Participant experience in a multisensor personal air quality exposure study using low-cost sensors

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(Integrated Climate forcing and Air pollution Reduction in Land Climate Compared and Air pollution

ICARUS Multi-sensor Campaign Onlin CO, CO2, VOCs, PM2.5, O3, NO2, Temp, Humidity, Air pressure. Smart D Organic chemicals PM, Location, Temp, Humidity Exposure Steps, Activities. ure Time – Activity Heart Rate, Diary ing & Questionnaire SurveyMonkey



Surveys

- Pre- and post campaign surveys
 - Some reoccuring questions



1 - Ali je sodobrzanje v kampanji vpikulo na vale mnouje glede l ranimim dovoli, da biblili nekoravljeni ravomoniti svoje navndož	Ceda As	etanlje	anti are ada sta	laen	in B?
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Q13 – AEbi meva todalovaživ podobal razidare (*	O Da O Ne	_	_	_	600
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Q19 - Ste prepričani, da je ravnanje z valimi podatki u stremo?					

	* vala konstaktaa oosta (taka lahko vale odgero	ee primerjamo a po	da thi son	anjer).		
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 - Sense Algenetics a statistic processing of the parameters are compared at the sense of the sen	ispostovljenost onornaliken v zrakn? QF – Menim, da je meja ispostovljenost	Zelo niska (1)	a)	0)	(0)	0
7. Prois, objevoir za schluje	izpostreljenosfonorazilien v zraku? QF – Menin, da je meja izpostreljenost enerazilien v zraku:	Zelo niska (1) O	(1) (1)	0)	0	0
7 - Proža, odgovotk za načelaje. Do No	izpostretjmostfoneraalileus varatus? QF – Minika, da je moja izpostretjimost normalileus varaku: QF – Proins, če delte z nami kukrine koli nogoći randjire in konena v svaka jem 100	Zelo niska 00 O me izkušaje, ki cre j renju.	(1) O	CD O	(i) O	(f) O
7 - Piwin, signerite sa anidaje.	leporter/passelisseraaliken v maks? QF – Menin, da je moja leporter/passet menaliken v mika QF – Provin, če-felte z nami kakrine kali negati mojitve ja bennena v union vakdanjen Jol	Zelo niska (0) D ne iskulaje, ki ste j jenje.	(I) O a dotteel	(7) O	60 O	(f) O nýr, npr.
0 - Precise, edgeweitre as aucledaje:	izportrylposofioneradilen v zesta? QF - Sterin, da je moji izportryljorot mornadilen v zesta: QF - Predin, de deliz z smal kakrine koli negori mojiter in bennen v cvien v shkajen kij	Zedo nisilia (0) O me istovinje, bi ste j jenjje.	(J) O a dodrei	(7) O	(i) O	(f) O
7 – Provin, odgovorite za navlednje: Ba No	bporter/posed-someadless v units? QF - Menin, de je mejt hporter/posed ensauliken v units. QF - Predin, de delter z nant kakrine bei negeri ensejtre in bennen v velen venklasjen lief ensejtre in bennen v velen venklasjen lief	Zedo minika (0) O me inkoninge, ki ste j jenje,	(2) O a dottrel	(7) O	(4) O	(f) O
0 – Provins, odgovorite na naciedaje: Da Ne	bperter/proof-series/line v prilo? QF - Menin, do je nejo izporter/proof series/line v prilo: series/line v pri	Zedo minita OD O ne influeingie, ki swoj jenjje,	(1) O	(t) O	(i)	(f) O nýr, nyr.
17 – Protina, odgovorite na navilednje: Da Na	Ppotterformetormaline v zula? Of - Music Adjound topotelyment encodine v zula. Of - Preiss, is define v and tabetechningspri encyltre is brownen v reisen vuldation (b)	Zedo niska (D) O ne likulaje, ki ste j enje,	(J) O a dedired	(7) O	60 O	(f) O nột ngư
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Da No	izportivljenovljenovadilov v zniko? QF – Minika, do je moje leportevljenovl osmanilikov v moje osmanilikov v odko z nasel kakrine koli segari omojitve in besnena v valem vrahlanjem ilitj	Zedo niska (D) D me likkulaje, ki ree j meja.	(1) O a destree	(7) O	(i) O	(f) O
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QI – Protin, vnesite rroj vala kontaktna osoba vprašalnikom).	a ocebua ID iteri (taka lahko vale	ika t kampanji, adgecare prime	pr. LJU_S_ juna i polat	POSB, ki v na ki nananejev	ja je por	redovala sjim
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Q4 – Ali vas skobi globe rale tosastas iposteriji pasati iposteriji pasatiji (Sphih me ne skohi (D)	а) О	00	•		Zelo me skrbi B O
Q4 - Ali vas skoltojekis rako tenastas gentroljenenti razlamas senaskoje?	Spibh me ne skriti (0) O Velike manjite, ket pen suffathoodite	d) O Male manjite, ket tem prizakovalia	(ð) O Taka, ko	6 C 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	o ajin ajin cian	Zelo me skrbi (5) O Veliko volja, koz seu pritskovalja
Q4 – All van skoleigheite rