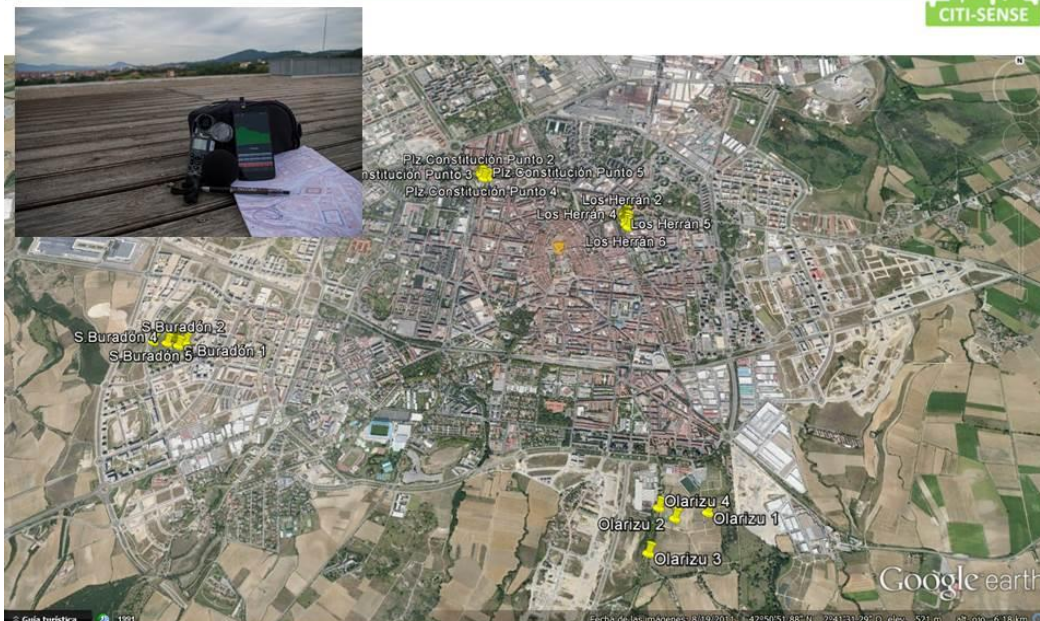
Vitoria-Gasteiz

- Los Herran
- Parque Salinillas
- Plaza Constitución
- Parque Olarizu

tecnalía Inspiring Business ibatuz

December 2015

Vitoria-Gasteiz: Four public sites



**55 People Involved
 (139 Valuations)**

Participants: psychosocial wellness & health



Health & lifestyle

Perceived Health 78% Good or Excellent

Few differences among areas

Perceived stress: high stress(21%), medium stress (31%)

Sleep 17% sleep less than 8 hours/day

- 12% consider not enough
- 30% sleep problems

Psychosocial variables: sensitivity

59% high to noise

25% high to heat

	N	42	34	33	30	139		
		Los Herran	Salinillas	Constitución	Olarizu (CEA)	% TOTAL	frec	Differences
Good Health		76,19	82,35	70,97	83,33	78,10	107	t
Car (frec)		21,43	47,06	41,94	16,67	31,39	43	*
Sleeping 8 h. or more		17,65	9,09	29,41	8,33	17,54	10	ns
Restful sleep (s/n)		83,33	85,29	96,77	90,00	88,32	121	ns
Sleeping problems(s/n)		30,95	29,41	25,81	33,33	29,93	41	ns
Noise sensitive		59,52	64,71	45,16	66,67	59,12	81	ns
heat sensitive		30,95	20,59	12,90	33,33	24,82	34	ns
High stress-1		26,19	20,59	19,35	16,67	21,17	29	t
Medium stress-1		28,57	41,18	16,13	36,67	30,66	42	t



Welfare and Quality of Life of People in their midst Urban or Territorial as megatrend

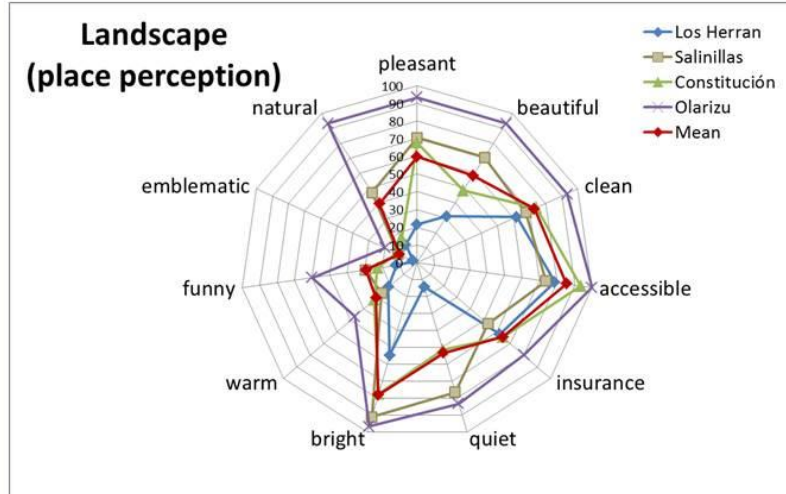
Compared Results: 4 public sites in Vitoria-Gasteiz



Landscape: Sites perception



- **Olarizu (O)** the Best landscape: natural, nice, clean, accessible, safe, quiet ... **pleasant**
- **Salinillas (S) y Constitución (C)**
- **Medium**
 - Salinillas is some nicer, quieter and brighter and more natural than Constitución
 - Constitución is more accessible and far, although less natural than Salinillas
- **Los Herran (H)**, the worst: uglier, noisy, dark ... less pleasant



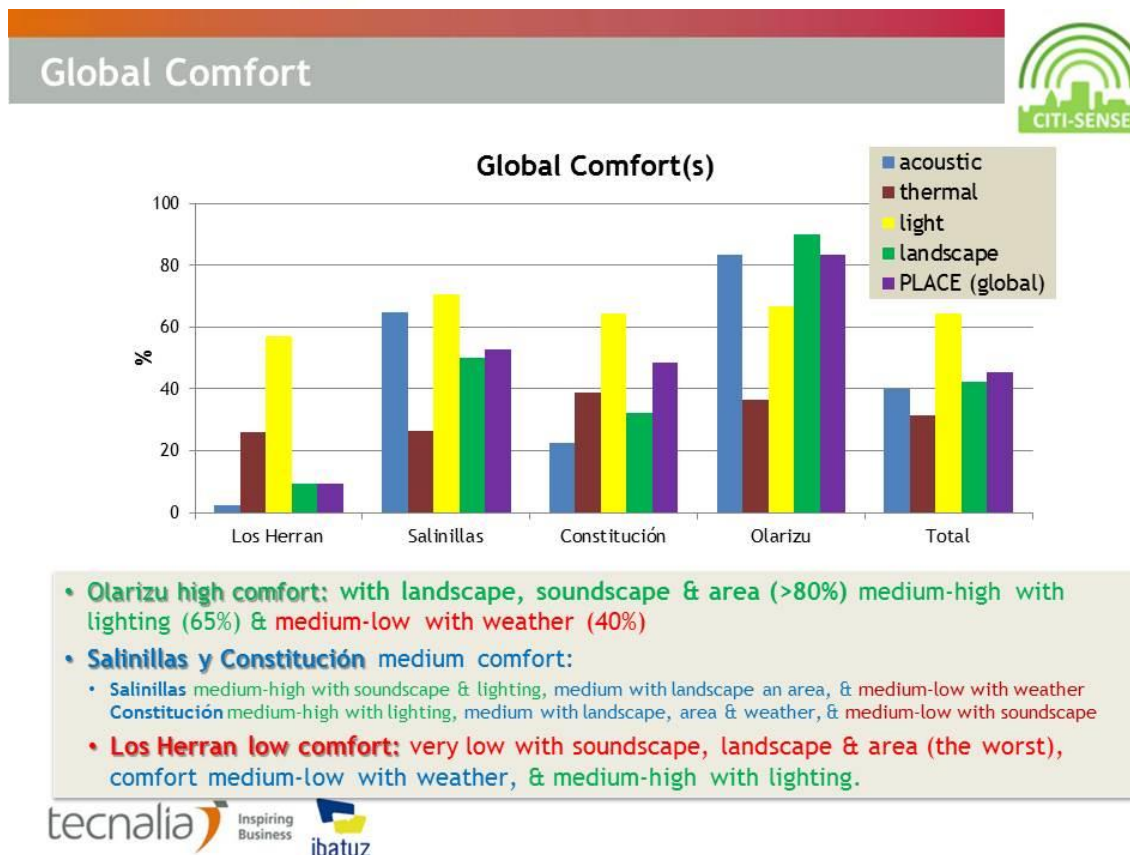
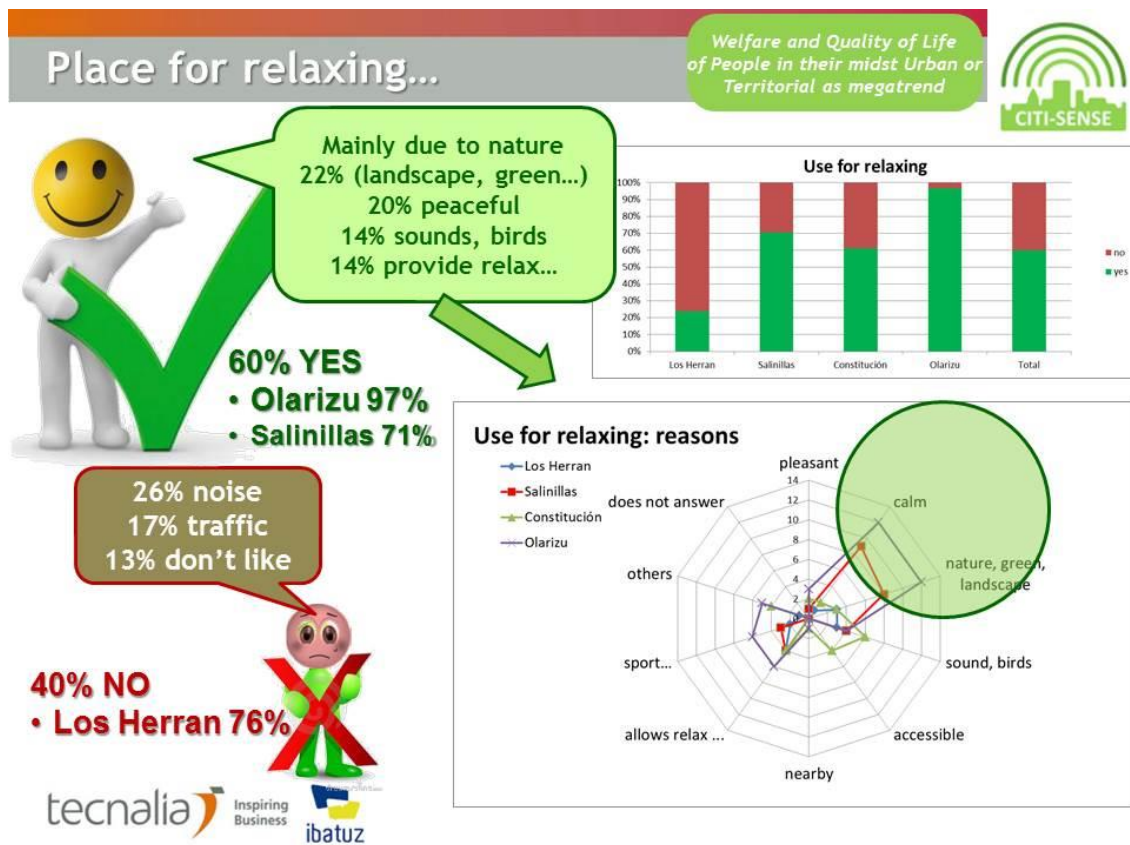
Most and least liked aspects...

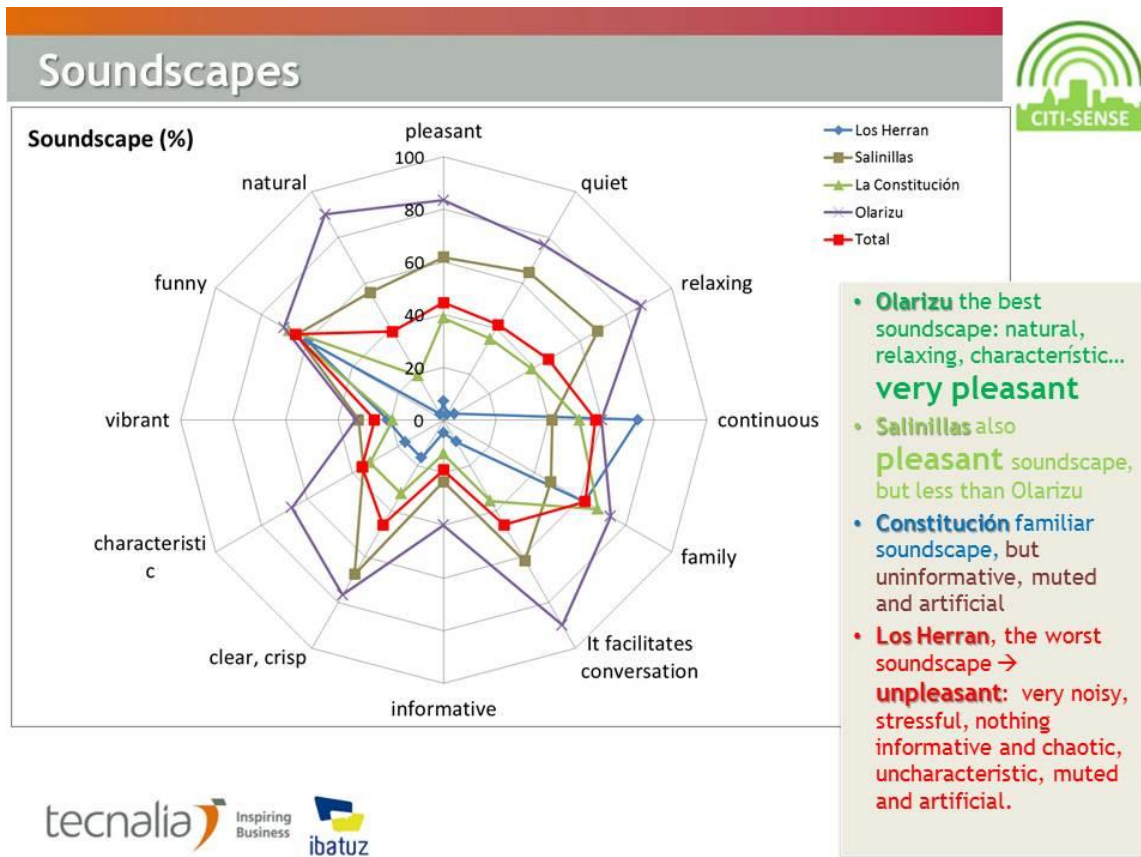


- 36% **Nature (All)**
- 19% **Landscape (S,O)**
- 12% **Sounds, Birds (H,S,O)**
- 10% **water, lake (C, O)**

- **Best valued** of the 4 sites is:
 - Nature, wooded, green (50/139)
 - Landscape, surround environment (26/139) → not in Los Herran
- **Also is positive**
 - Nature sounds, birds (16)
 - The water (14) → Only in C y O
 - Accessibility, closeness (11) → LH y C
 - Peaceful (10)
- **Worst rated**
 - Urbannoise, traffic (28/76) → mainly in Los Herran
 - Houses and surrounding (18) → Mainly in Salinillas
 - Weather conditions: Cold & wind (8) → Only in Salinillas & Olarizu

- 20% **Noise (H)**
- 13% **Houses, surrounding (S)**
- 7% **factories (O)**
- 6% **cold, winds(S, O)**



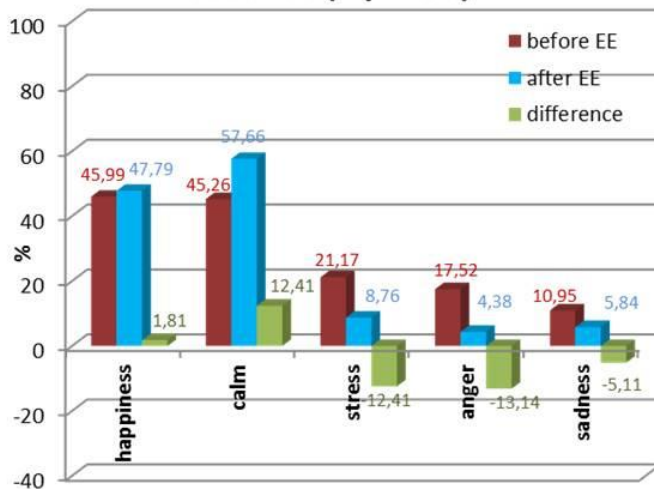


EE effects on emotions

		Activation	
		low	high
valence	Positive	calm	Joy
	Negative	sadness	Anger

Wellness and Health

Citizensense (4 places)



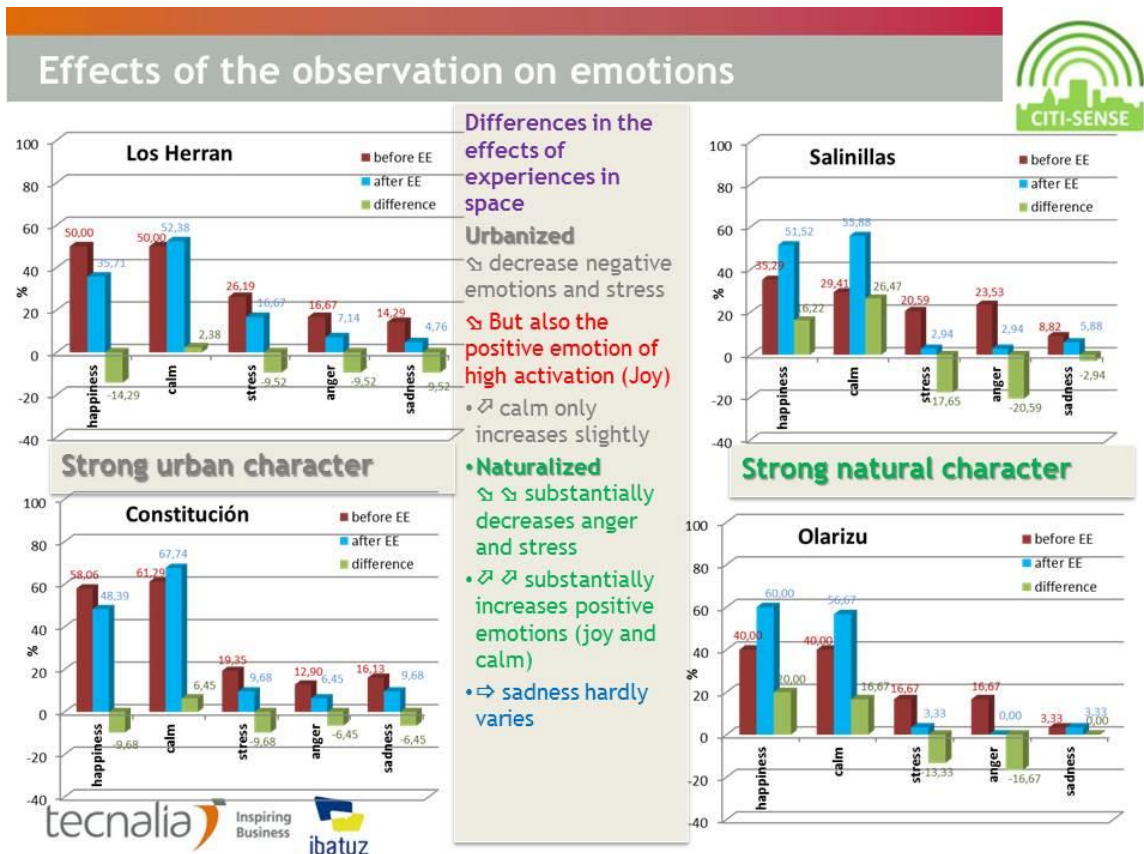
The experience in these open spaces have a positive effect on the health and wellbeing of people:

Substantially decrease the **STRESS** and the **ANGER**

- Increases **CALM**
- Slightly Decreases the **sadness**
- The **joy** hardly varies globally



Welfare and Quality of Life of People in their midst Urban or Territorial as megatrend



Conclusions (I)

- The four areas selected collect realities of EP varied from very urbanized very Naturalized
- Los Herrán → Constitución → Salinillas → Olarizu
- **Effect of degree of naturalness** in:
 - Increases soundscape and visual comfort
 - Los Herran: very low, Constitución: medium-low, Salinillas: medim & Olarizu: high
 - Enhances perception, Landscape & pleasantness
 - **Los Herran** It is the worst and least enjoyable
 - The worst rated is the **city noise, traffic** (mainly in Los Herran), **environment and houses** (mainly in Salinillas) and **weather conditions**: cold and wind
 - While **Olarizu** is the best and most enjoyable: natural, nice, clean, accessible, safe, quiet ...
 - The best rated are the **elements and nature sounds** (trees, green), **landscape, environment, water** (Constitución & Olarizu), **accessibility, proximity, peaceful** ...
 - Enhances soundscape (perception)
 - **Los Herrán** the worst: very noisy, stressful, uninformative, chaotic ... → **unpleasant**
 - **Olarizu** natural, relaxing, characteristic: the best soundscape ... → **very pleasant**

Conclusions (II)



• Effect of degree of naturalness in:

- Increases the use for **relaxing**:
 - from 22% in Los Herran (60% Constitución y 70% Salinillas) to 97% in Olarizu
- Decreases more high activation negative emotions like **anger**
 - Los Herran (-10%) → Olarizu (-17%)
- Decreases more **stress**
 - Los Herran (-9%) → Olarizu (-13%)
- Increases high activation positive emotions like **Joy** than in urbanized areas:
 - Los Herran (-14%) → Olarizu (+20%)
- Increases low activation positive emotions like **calm**
 - Los Herran (+2%) → Olarizu (+17%)

Overall experience in open spaces has a positive effect on the health and wellbeing of people: *** Reduces substantially the STRESS and ANGER, *Increases CALM y* Decreases slightly SADNESS.**

ii. Results of Los Herran

28 observations were made.

Description of place

Time of development	Potential future renovation
Type of urban area	Residential. High density. It is part of the inner traffic ring of the city. The shape of the street is a boulevard with a pedestrian area at the centre of the two ways traffic (two lanes each).
Maintenance	Regularly maintained
Greenery	Grass, bushes and scattered trees
Location in the city	City centre. It is located at one of the edges of the city centre and close also to emblematic spots of the city: old city and art museum.
Aim of the evaluation	Identify ideas for renewal. The main bus station of the city was located on this area. There have been different initiatives and projects to renovate the area, including the building that was used as bus station.



Figure 36. Sites for the full implementation in Los Herran (old) bus station area.



Figure 37. Detail of site 1.



Figure 38. Detail of site 2.



Figure 39. Detail of site 3.



The cover features a white central panel on a red and orange background with abstract wavy lines. At the top is the Citi-Sense logo. Below it, the title 'Citi-Sense Experiences Vitoria-Gasteiz Los Herrán' is written in green and black. At the bottom of the panel are the logos for 'tecnalia Inspiring Business' and 'ibatuz'. The date 'December 2015' is printed in white at the bottom right of the cover.

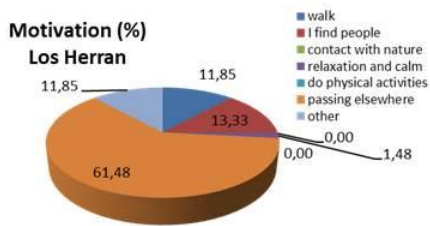
Los Herrán

28 people involved
(42 evaluations)

	Smartphone data collected				Shared in the workshop
	Measurement	Perception	66 Comments (contributions to the open questions)	32 Photos	
Diagnosis	X	X			
Evaluation		X	X	X	X
Ideas / Proposals				X	X

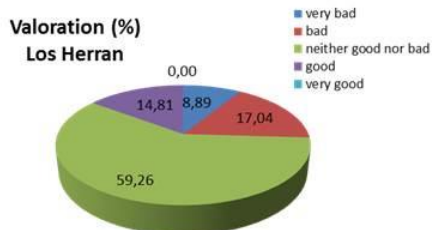
Los Herrán: Previous experience at the place (I)

90% of participants have previous experience



• Main reason for use: passing by (61,5%)

- Others:
 - Meeting with others (13%) and
 - Walk (12%)



• Los Herrán Valuation → Place neither good nor bad

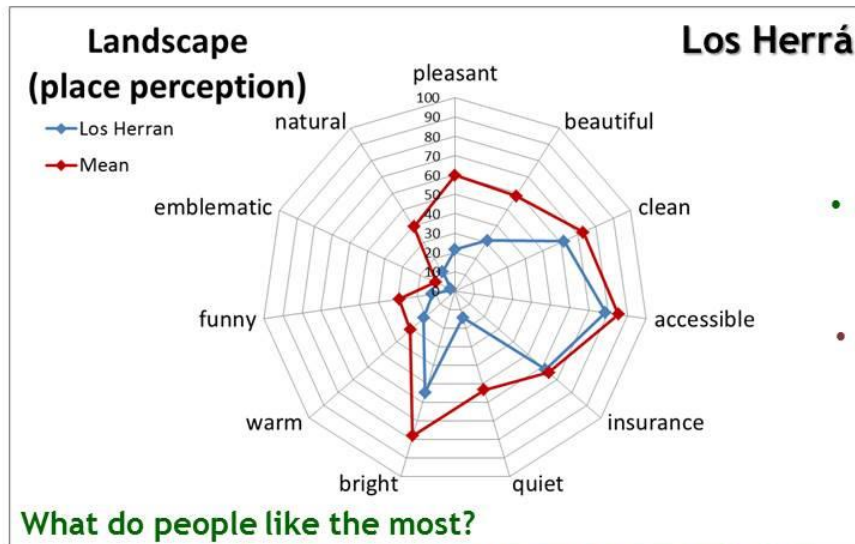
- Bad (26%)
- Good (15%)

Los Herrán: Previous experience at the place (II)



- **Frequency of use:** Very varied,
from daily (24%) to occasionally (35%)
 - 24 hours: in different periods of the day (69,6%)
 - Weekly: labor days (27,6%) or when it suits them (33,3%)
 - Annual: during the whole year (91,9%)
- **Use time:** Short,
from 0 to 15 minutes (63,0%)
- **From where:** From house (27,4%)
- **Distance:** Very varied
- **Transportation mode:** Mainly walking (63%),
also by car (23%)

Los Herrán: Place Perception



Los Herrán is perceived as

- Accessible
- Clean
- Safe & luminous
- ...but also as
 - artificial
 - not emblematic
 - Noisy
 - Boring
 - Cold &
- Unpleasant

What do people like the most?

→ Green (nature) element & accessibility

What do people dislike the most? → Traffic noise

23,8% would use it for relax ← Due to its nature & noise elements...

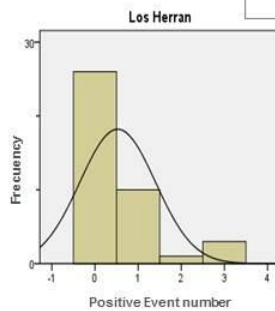
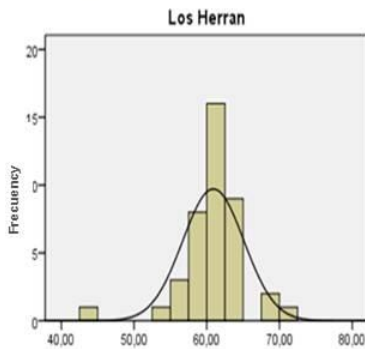
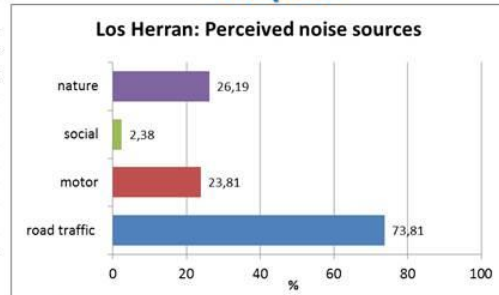
Los Herrán: Sound environment & comfort (I)



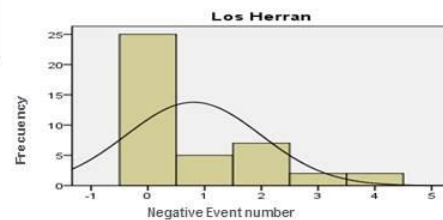
Objective Parameters

	Estadísticos descriptivos				
	N	Mínimo	Máximo	Media	StandDev
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
ESEI	41	3,43	9,66	6,5298	1,42357
laeq	41	43,49	70,11	60,9037	4,20846
laeqmax	36	65,40	97,11	79,2653	6,09054
laeqmin	38	33,29	52,54	47,5687	3,36463
nº de eventos	41	0	9	1,41	1,975
nº de eventos positivos	40	0	3	,53	,877
nº de eventos negativos	41	0	4	,80	1,188
N válido (por lista)	34				

Perception



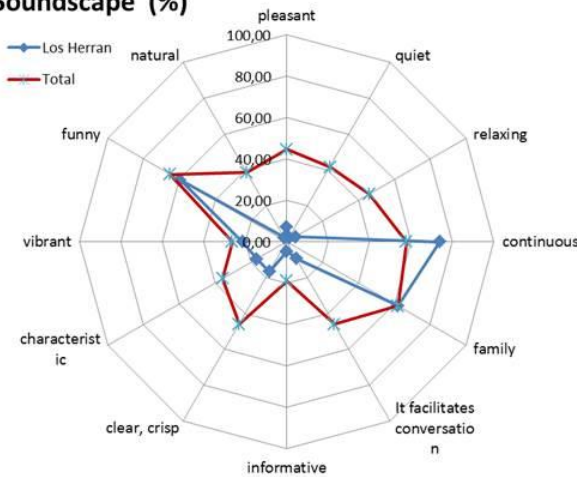
The most important noise source is traffic (73,8%), that is evaluated as unpleasant (48%) or very unpleasant (21%)



Los Herrán: Sound environment & comfort (II)

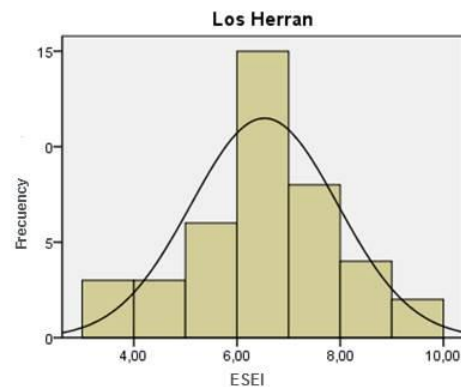


Soundscape (%)



- Soundscape continuous, funny & familiar...
- ... but also artificial, noisy, uninformative, difficult to talk, chaotic, not characteristic & muted
- ... that is unpleasant

- The **ESEI** -*sound environment index*- is **medium** 6,5 (sd=1,4), ranging from
 - 5 (medium-low) to
 - 8 (acceptable).

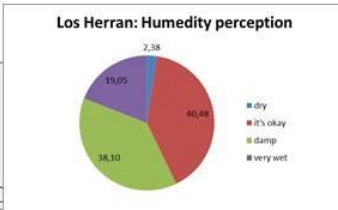
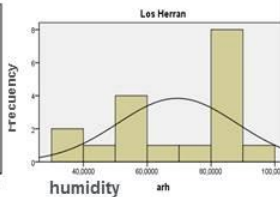
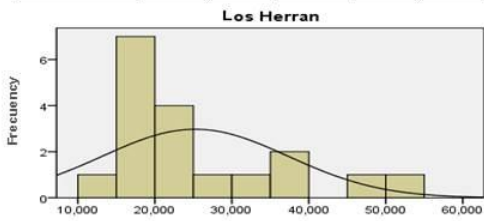
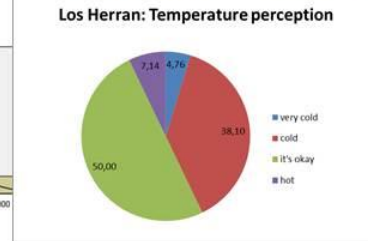
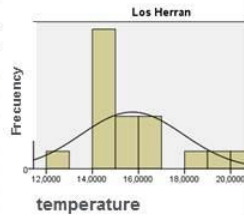


Los Herrán: Thermal environment & comfort (I)

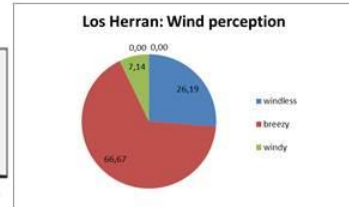
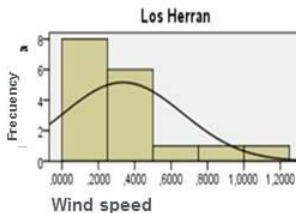
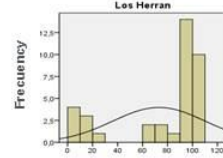


Objective Parameters

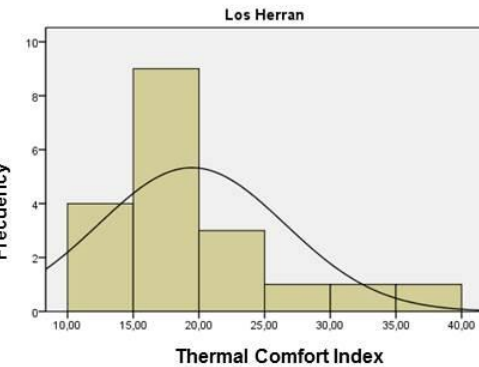
	Estadísticos descriptivos				
	N	Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
Índice de confort térmico	19	11,38	38,39	19,4616	7,10736
at	18	12,1695	20,7831	15,729799	2,2129235
avis	17	0,105	1,2309	3,35777	3,282911
arh	18	35,8389	98,3621	69,430126	18,6870833
tmrt	18	11,816	51,953	25,24022	12,089609
P3_radiación	42	0	1	,40	,497
P3_Cubierta	37	0	100	73,14	37,164
P3_actividad	42	1	9	4,38	3,043
Clos_TOT	42	,84	1,12	,9195	,19035
N válido (por lista)	18				



Mean radiant temperature



Sky coverage

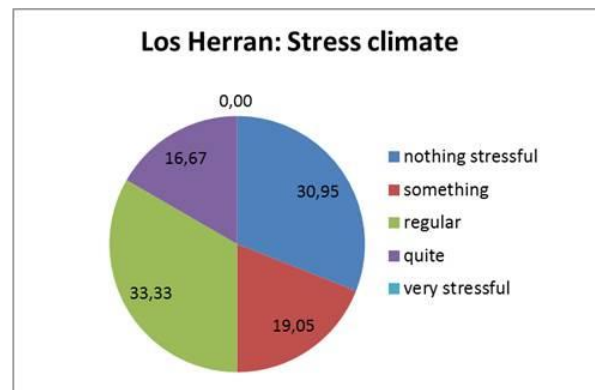


Low thermal stress

- The majority consider thermal conditions nothing (31%) or just something stressful (19,1%)
- 16,7% consider that the climate is quite stressful

The average PET is 19,5 (sd=7,1) → comfortable

- some people consider slightly cool
- And others slightly hot



Results of perceived comfort and indicators



LOS HERRÁN PUNTO 1

Paisaje percibido

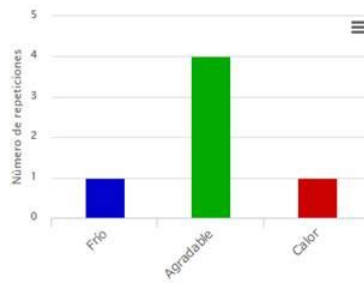
Confort térmico

Confort acústico

Confort global percibido

The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (objective) of observations with similar perception values

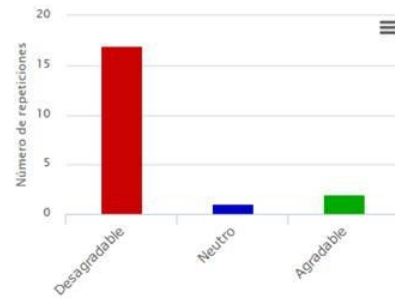
Confort térmico



Valor PET medio

Frío	Agradable	Calor
15.36	17.48	28.63

Confort acústico



Valor ESEI medio

Desagradable	Neutro	Agradable
6.37	6.38	6.76



Results of perceived comfort and indicators



LOS HERRÁN PUNTO 2

Paisaje percibido

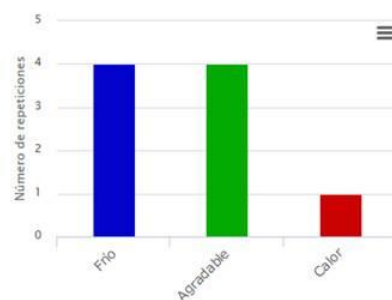
Confort térmico

Confort acústico

Confort global percibido

The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (objective) of observations with similar perception values

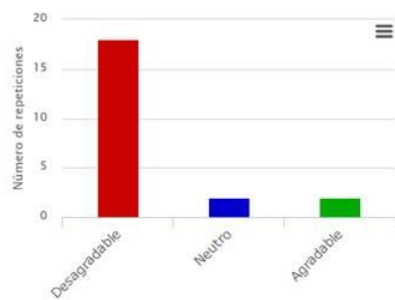
Confort térmico



Valor PET medio

Frío	Agradable	Calor
14.59	18.06	38.39

Confort acústico



Valor ESEI medio

Desagradable	Neutro	Agradable
6.40	7.69	3.57



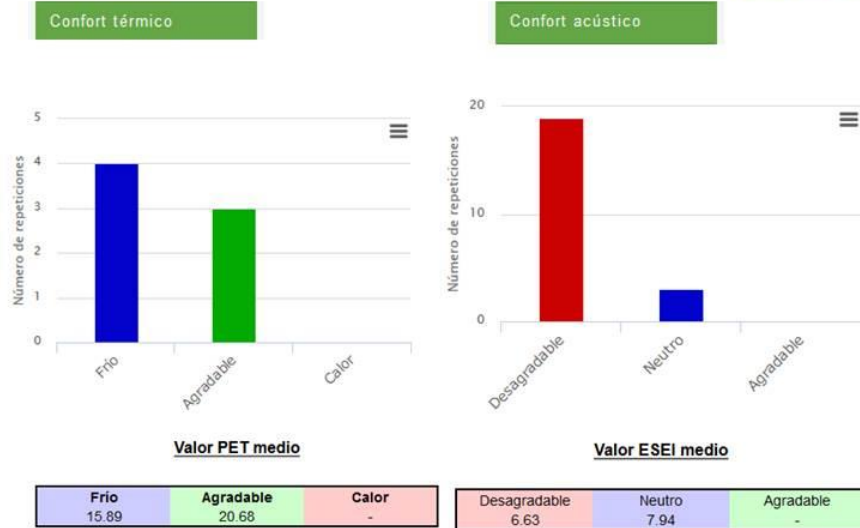
Results of perceived comfort and indicators



LOS HERRÁN PUNTO 3

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido

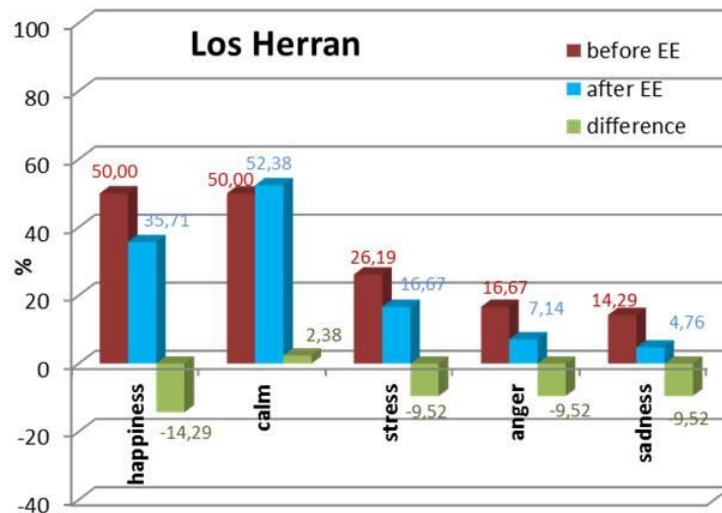
The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (objective) of observations with similar perception values



Effects on perceived emotion



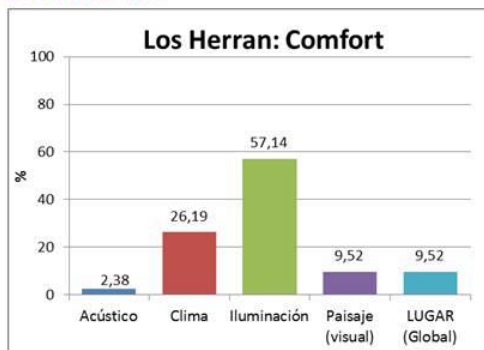
- Negative emotions and stress decrease
- but happiness also decreases



Comfort Analysis



- **Los Herrán boulevard** is perceived as **Accessible, Clean, Safe & luminous** but also as **artificial, not emblematic, noisy, boring, cold** → **unpleasant**
- **Noise Environment** is considered as **continues, funny & familiar...** but also as **artificial, noisy, uninformative, difficult to talk, chaotic, not characteristic & muted...** that is to say **unpleasant** → **ESEI 6,5 acceptable that needs improvement actions**
- **Thermal stress is low** → **The PET indicates thermal conditions are comfortable**



- **Los Herrán boulevard is**
 - Acoustically almost nothing comfortable
 - Visually very uncomfortable
 - Climatically something comfortable
 - Lighting implies average comfort

Overall the comfort is very little

Comments



KEYWORDS: Traffic, Noise, Pollution, Sunny day.

The weather during the data collection was very sunny.

General Comments associated to noise / pollution generated by traffic.

Sound Environment: Traffic Noise/ Traffic lights
Sound sources: Nature 26% <-> 74% Traffic

Thermal comfort sunny weather / annoying sunlight

Results: Rating of Items



Results: Suggestions



Los Herrán: Summary



- Comfort indicators represent correctly participants` perception.
 - The acoustic comfort is very low. Traffic noise levels are very continuous ($\approx 60\text{dBA}$) with very few sound events, but negatives.
 - Average thermal comfort is also low. The observations are carried out in diverse weather conditions: generally is cold weather (15°) & there is few wind ($0,2\text{m/s}$), but in some observations temperature is 20°C and there are no clouds and humidity varies ($55\text{-}85\%$).
- the place is valued as: **Known and Accessible.**
- Traffic shapes the place, BUT....Nature green elements are highly valued:

“It is a small oasis”

The main USE of Los Herrán boulevard is CROSSING from one place to another, but

24% would go there to RELAX,

due to the presence of natural elements and sounds

→ OPPORTUNITY FOR IMPROVEMENT

During the workshop is mentioned that it had already improved and that it would be interesting to repeat the experience to assess the change

iii. Results of La Constitucion

32 observations were made at this place.

Description of place

Time of development	Potential future intervention
Type of urban area	Residential. Medium density. Square with different heights and a fountain at the centre. It is surrounded by streets with traffic, since it is located close to one of the main entrance to the city. The square is at the beginning of one of the main streets of the city.
Maintenance	Well maintained
Greenery	Grass and trees
Location in the city	City centre
Aim of the evaluation	Identify ideas for renewal. There is a renovation strategy of the city that will affect this square. The renovation aims to show the city strategy on nature based solutions (blue and green).

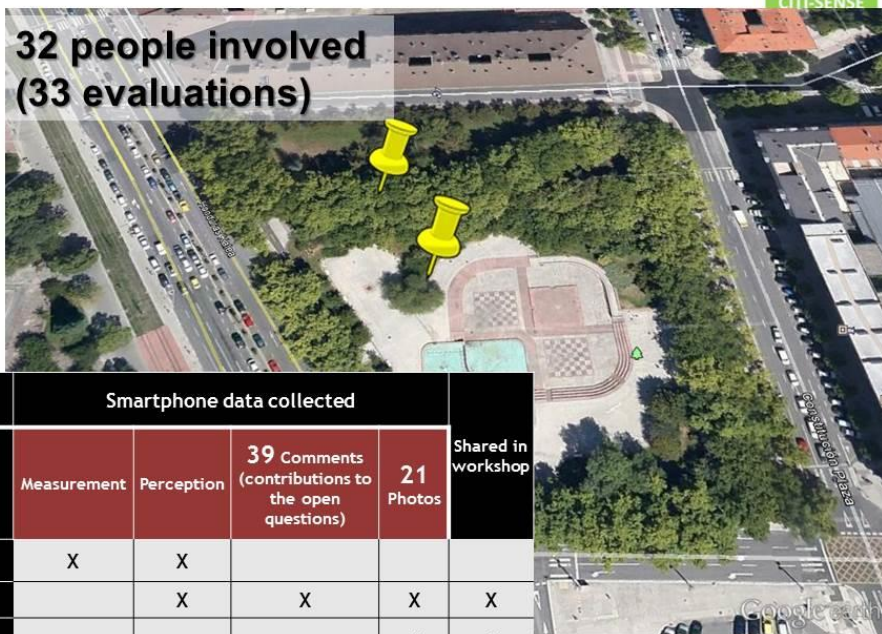


Figure 40. Sites for the full implementation in La Constitución square.



Figure 41. Detail of site 1

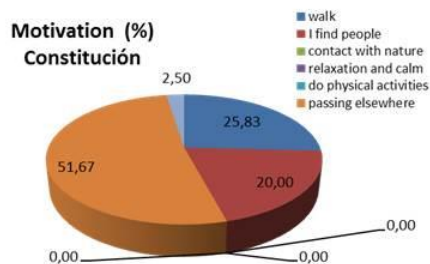
Figure 42. Detail of site 2.



Constitución: Previous experience at the place (I)

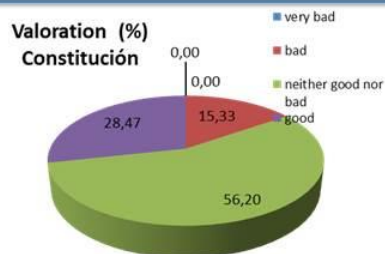


91 % of participants have previous experience



• **Main reason for use:**
passing by (51,7%)

- Others :
 - Walking (26%)
 - Meeting with others (20%)



• **La Constitución Valuation**
→ **Place neither good nor bad**

- Good (29%)
- Bad (15%)



Constitución: Previous experience at the place (II)



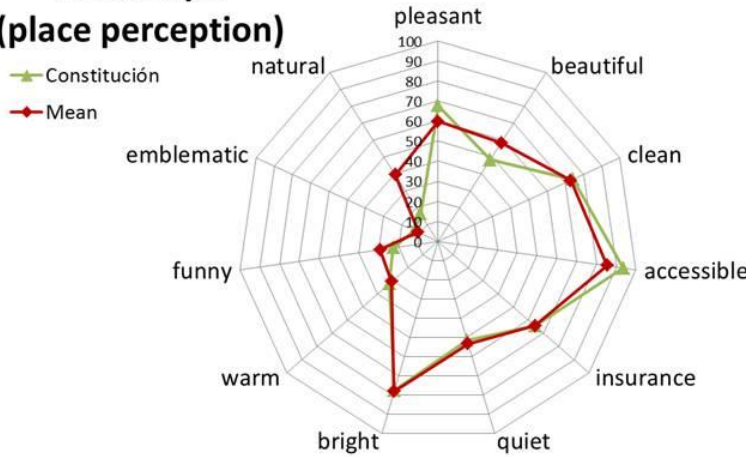
- **Frequency of use:** Very varied
being dominant monthly (71%)
 - **24 hours:** in different periods during the day (72%)
 - **Weekly:** in different periods during the day (28%) or when it suits them (32%)
 - **Anually:** throughout the year (90,5%)
- **Use time:** Short
from 0 to 15 minutes (73,0%)
- **From where:** From house (33,8%)
- **Distance:** between 500m & 3 km (74%)
- **Transportation mode:** Mainly walking (63,5%)



Constitución: Place Perception



Landscape (place perception)



Constitución is perceived as

- Accessible
- Clean
- Safe
- Luminous
- & something nice, safe & quiet
- ...but also as
- not emblematic
- A Little Boring
- & Cold

What do people like the most?

→ Green (nature) element & accessibility

What do people dislike the most? → Traffic Noise

61,3% would use it for relax ← Due to its nature & sound elements



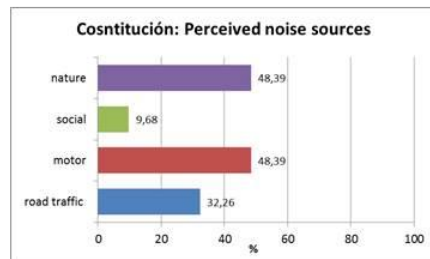
Constitución: Sound environment & comfort (I)



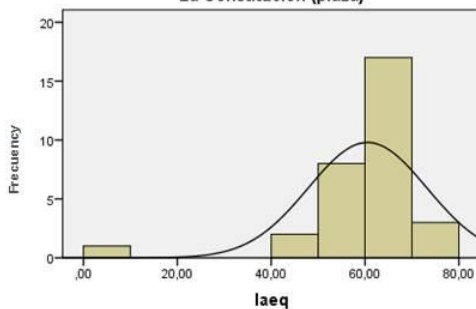
Objective Parameters

	Estadísticos descriptivos				
	N	Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
índice de confort acústico	31	4,32	11,00	6,9816	1,35944
laeq	31	0,00	72,61	60,5374	12,62794
laeqmax	30	0,00	96,85	74,6597	15,53558
laeqmin	31	0,00	66,04	51,8845	11,80949
nº de eventos	31	0	4	1,10	1,193
nº de eventos positivos	30	0	4	,77	1,073
nº de eventos negativos	31	0	2	,29	,588
N válido (por lista)	29				

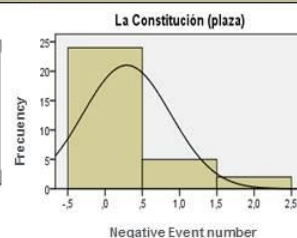
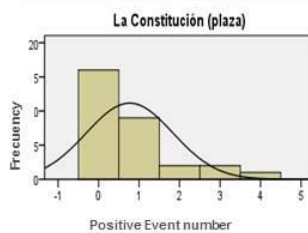
Perception



La Constitución (plaza)



Most perceived sound source is nature, valued as pleasant, and engines followed by the traffic, both valued as unpleasant.

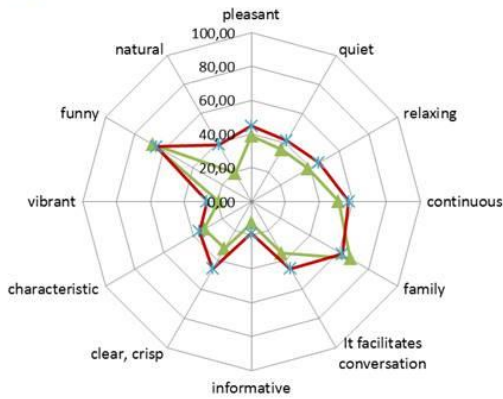


Constitución: Sound Environment and comfort (II)



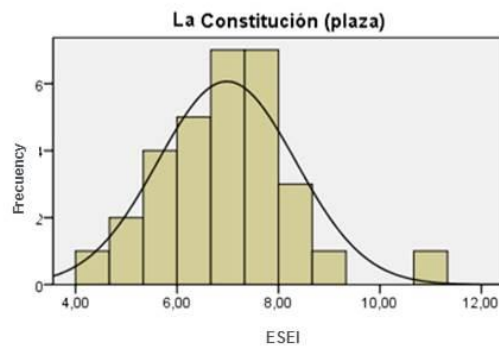
Soundscape (%)

— La Constitución
— Total



- Soundscape is considered familiar and a bit funny
- ... but also artificial, noisy, not relaxing, uninformative, difficult to talk, chaotic, uncharacteristic & muted
- ... that is unpleasant

- **ESEI -sound environment index-** is medium 7,0 (sd=1,4), ranging between
 - 5 (medium-low) to
 - 8 (acceptable).



Constitución: Thermal environment & comfort (I)

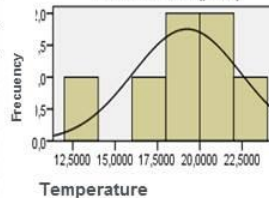


Objective Parameters

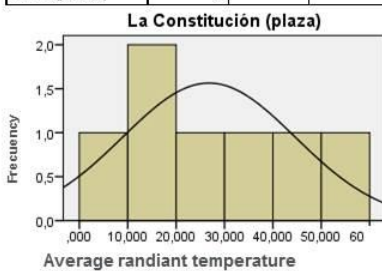
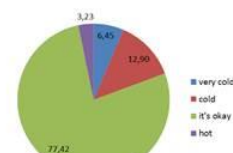
	N	Estadísticos descriptivos			
		Estadístico	Mínimo	Máximo	Desviación estándar
Índice de confort térmico	6	13,36	33,65	21,9000	8,42530
at	7	13,7395	23,9564	19,242835	3,1876630
avis	7	22,47	1,1760	573661	3,188175
airh	7	34,1007	69,8844	48,976503	11,6497202
Tmrt	7	8,638	53,682	26,77900	17,852489
PS_radiación	31	0	1	,42	,502
PS_cubierto	28	0	100	45,71	37,314
PS_actividad	31	1	9	5,68	2,941
Cloe_TOT	31	,44	1,12	,8571	,26702
N válido (por lista)	6				

Perception

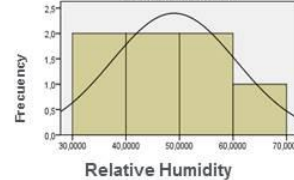
La Constitución (plaza)



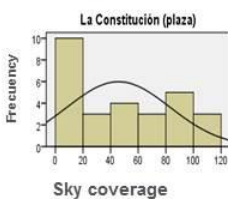
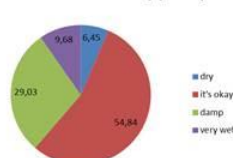
Constitución: Temperature perception



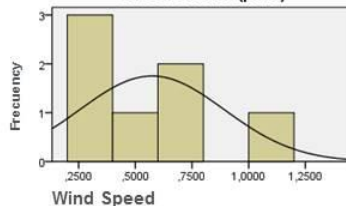
La Constitución (plaza)



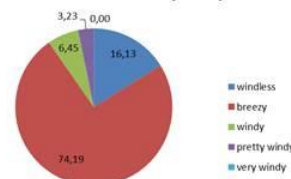
Constitución: Humidity perception



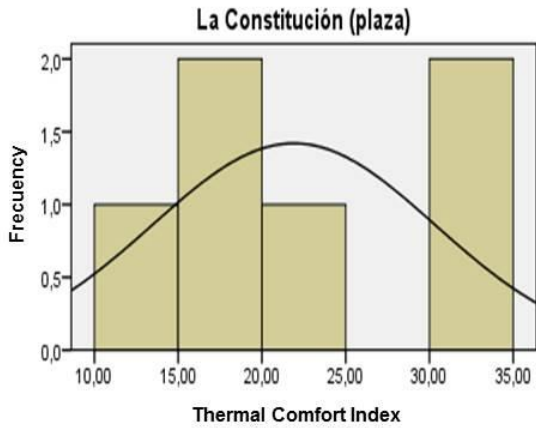
La Constitución (plaza)



Constitución: Wind perception



Constitución: Thermal environment & comfort (II)

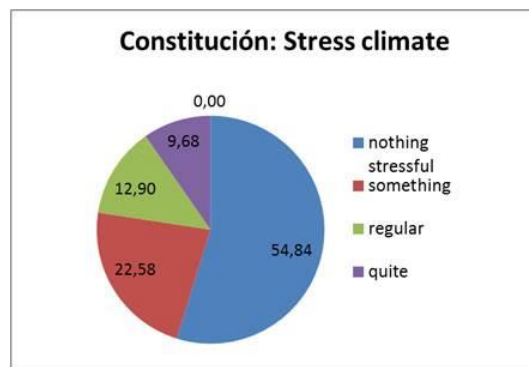


Low thermal stress

- Most consider thermal conditions as nothing (55%) or a little stressful (23%)
- Only 10% consider that the weather is quite stressful

The average PET is 21,9 (sd=8,4) → comfortable

- Some people consider the weather hot



Results of perceived comfort and indicators



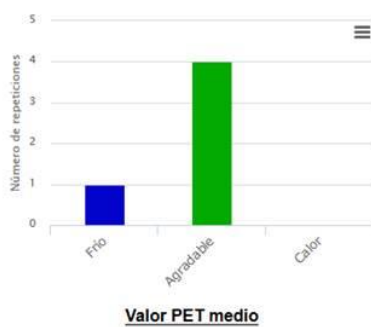
PLAZA
CONSTITUCIÓN
PUNTO 1

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido

The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values

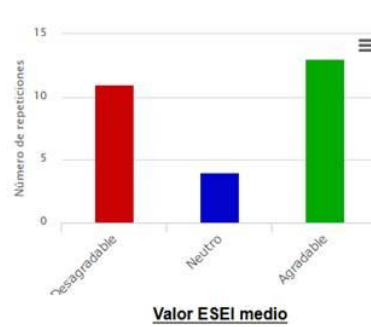


Confort térmico



Frio	Agradable	Calor
17.60	13.45	-

Confort acústico



Desagradable	Neutro	Agradable
7.17	6.83	6.99

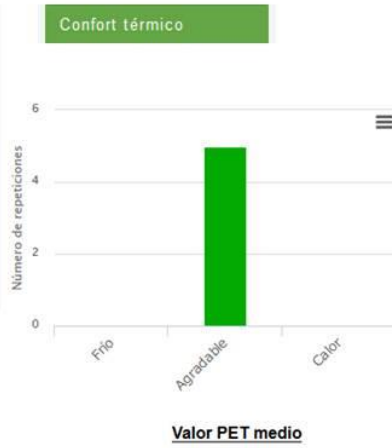
Results of perceived comfort and indicators



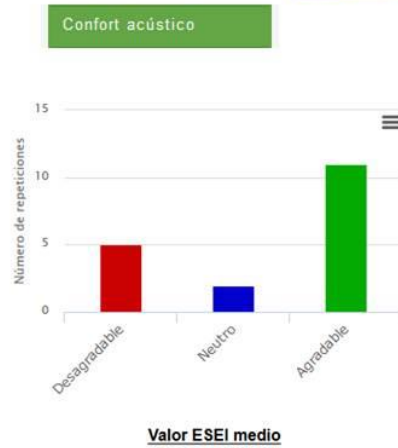
PLAZA
CONSTITUCIÓN
PUNTO 2

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido

The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values



Frio	Agradable	Calor
-	23.69	-

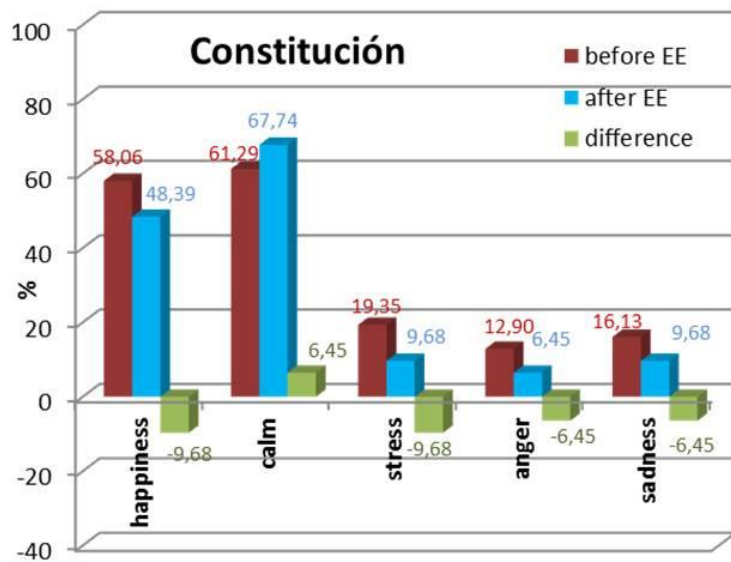


Desagradable	Neutro	Agradable
6.99	11.00	6.81

Constitución: Effects on perceived emotion



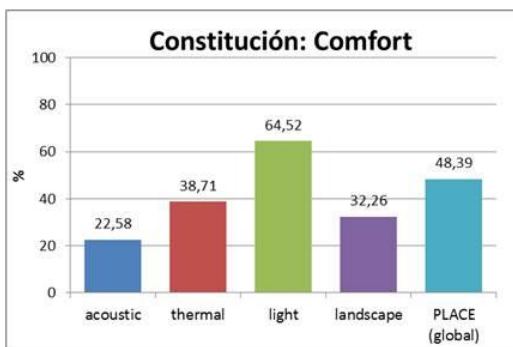
- ↘ Negative emotions and stress decrease
- ↗ Calm Increases
- ↘ but joy also decreases



Constitución: Comfort Analysis



- **Plaza de la Constitución** is perceived as **Accessible, Luminous, Clean, & something nice, safe & quiet...** but also as not emblematic, a Little Boring & Cold → **Generally 70% considers pleasant**
- **Soundscape**, with natural sounds (pleasant) and noise, it is considered something **familiar & a bit fun...** but also something **artificial, noisy, not relaxing, uninformative, slurring of speech, chaotic, uncharacteristic and muted ... that is rather unpleasant** → **ESEI 7 acceptable but It needs improvement actions**
- **Thermal stress is low** → **PET indicates thermal conditions are comfortable**



- **Plaza de la Constitución** is
 - Acoustically uncomfortable
 - Has medium-low comfort
 - With climate
 - visual
 - Medium-low light comfort
- **Overall the comfort is medium**



Comments



KEYWORDS: Traffic, Noise, Small Space, Urban Furniture

General Comments:

Negative reaction to traffic and to the fact that the fountain (furniture) wasn't running.

Soundscape: Noise generated by traffic depending on the time of the day / Place to be improved

Sound sources: Natural 48% <-> 48 + 32% Engines + traffic

Thermal Comfort: Slight cold sensation
Low light



Results: Rating of Items



Results: Workshop Comments



Generally square is good valued.

Surprisingly, it has been rated as natural and they believe that is caused by the observation exercise itself.

"When you go through the square, you' only notice traffic noise".

- Give it more social attractiveness:
 1. Use it for social events, as it was used for the Fair Nations, it would make it close to people from outside the neighborhood.
 2. Connect it with the Public Neighborhood Centers ("El Pilar" building)
- The lower part of the square needs to be renovated, remains past times...
- They like the fountain and is valued as a "safe" fountain.
- Improve night lighting
"it is difficult even crossing it ciclyng".

Results: Suggestions



Constitución: Summary & comfortability

Both the questionnaire (70% values as pleasant) and the workshop highlight that **the square is pleasant**

- The activities developed at the Square are varied. 20 % considers it a **meeting place** with others, although the **time they use it is short**.
- Although the square is well valued, global comfort is medium-low (49 %).
 - During observations the acoustic comfort is low. The traffic noise is stable ($\approx 60\text{dBA}$) with few sound events, more positives than negative ones. Soundscape perception during observation is more negative than the objective data measured, especially in the upper part of the square (in point 1).
 - Thermal comfort is medium because the average observation are done in **hot weather (20°)**, but there are some cases with 12°. It is a bit windy (0,6m/s) and wet (50%) and the sky is half covered (50%).

61,3% participants **would use the square for relaxing** because the **sounds & green elements (the water and the lake)**.

- It arises that the square **needs a renovation to:**
 - Give more social attractiveness.
 - Make it more funny and emblematic
 - Reduce concrete ground.

iv. Results of Salinillas

27 observations were made.

Description of place

Time of development	Recent
Type of urban area	Residential. Low density. High buildings. This area is used as a park although it does not have specific equipment. There is a small hill at its centre The traffic ring of the city is relatively close.
Maintenance	Not well maintained
Greenery	Grass
Location in the city	Suburbs
Aim of the evaluation	Ideas for promoting its use. It is an opportunity to be transformed into a park.



Figure 43. Sites for the full implementation in Buradón Park.



Figure 44. Detail of site 1.

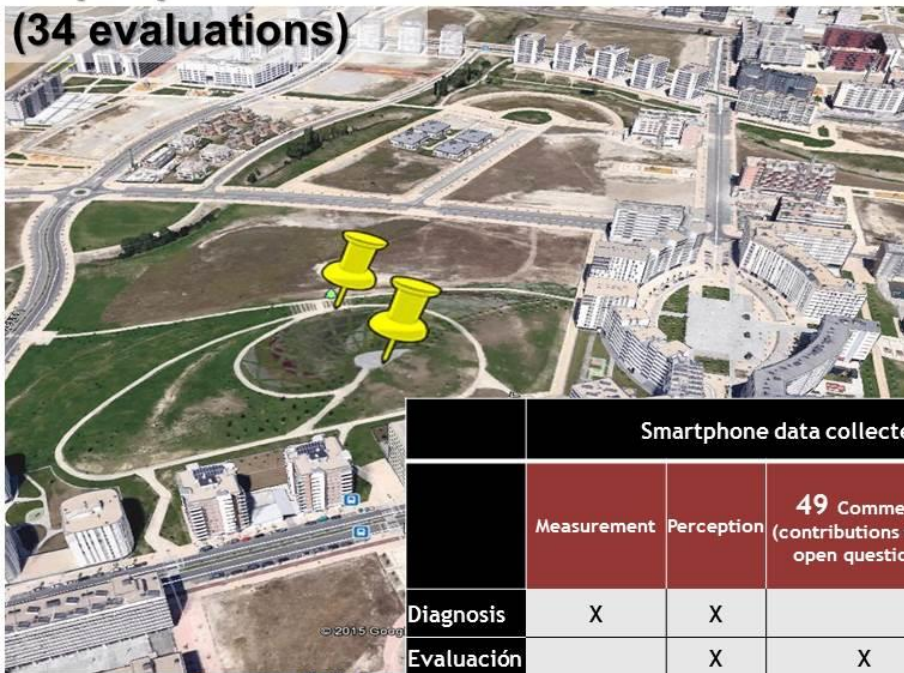
Figure 45. Detail of site 2.



Salinillas

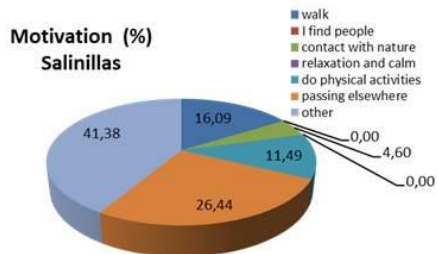


**27 people involved
(34 evaluations)**



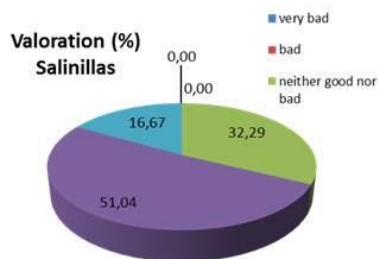
	Smartphone data collected				Shared in workshop
	Measurement	Perception	49 Comments (contributions to the open questions)	26 Photos	
Diagnosis	X	X			
Evaluación		X	X	X	X
Ideas /				v	v

Salinillas: Previous experience at the place (I)



• Main reason for use: passing by (26,4%)

- Others:
 - Walking (16%) y
 - Sport Activities (12%)



• Valuation

Good or EXCELENT

- Good (51,0%)
- Very Good (16,7%)

Salinillas: Previous experience at the place (II)

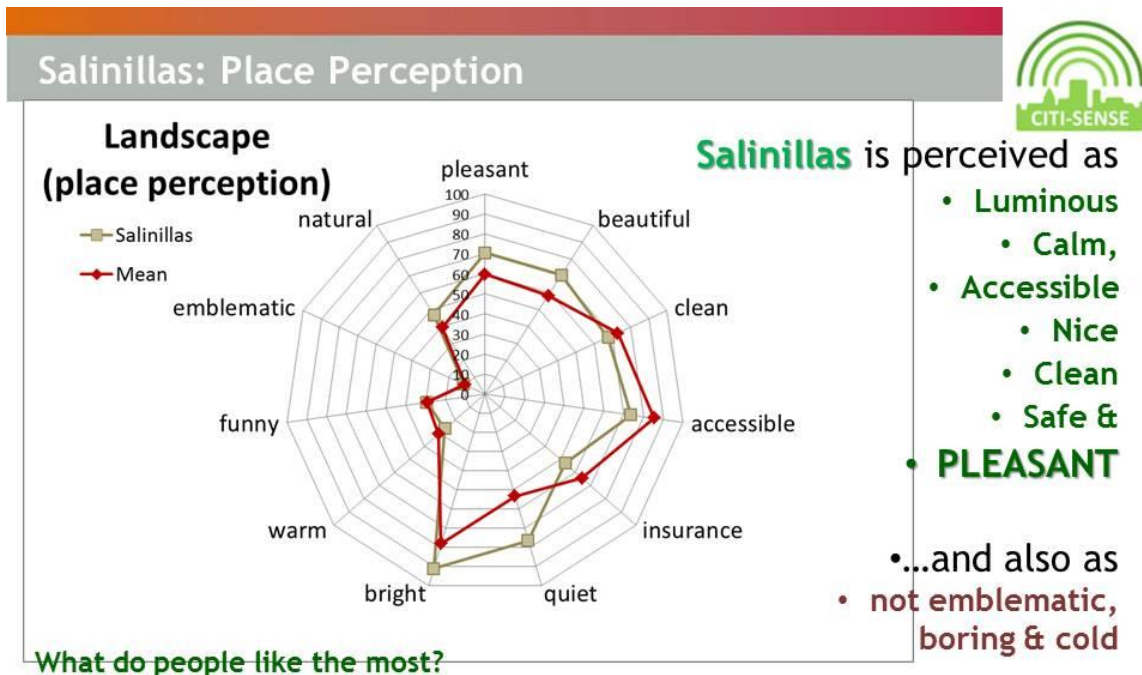


• Frequency of use: Less known place (60,6%).

Those who use it:

- 24 hours: in different periods during the day (50,5%)
- Weekly: Weekend (25,3%) or in different periods (19,8%)
- Annually: throughout the year (37,2%) or in different periods (27,7%)

- **Use time:** Short from 0 to 15 minutes (63,3%)
- **From where:** not from home or workplace/study
- **Distance:** more than 3 Km (62,6%)
- **Transport mode:** Walking (35,6%), by car (22,2%)

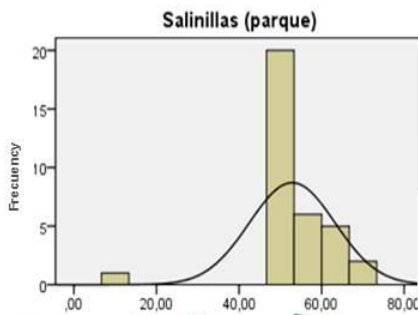
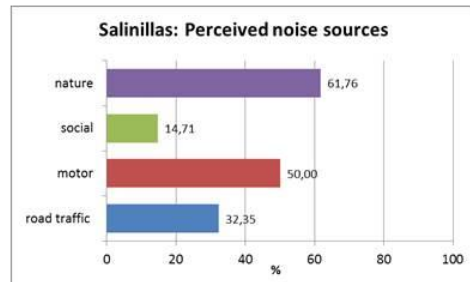


Salinillas: Sound Environment & comfort (I)

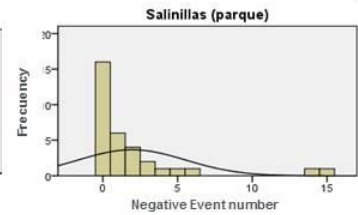
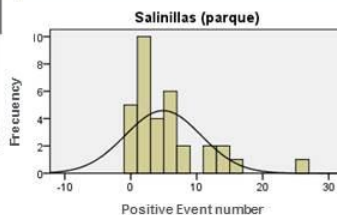
Objective Parameters

Perception

Estadísticos descriptivos					
	N	Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
Índice de confort acústico	34	4,39	16,86	8,7182	2,28926
laeq	34	8,45	71,32	52,8662	10,38137
laeqmax	33	58,98	96,85	76,3042	10,65153
laeqmin	33	38,36	73,55	43,7727	6,20505
nº de eventos	34	0	50	7,98	9,800
nº de eventos positivos	33	0	26	4,91	5,747
nº de eventos negativos	33	0	15	1,94	3,596
N válido (por lista)	30				



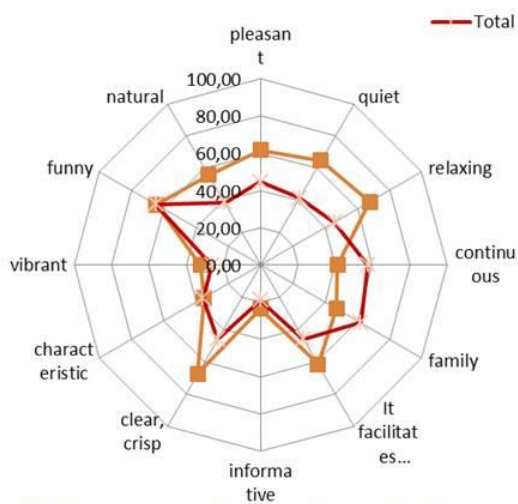
Most perceived sound source is nature (61,8%), valued as pleasant (38%), followed by engines (44,1%) and traffic (32,4%), valued as unpleasant.



Salinillas: Sound Environment and comfort (II)



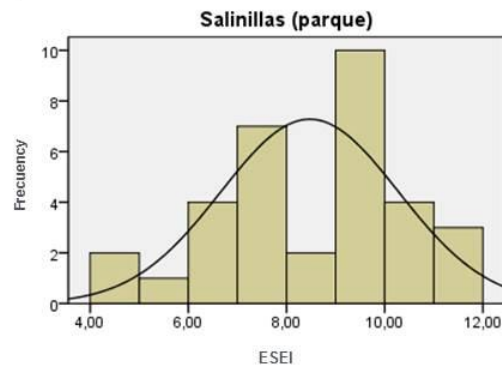
Soundscape (%)



• Soundscape is perceived as calm, relaxing, clear, funny, natural, promote speech... that is pleasant

• ... but also uninformative, characteristic and a bit muted

• ESEI or *acoustic comfort index* is **good** 8,7 (sd=2,3), from 6 (medium-low) to 12 (excellent).



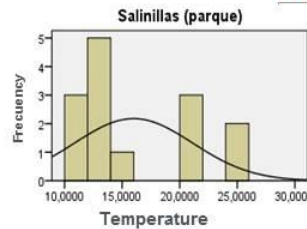
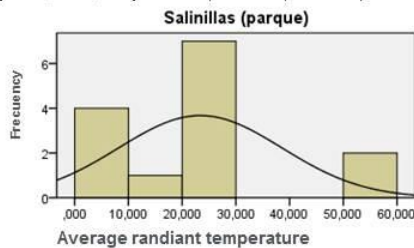
Salinillas: Thermal environment & comfort (I)



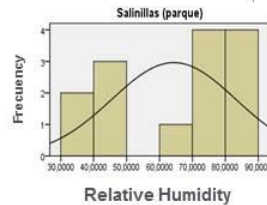
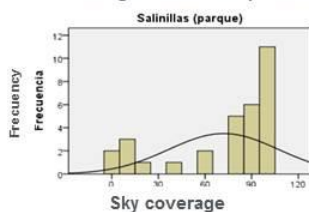
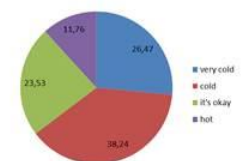
Objective Parameters

	Estadísticos descriptivos				
	N	Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
Índice de confort térmico	14	6,83	35,82	15,3957	9,02878
at	14	11,3127	25,0233	15,992031	5,1308305
avis	14	1,878	4,4375	1,312452	1,0467428
arih	14	34,7999	98,4127	84,338062	18,8504810
Tmrt	14	5,771	53,883	23,38200	15,204990
P3_radición	34	0	1	,71	,462
P3_Cubierta	31	0	100	71,94	35,348
P3_oscuidad	34	1	9	4,24	2,862
Clos_TOT	34	,34	1,12	,8638	,29880
N válido (por lista)	14				

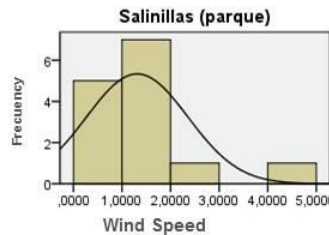
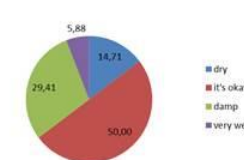
Perception



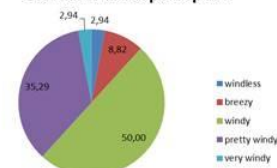
Salinillas: Temperature perception



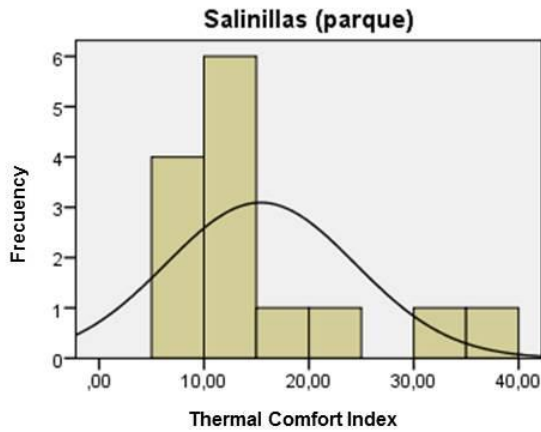
Salinillas: Humidity perception



Salinillas: Wind perception



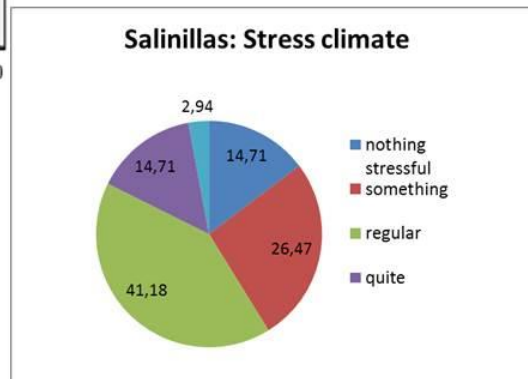
Salinillas: Thermal environment & comfort (II)



Low thermal stress

- Most consider thermal conditions as nothing (15%) or a little stressful (27%)
- Only 18% consider that the weather is quite stressful

PET is low
(average 15,4 & sd=9)
→ Slightly cold

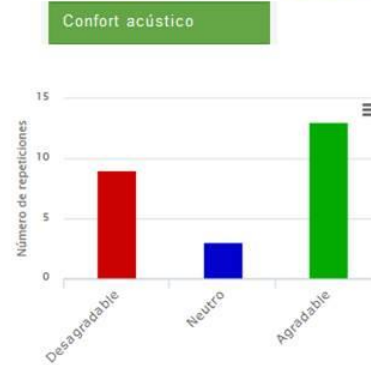
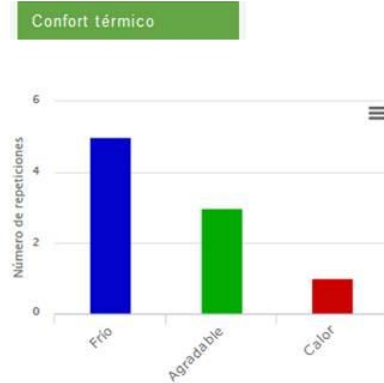


Results of perceived comfort and indicators



S.BURADÓN
PUNTO 1

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido



The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values

Valor PET medio

Frio	Agradable	Calor
9.64	18.30	32.78

Valor ESEI medio

Desagradable	Neutro	Agradable
7.73	7.60	10.18

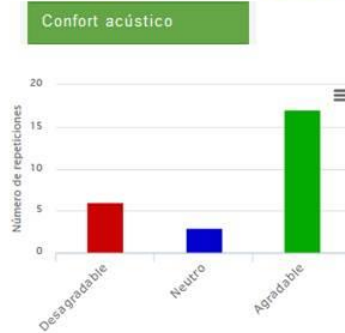
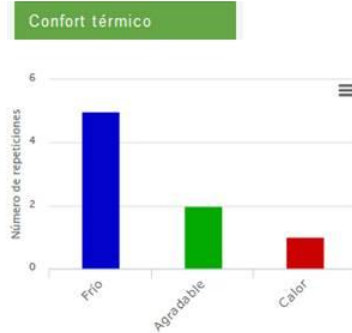


Results of perceived comfort and indicators



S.BURADÓN
PUNTO 2

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido



The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values

Valor PET medio

Frio	Agradable	Calor
12.20	14.99	35.82

Valor ESEI medio

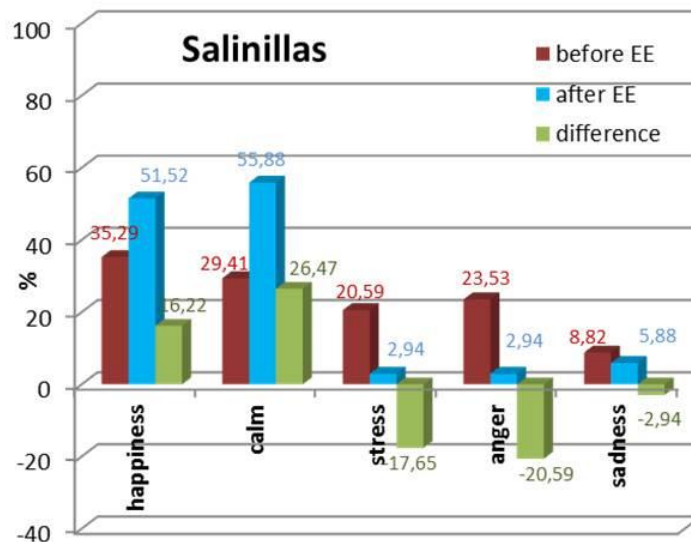
Desagradable	Neutro	Agradable
9.05	8.18	8.09



Effects on perceived emotion



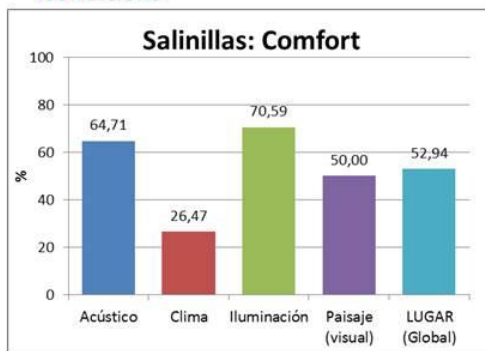
- ⇄ Anger and stress decrease considerably
- ⇄ positive emotions (joy & calm) increase considerably
- ⇄ Sadness just varies



Salinillas: Comfort Analysis



- **Salinillas's green park** is perceived as **luminous, calm, accessible**, in conclusion as **pleasant**, but also is perceived as **not emblematic, boring & cold**
- **Soundscape** is considered **calm, relaxing, clear, funny, natural**, that promote speech...
-> **pleasant**, but also **uninformative & characteristic**, and some muted → **ESEI 8,7 is good**
- **Thermal stress is low** → **PET shows certain thermal uncomfortability due to cold conditions**



- **Salinillas's green park**
 - **Enough light and acoustically comfortable**
 - **Visually Comfortable**
 - **not comfortable climatically**
- **Generally is very comfortable**

Comments



KEYWORDS: Integrated green space, Urbanization, cold day
It highlights the influence of climatic conditions (cold) during data collection.

and perception is influenced by the urban environment close to the space (housing).

It is the site that has generated less comments.

General Comments

Soundscape: Natural site integrated in town

Thermal comfort: Intense cold sensation / high brightness (Luminosity)

Results: Rating of Items



😊
Aire Limpio
Vistas / Paisaje
Canto de pájaros
Silencio

😞
Viento
Está lejos
Obras

	Fotos		Comentarios	
	N	%	N	%
Agradable	19	73%	39	59%
Desagradable	7	27%	27	41%



Results: Suggestions



😊
Aire Limpio
Vistas / Paisaje
Canto de pájaros
Silencio

😞
Viento
Está lejos
Obras

Más arbolado y más frondoso

Espacio de ocio, encuentro y recreativo

Setos a modo de pantalla de viento



Salinillas: Summary



It is rated as good or excellent (51 + 17%).

It is a little known space → OPPORTUNITY

- 71% would use it to relax because it is considered quiet and due to the presence of natural elements
- It is considered very comfortable, thanks to the sounds, its landscape and the light.
 - During observations acoustic comfort is high. The atmosphere is quiet ($\approx 53\text{dBA}$) with events, more positive ones but also some negatives.
 - Thermal comfort is low because mostly it was cold (16°), wind (1.3 m/s) and overcast and quite humidity (80%), although one day was 20° and much lower humidity (45%).
- The comments reflect the positive effect on perceived health (emotions and stress) related to visit this park.
 - Participants dislike → the presence of houses, noise and weather conditions.

It is proposed to promote being more emblematic and funny:

- Adding trees and/or hedges to reduce the wind effect, although it is recognized that it could lead to feelings of insecurity
- Encourage some recreational economic initiatives (bars or terraces)

v. Results of Olarizu

26 observations were made.

Description of place

Time of development	Natural
Type of urban area	Natural. Very low density. There are some industries in this part of the city, although quite far. There is no traffic and there is a path for bikes arriving to this area, as an entrance to the green ring of the city.
Maintenance	Well maintained
Greenery	Grass, bushes, trees and water. There is a pond on the middle
Location in the city	Green Ring
Aim of the evaluation	Citizens recognize it as a natural area, with good quality. Ideas for preservation



Figure 46. Sites for the full implementation in Olarizu.



Figure 47. Detail of site 1.



Figure 48. Detail of site 2.



December 2015

Parque Olarizu



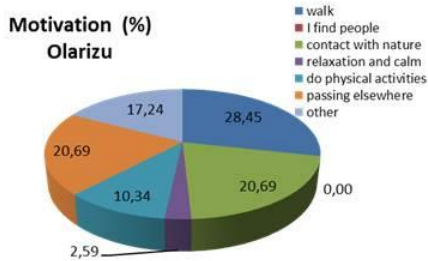
**26 people involved
(30 evaluations)**



	Smartphone data collected				Shared in workshop
	Measurement	Perception	61 Comments (contributions to the open questions)	25 Photos	
Diagnosis	X	X			
Evaluation		X	X	X	X
Ideas / Proposals				X	X

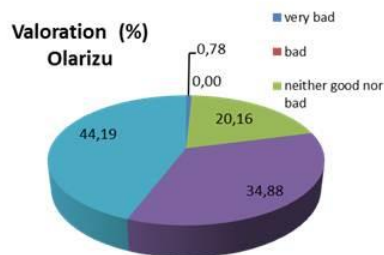


Olarizu: Previous experience at the place (I)



• Multi-USE place

- Walking
- Touching the nature
- Crossing by
- Sport activities
- ...



• Good valuation or EXCELENT

- Very Good (44,2%)
- Good (34,9%)

Olarizu: Previous experience at the place (II)



- **Frequency of use:** Monthly
 - 24 hours: varies → morning, evening or different periods during the day
 - Weekly: Weekends (30,6%) or in different periods (43%)
 - Annual: throughout the year (48%)
- **Use time of use:** very varied
 - medium (31% from 30 to 60min.) or
 - long (22% 60 minutes or more)
- **Distance:** more than 1 Km (93%)
- **Transportation mode:** Mainly cycling (33,3%)

Olarizu: Place Perception



Olarizu is the best perceived place



What most like → the nature (green) & landscape and surround

Least like → noise, houses and surround, and weather conditions

All of them (96,7%) would use for relaxing ← being calm and natural elements, landscape...



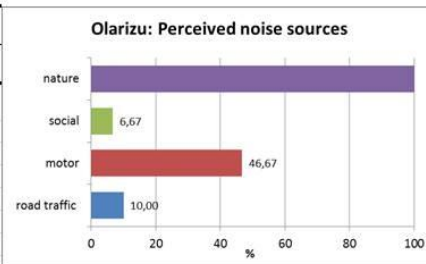
Olarizu: Sound environment & comfort(I)



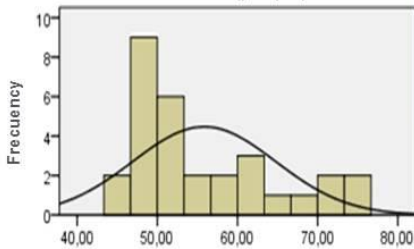
Objective Parameters

	Estadísticos descriptivos				
	N	Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
Indice de confort acústico	30	3,75	11,79	8,7337	2,43158
laeq	30	43,58	74,64	55,8457	8,91767
laeqmax	29	53,72	96,18	74,6917	9,45822
laeqmin	30	33,60	63,40	43,3990	6,83429
nº de eventos	30	0	25	8,23	7,021
nº de eventos positivos	29	0	15	5,31	4,922
nº de eventos negativos	30	0	19	2,57	4,470
N válido (por lista)	29				

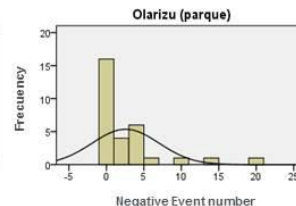
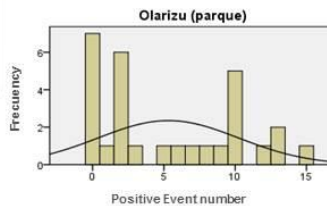
Perception



Olarizu (parque)



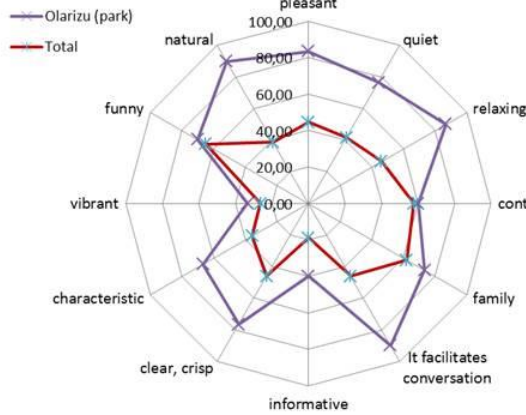
More perceived sound source is Nature (100%), that is valued as pleasant, followed by engines (46,7%) that are unpleasant.



Olarizu: Sound Environment and comfort (II)



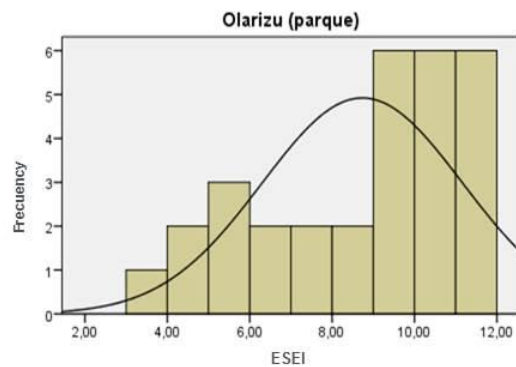
Soundscape (%)



• Soundscape is perceived as natural, very relaxing, calm, clear, characteristic, promote speech... that is to say **pleasant**

• ... but also uninformative and muted

• ESEI or *sound environment index* is good 8,7 (sd=2,3), prevail values exceed from 8 to 12 (excellent).



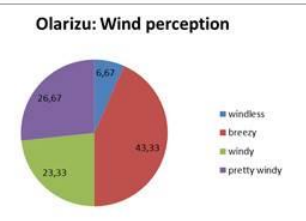
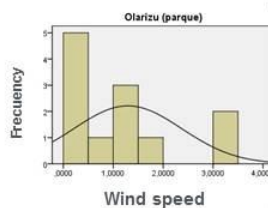
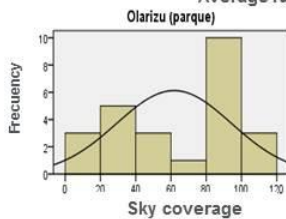
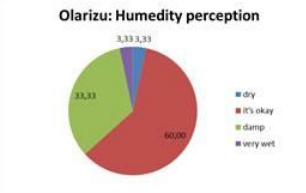
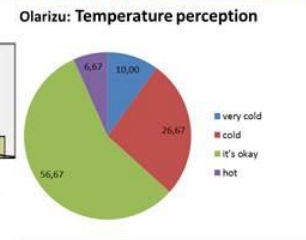
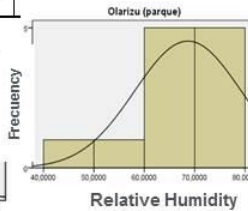
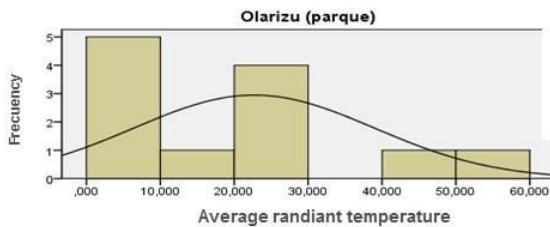
Olarizu: Thermal Environment & Comfort (I)



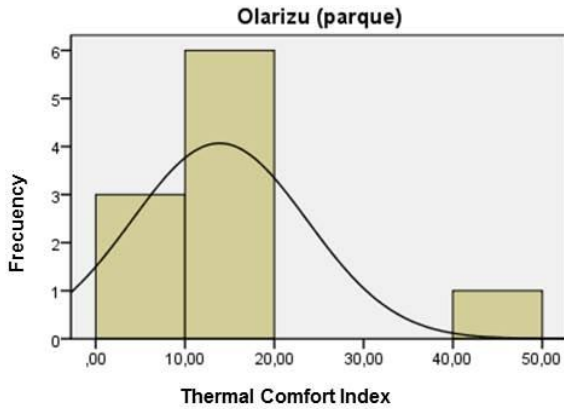
Objective parameters

	N	Estadísticos descriptivos			
		Mínimo	Máximo	Media	Desviación estándar
	Estadístico	Estadístico	Estadístico	Estadístico	Estadístico
Índice de confort térmico	10	5,08	40,12	13,8580	8,80644
at	11	11,1264	24,4398	15,613895	3,6231400
aws	12	,4188	3,4948	1,290988	1,0821216
air	12	44,5806	79,9922	68,647285	10,6768188
Tmrt	12	9,167	57,731	22,69208	16,242284
P3_radación	30	0	1	,43	,504
P3_Cubierta	25	4	100	61,76	32,570
P3_actividad	30	1	9	3,80	2,188
Clos_TOT	30	49	1,12	,7823	,21053
N válido (por lista)	10				

Perception



Olarizu: Thermal Environment & Comfort (II)

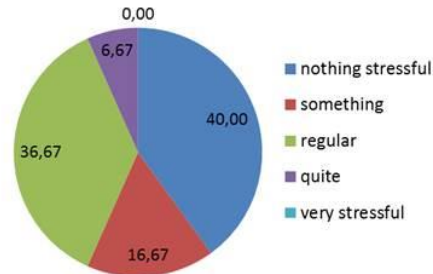


Low thermal stress

- Most consider thermal conditions as nothing (40%) or a little stressful (17%)
- Only 7% consider that the weather is stressful

PET is low
(medium 13,9 y sd=9,8)
→ slightly cool

Olarizu: Stress climate

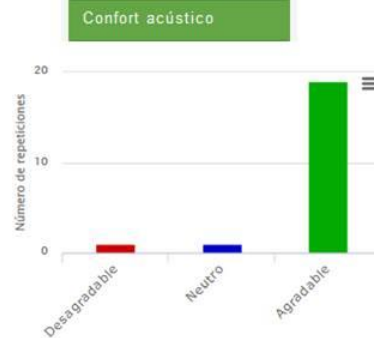
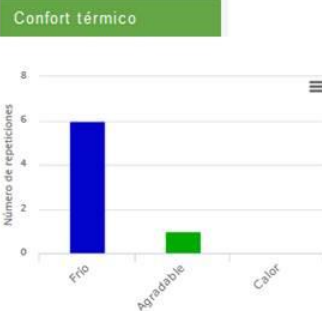


Results of perceived comfort and indicators



CEA PUNTO 1

- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido



The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values

Valor PET medio

Perception	Valor PET medio
Frio	8.68
Agradable	22.64
Calor	-

Valor ESEI medio

Perception	Valor ESEI medio
Desagradable	10.40
Neutro	4.66
Agradable	9.06



Results of perceived comfort and indicators

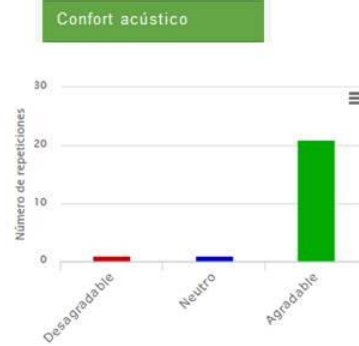


CEA PUNTO 2

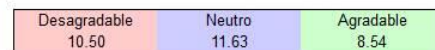
- Paisaje percibido
- Confort térmico
- Confort acústico
- Confort global percibido



Valor PET medio



Valor ESEI medio



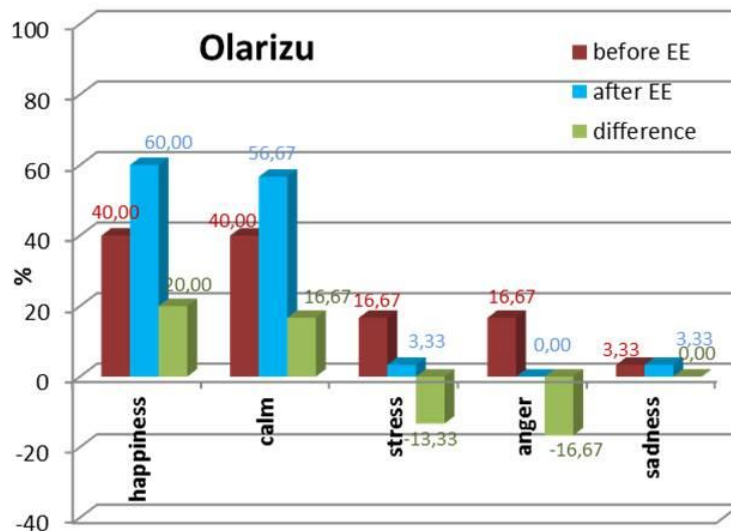
The graphs represent the comfort perceived by the participants (subjective). The tables present the average values of comfort indicators (target) of observations with similar perception values



Effects on perceived emotion



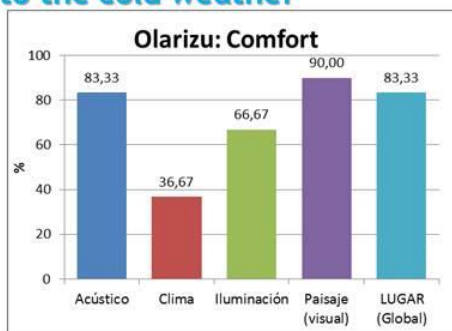
- ↘ ↘ Anger and stress decrease dramatically
- ↗ ↗ Positive emotions (Joy & Calm) increase substantially
- ⇔ Sadness hardly change



Olarizu: Summary & Comfort Analysis



- **Olarizu park** is the best perceived public space: **very natural, very nice, very clean, very accessible, very luminous, quite calm, quite safe** → **VERY PLEASANT**, although not emblematic, not enough funny & slightly cold.
- **Soundscape** is considered **very natural, very relaxing, calm, clear, characteristic, funny, natural...** that means **pleasant...** but also **not much informative & muted** → **ESEI 8,7 is good to excellent**
- **Thermal stress is low** → **PET indicates certain thermal discomfort due to the cold weather**



- **Olarizu park is**
 - **Very comfortable in terms of sounds & visual aspects**
 - **Light is comfortable and**
 - **Clime conditions give medium-low comfort**
- **Generally is VERY COMFORTABLE**



Comments



KEYWORDS: Positive space, School Noise, Nearby Factory Noise, Audible Traffic

Problems filling the questionnaire.

General comments: comfortable space affected by distant noise

Soundscape: Low impact from traffic / Negative effect from nearby factory / Acoustic pollution caused by a nearby school that reduces comfort



Results: Rating of Items



Results: Workshop Comments



Featured items after knowing about the results :

- It is hardly emblematic, it miss something that would make it remarkable.
- Sometimes it is not so pleasant by the few trees.
- It is considered a monotonous landscape.
- There are some unfinished areas.

Although it is a natural area, it has elements of improvement with respect to the comfort of those who visit.

- Bigger trees would make the area more welcoming
- Create a small legend around the place to make it attractive and to promote its visit



Results: Suggestions



Olarizu: Summary

It is a place to **get contact with nature** and to walk
It is visited for one-hour, monthly, and **cycling** (33%).

Is **VERY PLEASANT & VERY COMFORTABLE** in all its variables.

They like most → Nature (green), landscape & surrounding environment

They like least → noise & houses

Almost all participants (96,7%) would use for relaxing ← because of its calm & natural elements, landscape.....

- During observations acoustic conditions are diverse but mostly quiet ($\approx 50\text{dBA}$), with some acoustic events, majority positive. Although in some observations 60 and even 70dBA were measured.
- Thermal comfort is low because it was a bit cold (16°), some wind (1,3m/s) & some humidity (68%),

The visit **offers benefits on perceived health.**

It is suggested that **more meaning** should be given to the park:

- Bigger trees.
- Create a small legend that can attract more people

ANNEX XI: CITIZENS AND PARTICIPANTS EMPOWERMENT EVALUATION RESULTS

- ❖ **Product usefulness:** Overall, the participants identified the environmental evaluation within the selected spaces (Olarizu, Salinillas, Los Herrán and Constitution Square) and the toolkit in particular as useful. According to the citizens engaged in the CITI-SENSE experience, the evaluations “show accurately how the people feel when they are strolling through the area (Olarizu park)” and “the collected data are real and foreseeable (Salinillas area)”. Furthermore, the collected data gathered both subjective and objective perceptions, which made the experience unique and very valuable with regard to public spaces and environmental governance assessment.

In general, the toolkit and the evaluation process was received with curiosity and assessed as positive by the participants. Moreover, the participants pointed out that the toolkit makes possible the public spaces evaluation and it helps to observe and notice certain elements that can be easily unseen.

However, most of the participants reported that the collected data have to do something good, showing uncertainty about this experience. According to a participant, *“this is an interesting experience, but the important thing is to be useful”*.

- ❖ **Actions:** Before using the app and sensor, the participants felt that they were about to take part in an original study. Thus, some of them believed that the toolkit was going to push their awareness and motivation with regard to environmental governance and citizens’ empowerment.

Collecting data, giving opinions and assessing diverse public spaces with regard to environmental conditions was perceived as a beneficial experience by the participants. Thanks to the CITI-SENSE project in Vitoria-Gasteiz, the self-awareness and interest about environment increased among participants. Many of them reported that after having made several observations, they felt more committed with Vitoria-Gasteiz public spaces.

Besides, participants said that they were going to keep an eye on the spaces where the data were collected, in order to monitor the environmental quality of these areas. This action was

understood as a long term plan; being useful for those spaces that eventually are going to be transformed by public authorities.

❖ **Product improvement:** The app + sensor were seen as a smart, light, portable and technologically appealing toolkit, particularly among the young participants. However, it was reported that some functionalities should be improved in order to make it more accessible:

1. First of all, participants mentioned that it was necessary to get more information about the toolkit. Furthermore, the participants reported that sometimes the app crashed; thus certain software improvements are required in order to make the product more functional and robust. Besides, with regard to the devices, participants reported that the connexion between the app and the sensor failed sometimes, being necessary to link both devices properly.
2. Second, some participants pointed out that it was not comfortable to collect data using two devices instead of one. Particularly, among elder participants the public spaces assessment was described as a difficult task, essentially due to their lack of experience with new technologies.
3. Third, the participants noticed that the app was not fully translated into the selected language and some of them experienced difficulties when the app windows switched from Spanish to English. Furthermore, it was suggested that a tutorial would have made easier and friendlier the experience.
4. Finally, with regard to adaptability, participants reported that the toolkit should be more intuitive. In addition, it must be adapted for all the different age groups with a User-friendly interface, making the experience inclusive for all the population segments.

❖ **Public Spaces and environmental quality improvement**

Opportunities for you: Many participants reported that they were feeling more relaxed, less stressed and more comfortable after the experience. Therefore, the toolkit had an impact in the health and emotions of the participants, being an opportunity for the citizen's well-being. Thanks to this achievement, the environment would benefit from conscious citizens committed with environmental quality.

Additionally, participants reported that the toolkit was an opportunity to support the public spaces improvement. The CITI-SENSE experience engaged diverse participants into an assessment process in Vitoria-Gasteiz. Consequently, many of them considered that it was fundamental to monitor the environmental quality in the city, and to contribute to the public spaces improvement. Furthermore, sharing different opinions among participants was described as an opportunity to discover citizens' thoughts with regard to environmental quality in Vitoria-Gasteiz.

Finally, it was reported that the toolkit is an opportunity to get information about environmental parameters. Likewise, this achievement is fundamental to contribute to the citizen's environmental governance.

Opportunities for the others: Overall, it's an opportunity for all the citizens because it raises global awareness in environmental issues and public spaces conditions. Additionally, the toolkit provides useful information to the locals. Therefore, citizens would get a big benefit from this experience.

However, local authorities would benefit from the toolkit too, considering how the information and the collected data eventually may help in the public decision making process with regard to public spaces development and improvement.

Barriers for you: According to the participants, the main barrier was the disinterest that certain citizens may express with regard to environmental issues. Presumably, at some point citizens could feel that there are other issues that require more attention, affecting environmental public assessment in particular. So, it was pointed out that local authorities should carry out environmental campaigns to raise awareness among Vitoria-Gasteiz citizens. Besides, while some proposals coming from citizens' participation may contribute to environmental improvement, it could affect citizens' safety. For example, one participant pointed out that it would be useful to plant trees and bushes around paths, but that may result in unsafe areas (particularly during the night hours).

Barriers for the others: Local authorities' attention was pointed out as the main barrier. If the citizens participation in the decision making process is ignored by the public administration, it is going to be very difficult to transform public spaces. According to the participants, local

authorities must be engaged in order to implement green policies in diverse public spaces. As it was pointed out: *“next step it is not in our hands”*.

Conditions for you: The main condition reported was the need to repeat the experience under different weather conditions and seasons. So, to repeat the experience was one of the essential conditions for the participants.

Conditions for the others: We want to remark two conditions for other actors/agents mentioned with regard to the CITI-SENSE experience. First, it was reported that the toolkit could be useful on condition that citizens raise their awareness on environmental issues. If citizens prioritise other issues, the whole assessment process would be good for nothing.

Furthermore, local authorities must be interested in this toolkit too in order to contribute on the environmental improvement. Otherwise, the collected data would not be useful. So, on condition that citizens and local authorities make a commitment, it would be possible to achieve the environmental improvement in Vitoria-Gasteiz through the public participation.

❖ **Collaboration within the empowerment initiative**

For you: Broadly speaking, the citizens’ collaboration was reported as positive and useful. Participants engaged in this experience showed enthusiasm and willingness to be part of the empowerment process. Participants gave their opinions, made some recommendations and discussed different public spaces in Vitoria-Gasteiz. They believed that it was possible to contribute to the environmental governance, and to go ahead with this it would be necessary to carry out empowerment processes and open assessment of public spaces.

For the others: There were a wide range of influence opportunities according to the comments made by participants. Citizens’ awareness and consciousness on environmental issues pushed many of them to make serious proposals about possible improvements in the public spaces. Thus, the citizen’s influence coming from an empowerment initiative was seen as highly valuable by participants, essentially because it was an opportunity to collaborate in the public spaces transformation.

❖ **Learning about the empowerment initiative**

What did you learn: Basically, it was reported that participants learnt a lot about an empowerment initiative that required the use of new technologies. The initiative itself was understood as a very innovative experience, and it was pointed out that this kind of assessment process was an original way to engage citizens into environmental awareness within public spaces. So, the new technologies use was highlighted as one of the most remarkable lessons learnt. Furthermore, the participants reported that thanks to the empowerment initiative, they learnt about how to monitor the public spaces and keep an eye on details that usually are forgotten.

Finally, some participants reported that after the empowerment initiative, they have changed their thoughts about public spaces. So, this initiative helped to demolish pre-established ideas and misconceptions about public areas, contributing to enhance citizens' knowledge with regard to assessment processes and environmental skills.

From whom did you learn something useful? The participants learnt considerably from each other during the focus groups sessions. Group discussions and critical conversations contributed to increase the empowerment with public spaces among participants. During the evaluation process it was reported that the experience was quite successful in the citizens' engagement, and it was pointed out that every participant learnt about each other's opinions. Moreover, young participants helped and supported elder citizens experiencing difficulties when using the app and that was pointed out too as a learning experience.

❖ **Responsibilities:**

Scientist: According to the participants, scientists have a great responsibility providing technological support to the empowerment initiatives. As it was stated, experiences such as CITI-SENSE contribute to community social progress and this is a great tool to move forward in environmental awareness and public decision making process.

Citizens: Overall, it was reported that citizens have a huge responsibility within the empowerment initiatives. According to the participants, it was absolutely necessary to take into account citizens into the decision-making processes and public policies implementation, and for that it is indispensable to have fully committed citizens with public spaces and

environmental issues. Therefore, it is fundamental to carry out empowerment initiatives with citizens, but there must be a social-awareness and responsibility from them in order to achieve a successful experience. If citizens are not concerned about public spaces and environmental quality, it would be very difficult to move forward with empowerment initiatives.

Authorities: By far, local authorities were pointed out as one of the key stakeholders in relation to the empowerment initiatives. If local authorities do not take into account citizens' thoughts, worries and opinions with regard to public spaces and environmental satisfaction, it is very difficult to accomplish a participatory management for a public policy making process.

Thus, local authorities are the main group responsible of this initiative. According to the participants, they have to incentivise scientists and support the empowerment initiatives and experiences. Moreover, it is essential to take into account citizens opinions in the local decision making process, ensuring that citizens are fully committed and empowered enough with public governance, including environmental issues.

❖ **Empowerment initiative evaluation**

Opportunities for you: Essentially, thanks to this empowerment initiative, citizen's observatories were created in Vitoria-Gasteiz. Hence, it was an opportunity to give diverse opinions and remarks with regard to public spaces and environmental improvement. Particularly, objective and subjective perceptions transmission about public spaces were reported as one of the key aspects. Additionally, participants said that it was an opportunity to share different ideas and opinions with other citizens because they were learning in the group from each other. In many ways, the initiative was an opportunity to empower people to think for themselves and reinforce their bonds as citizens. According to a participant: *"Meeting new people and gathering with others is a positive experience and a great chance to empower ourselves"*.

Opportunities for the others: Broadly speaking, the CITI-SENSE experience brought the opportunity to learn quite a lot about how to assess a public space, to raise the awareness on environmental issues, the role that technologies could play within empowerment initiatives and how to contribute to the environmental governance. Thus, one of the accomplishments of the experience was to provide skills to the citizens and empower them. Moreover, the participants living closed to the public spaces where the experience was carried out found that

the CITI-SENSE experience was an opportunity for them to contribute to the development of their own neighbourhoods.

Barriers for you: Certain technological limitations were reported as barriers among elder participants during the empowerment initiative. Thus, some citizens could face problems to understand the empowerment methodology and technological tools, basically caused by their inexperience. It is necessary to make clear enough the empowerment initiative process and evaluation among all the participants, avoiding any discrimination in the public decision making.

Barriers for the others: As it happened with the toolkit evaluation, local authorities were pointed out as the main barrier to carry out an action plan within an empowerment initiative project. If local authorities and the public administration do not participate in the initiative or do not take into account citizen's opinions, the whole experience would be useless. On the other hand, citizen's disinterest in environmental issues may affect public gatherings on this.

Conditions for you: It is necessary to make clear enough the empowerment initiative process and evaluation among all the participants, avoiding any discrimination in the public decision making process. Thus, the main condition is to guarantee a user-friendly toolkit and an understandable method to carry out the empowerment initiative process.

Conditions for the others: Once again, the main conditions to carry out actions based on empowerment initiatives are the engagement of local authorities and citizens. Both are susceptible to be barriers against any empowerment process and a condition to make any initiative successful. Besides, Vitoria-Gasteiz local associations' engagement was reported as necessary. The well-known "Civic Centres" should contribute into the empowerment process, pushing citizens to take actions with regard to environmental governance.

ANNEX XII. MUNICIPALITY OF VITORIA-GASTEIZ RESULTS

Authorities Feedback: Environmental Studies Centre (Vitoria-Gasteiz)

Interviewees: two leading authorities from the Environmental Research Centre (Interviewees identity has been protected. Results show their ideas with regard to the empowerment evaluation process, while identity information has been concealed).

- ❖ **The product:** The sensor was described and seen as an asset. Moreover, the use of new technologies was pointed out as something useful to get information about urban quality and public spaces parameters.

Interviewee 1: *“I think that new technologies are important and we have to use them. I think that this product is a tool”.*

Interviewee 2: *“Broadly speaking, this is an interesting experience”*

However, some limitations were pointed out. On the one hand, legal issues and budget limitations may constrain the implementation of sensors. On the other hand, the obtained data and conclusions were seen as not very surprising or not original enough.

Interviewee 1: *“Legal issues and budget. There are conditions and competences. I can’t undertake a participation process when you haven’t got any budget or competencies to carry out certain improvements”.*

Interviewee 2: *“what you have done involves a lot of work, and your conclusions and findings aren’t very surprising, It’s not worth it”.*

- ❖ **The collected data:** The data gathered by citizens were seen as potentially useful. According to the Interviewees, the collected data was useful if it was perfectly checked, being complementary to public spaces evaluation by citizens. However, it was pointed out that the questions were perceived as too technical.

Interviewee 1: *“It is strongly focused on physics parameters so it is a bit limited. When you have presented to me this product, I have thought that it was very oriented to physical parameters”.*

- ❖ **Product improvement:** None of the interviewees reported any suggestion or recommendation for the product update or improvement. They said that they would not change anything. Thus, the product was seen as technologically advanced and useful. However, they insisted on the results, saying that they were not sufficiently original or very surprising.

Interviewee 1: *“I would not improve it. I think that the product is fine, but it is complementary to a series of observations or surveys that I could carry out”.*

- ❖ **Public Spaces improvement:** According to the ESC managers, they were aware of the CITI-SENSE engagement process with participants. They found that public participation processes were fundamental when improving public spaces, and they mentioned that they actually carried out public participation processes too.

Interviewee 2: *“we are currently defining the food and agriculture strategy within the city. Our goals are to identify the current situations, aims, the components within the food and agriculture chain, the strengths and weaknesses, how to prioritize certain issues... and for that we are carrying out a public participation process”.*

However, some limitations were pointed out with regard to the CITICENSE public participation process. For example, the legal framework, municipalities’ engagement and budget resources were indicated as elements susceptible to limit public participation initiatives.

Interviewee 1: *“If there aren’t legal conditions, administrative conditions and economic conditions to carry out certain processes (such as an acoustic panel to measure noise), I can’t empower the people”.*

- ❖ **The Empowerment Process:** Citizens engagement is fundamental in the decision making process. The ESC managers believed that Vitoria – Gasteiz citizens are quite empowered with regard to public spaces environmental quality. Moreover, the environment is defined as something crucial.

Interviewee 1: *“So, coming back to the question, I think that our citizens are happy because they now that environmental issues are crucial for Vitoria-Gasteiz, and there’s a lot of people engaged with this, which is an opportunity for us”.*

However, with regard to empowerment evaluation process, the Interviewees said that the CITI-SENSE project did not contribute to create empowerment among the citizens. It was pointed out that the empowerment only happened with the tool (sensors), and that CITI-SENSE experience was something experimental.

Interviewee 1: *"I think that participants have been empowered with the CITI-SENSE tool only".*

Interviewee 2: *"I don't think that it is a public participation process. It is something experimental, a pilot. I think that you have done a kind of pilot with CITI-SENSE".*

Clearly, the empowerment assessment was the most discussed issue among the interviewees. Since ESC in Vitoria – Gasteiz carries out public participation processes and empowerment initiatives with citizens, they acknowledge that the CITI-SENSE project is extraordinarily technological and advanced, but still limited with regard to environmental engagement. The experience that ESC has in this field was identified as valuable when comparing it with the CITI-SENSE experience.

Interviewee 1: *"I find CITI-SENSE empowerment initiative very limited"*

Interviewee 2: *"CITI-SENSE doesn't reach all the citizens, and I have my doubts if CITI-SENSE experience could enrich a public participation process".*

So, having identified some limitations within the CITI-SENSE project by ESC managers, they were asked about the limitations that they face when they undertake empowerment processes in Vitoria-Gasteiz. Largely, they recognized that legal and budget issues may affect them. Furthermore, it was pointed out that empowerment processes often are constrained by a low-participation culture and the little diversity among the participants.

Interviewee 1: *"I can't undertake a participation process when you haven't got any budget or competencies to carry out certain improvements".*

Interviewee 2: *"...one problem is that usually the same people come to us. Our culture haven't got interiorised the participation".*

- ❖ **Learning and collaboration:** The Interviewees said that thanks to CITI-SENSE they have learned about sensors, new technologies and social media use for public participation processes with

regard to the public spaces assessment. Particularly they pointed out that new technologies are fundamental for young people, and that it is necessary to move to a modern and appropriate citizens' engagement process. Both found the technological aspects as the most original key point in CITI-SENSE. Moreover, the first interviewee said that the in-depth interview was for her a reminder about the importance of empowerment processes with citizens.

Interviewee 1: *"This interview reminds me the importance of the empowerment initiatives too. We are open to new technologies and empowerment processes"*.

Interviewee 2: *"I have learned about the sensors that were surprising for me. The use of new technologies was surprising too. Currently, with the smart cities concept, all these things are interesting"*.

However, both reported that some limitations may appear when new technologies are used. The sensors were seen as a complex product for public spaces assessment, and one of the interviewees said that the collected data were not well-directed or used.

Interviewee 1: *"CITI-SENSE is interesting but limited. It is just a tool"*.

Interviewee 2: *"We have to think what to do with all the data that is being collected by sensors"*.

So, if we assess ESC collaboration potentialities with the CITI-SENSE project, it would be certainly limited by the technological issues, and there would be a certain reticence to undertake public spaces evaluation processes by local authorities. As they reported "it is not always possible to empower all the citizens".

Interviewee 1: *"we haven't supported this project from the beginning because we found that it is somehow limited"*

Interviewee 2: *"More work is needed and it is limited with regard to the findings that you have presented"*.

ANNEX XIII. SUMMARY OF THE RESULTS FROM THE CITI-SENSE EMPOWERMENT EVALUATION

Summary

<i>Usefulness</i>	<i>Citizens</i>	<i>Authorities (ESC)</i>
To what extent is this activity/product useful to you?	It's a useful product. It helps to notice elements that can be easily unseen.	It's an asset. New technologies are always useful.
<i>Actions</i>	<i>Citizens</i>	<i>Authorities (ESC)</i>
Before: What do you expect it could help you to do better?	This is going to increase my awareness and motivation towards the environment.	It is interesting and necessary to introduce new technologies.
After: What can it help you to do better? What can it not help you to do better? What could it help you to do better if improved/adapted? How should it be improved?	I'm going to monitor the environmental quality and be aware of public spaces urban quality. The app need to be more stable and user friendly.	I would not improve it, the product is fine.
Which kind of actions did you already deploy based on this or do you plan to deploy in the <i>short term</i> (coming half year)? Which kind of actions do you plan to deploy based	I feel myself more committed with Vitoria-Gasteiz public spaces environmental quality. I'm going to monitor public spaces management, and demand a sustainable environment.	We carry out public participation processes with citizens in order to increase their awareness with public- spaces and environmental quality. We would like to increase citizens' empowerment with environment.

on this in the <i>longer term</i> (coming years)?		
<i>Opportunities – barriers – conditions for actions</i>	<i>Citizens</i>	<i>Authorities (ESC)</i>
<p>What are the <i>opportunities</i> for you to take AQ improvement action based on this?</p> <p>What are the <i>barriers</i> for you to take AQ improvement action based on this?</p> <p>Which <i>conditions</i> should be met for you to take AQ improvement action based on this?</p>	<p>Thanks to this product, I feel more relaxed.</p> <p>There are people that may not be interested in environmental issues.</p> <p>I want to test it under different weather conditions.</p>	<p>It's always interesting to check new technologies and functionalities with regard to public spaces assessment and environmental quality.</p> <p>The obtained data is too technical for citizens.</p> <p>Legal and budget conditions may affect me, and therefore this product implementation by ESC</p>
<p>What are the <i>opportunities</i> for others to take AQ improvement action based on this?</p> <p>What are the <i>barriers</i> for others to take AQ improvement action based on this?</p>	<p>It raises global awareness in environmental issues and public spaces conditions.</p> <p>Local authorities must pay attention to this initiative, and boost citizens' empowerment in environmental comfort within the city.</p>	<p>It might be interesting for schools and other institutions to work with this product.</p> <p>I can obtain the same outcome with other techniques.</p>

<p>Which <i>conditions</i> should be met for others to take AQ improvement action based on this?</p>	<p>The product is useful when citizens and authorities have an interest on that.</p>	<p>This product should be adapted to every case in particular.</p>
<p><i>Collaboration</i></p>	<p><i>Citizens</i></p>	<p><i>Authorities (ESC)</i></p>
<p>How do you appreciate collaboration within the Empowerment Initiative?</p> <p>What is positive what is negative?</p>	<p>It's necessary to collaborate and contribute to the environmental governance. Citizens' observatories are useful, and it is necessary to carry out an open assessment of the public spaces.</p>	<p>The empowerment initiatives are fundamental for us. However, if you only go to the "comfort topic" you can miss a lot of things.</p>
<p>How do you appreciate opportunities for you to have influence within the Empowerment Initiative?</p> <p>What is positive what is negative?</p>	<p>I want to be part of the public spaces transformation.</p>	<p>Currently our environmental strategy has been designed following a participation process, and that is something fundamental. But is not always possible to carry out empowerment initiatives (there are conditions, legal issues, budget limitations...)</p>
<p><i>Learning</i></p>	<p><i>Citizens</i></p>	<p><i>Authorities (ESC)</i></p>
<p>Did you learn something useful within the Empowerment Initiative?</p>		<p>It gives me a clue about how to integrate innovative tools and</p>

	I have learnt a lot about an initiative that requires new technologies use.	new technologies in the empowerment initiatives that we carry out.
From whom did you learn something useful within the Empowerment Initiative?	We have learnt one from each other during the focus groups celebration.	People want to live well and feel comfortable. If my strategy is to transform public spaces I have to consider a lot of key issues. CITI-SENSE is somehow limited, but it is interesting with this regard.
Responsibilities	Citizens	Authorities (ESC)
How do you see the responsibility of <u>scientists</u> within the Empowerment Initiative?	Scientists have a great responsibility with empowerment initiatives and environmental issues.	The environmental quality is an issue that concerns everybody. We believe in green fields and lands surrounded by trees. But that's an old idea and we have to look for new methods where green rings and urban development's live together.
How do you see the responsibility of <u>citizens</u> within the Empowerment Initiative?	Citizens have a huge responsibility. They must become aware of environmental quality importance and public spaces transformation.	
How do you see the responsibility of <u>authorities</u> within the Empowerment Initiative?	Authorities are the key agents. They have to implement the citizens' observatories decisions	

	and carry out empowerment initiatives.	
Opportunities – barriers – conditions for actions	Citizens	Authorities (ESC)
<p>What are the <i>opportunities for you</i> to take AQ improvement action based on collaboration within the Empowerment Initiative?</p> <p>What are <i>barriers for you</i> to take AQ improvement action based on this?</p> <p>Which <i>conditions</i> should be met <i>for you</i> to take AQ improvement action based on this?</p>	<p>It's an opportunity to give opinions, suggestions, recommendations and ideas about public spaces and environmental improvement.</p> <p>Elder people have had difficulties to understand and follow the initiative, and particularly the data gathering process and the empowerment methodology.</p> <p>The main condition is to guarantee a user-friendly toolkit and an understandable method to carry out the empowerment process initiative process.</p>	<p>The empowerment happens when the people get engaged and start demanding environmental quality.</p> <p>Maybe you want to transform a road into a green field, but in this road there must be a traffic flow.</p> <p>Maybe I have the chance to transform something, but there are limitations and conditions</p>
<p>What are <i>opportunities for others</i> to take AQ improvement action based on collaboration</p>	<p>It's an opportunity to learn and increase citizens' awareness with regard to environmental issues.</p>	<p>If there is any environmental attack, citizens would stop it.</p>

<p>within the Empowerment Initiative?</p> <p>What are <i>barriers</i> for <u>others</u> to take AQ improvement action based on this?</p> <p>Which <i>conditions</i> should be met for <u>others</u> to take AQ improvement action based on this?</p>	<p>Local Authorities must participate and take into account citizens suggestions and ideas.</p> <p>The condition for success is the public authorities' engagement.</p>	<p>Certain things are unquestionable.</p> <p>I can't undertake a participation process when you haven't got any budget or competencies to carry out certain improvements.</p> <p>Citizens should be sensible and understand that sometimes it is not possible to do certain things.</p>
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ANNEX XIV. EVALUATION OF KEY PERFORMANCE INDICATORS

In deliverable D3.3 “Recruitment Assessment and Plan for Phase 2: Full Implementation” the KPIs that will finally be used for the full implementation of the Vitoria-Gasteiz EI were presented. These have been derived from the KPIs proposed initially by WP4 (Liu et al., 2014 (D4.2)). A previous evaluation of the Key Performance Indicators (KPIs) was presented in deliverable D3.2 “Pilot study evaluation and protocol for phase 2” the pilot studies developed previous to the Full Implementation Phase. At that time, the global result was above the average. Specifically, the indicators related to sensors showed very high value, while the indicators related to the data server platform and to the products and services were evaluated as having a relatively positive performance. However, some of the indicators about citizens/users did not really apply at that time, since citizens were not being involved at that stage of the project.

In the following table, we present the evaluation made of the KPIs for the Empowerment Initiative of Public Spaces, developed in Vitoria-Gasteiz.

Table 11. Evaluation of Key Performance Indicators for Public Spaces EI.

KPIs type	KPI(s)	Successful level	
		description	scoring
1. Sensors indicators	1) Were sensors successfully validated and calibrated? Were special methods/protocols developed for QA/QC sensor readings? Was real-life deployment of sensor units demonstrated?	Yes	5
	2) Are readings of the sensors comparable to data obtained from standard sensors/devices? Could sensor data be algorithmically corrected to follow records from standard units? Comparison of personal sensors with standard monitoring instruments.	Yes	5
2. Platform indicators	1) Does the final data flow work? Measured variables can be viewed on the web and on the smart phone.	Yes	5
3. Products and services indicators	1) Are tools developed within the EI easy to use, attractive and enjoyable to use?	Partly	3
	2) Is usability assessment of products/services completed with stakeholder groups?	Yes	5
	3) What is the satisfaction level or useful level of the feedback from users for the products and services?	Satisfied	3
	4) Is assessment of the products/services used to assess the level of satisfaction with users of the products and services? Or have we asked users if they are satisfied with our products and services?	Yes	5
	5) Are stakeholders (e.g., local authority, scientists, schools, citizens, etc.) involved in the tools design process? Visualization at the web portal.	Yes	5
	6) Does the initiative increase public spaces comfort awareness and understanding of related issues in the population?	Yes	5
	7) What is the products and services access level (e.g., how easy to access the project product and service)?	Medium	3

KPIs type	KPI(s)	Successful level	
		description	scoring
	8) What is the quality of products (e.g., thermal comfort information) that are meaningful and could be presented to the public for participation?	High	5
	9) Is the expected initial time for each measurement maintained?	Yes	5
4. Users indicators	1) Is the work relationship with the stakeholders (e.g., local authorities, scientists, schools, citizens, etc.) established?	Yes	5
	2) Is the work relationship with the stakeholders (e.g., local authorities, scientists, schools, citizens, etc.) effective?	Partly	3
	3) Do citizens want to participate in observing their environment in the EI full implementation?	Yes	5
	4) Is engagement concerning the CITI-SENSE initiative with local authorities/scientists/schools/citizens documented?	Yes	5
	5) Is stakeholders response and satisfaction measured (e.g., by the use of questionnaires)?	Yes	5
	6) Is assessment of public engagement tools used to document engagement with stakeholders?	Yes	5
	7) What is the quality of communication and interaction with those citizens involved (e.g., scientists/citizen groups/citizens/administrators)?	Fair	3
	8) Have there been open lectures to the public, outreach activities, engagement of different stakeholder groups, dissemination materials, etc.?	Partly	3
	9) Local authorities' expectations about their participation in the project and the results.	Low	1
Others	1) Do location officers have thorough and clear understanding of the refinements required to the use of the sensors and other tools?	Yes	5
	2) Were lessons learned, potential issues addressed, recommendations for improvement and refinement implemented in the full implementation, and the objectives scope and remit of the full implementation achieved?	Partly	3
	3) Does the local team (as location officer and other partners of a location study) function well?	Yes	5
	4) Does this local team function/communicate well with external partners of the project?	Partly	3

ANNEX XV. SOCIAL IMPACT INDICATOR

The formula used to calculate the data corresponding to each of the variables is as follows:

1.
$$\frac{\text{Number of completed questionnaires (Online \& Paper)}}{\text{Common statistical sample for questionnaires in Vitoria-Gasteiz}} \times 0,1$$
2.
$$\frac{\text{Number of people that received CITI-SENSE information brochure}}{\text{Average number of people receiving paper publications in the city}} \times 0,1$$
3.
$$\frac{\text{Number of Likes in posts made in the CITI-SENSE Vitoria-Gasteiz facebook profile during the last year}}{\text{Number of Likes in posts made in Vitoria-Gasteiz Environmental Studies Centre profile}} \times 0,1$$
4.
$$\frac{\text{Number of people following CITI-SENSE Vitoria-Gasteiz facebook profile}}{\text{Number of people following Environmental Studies Centre facebook profile}} \times 0,2$$
5.
$$\frac{\text{Number of people sharing on their social network CITI-SENSE Vitoria-Gasteiz Facebook post}}{\text{Number of people sharing on their social network Vitoria-Gasteiz Centre for environmental studies facebook posts}} \times 0,2$$
6.
$$\frac{\text{Expected impact on radio, press and television}}{\text{Desirable impact}} \times 0,3$$

$\frac{48}{499} \times 0,1 = 0.009$ $\frac{1200}{2000} \times 0,1 = 0.06$ $\frac{40}{289} \times 0,1 = 0.013$ $\frac{27}{80} \times 0,2 = 0.067$ $\frac{8}{87} \times 0,2 = 0.018$ $\frac{8}{7} \times 0,3 = 0.34$
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$$\sum \frac{\text{CITI-SENSE Vitoria EI Variable}}{\text{Control Variable}} \times \text{Weighing Coefficient} \times 10 = \mathbf{5,07}$$

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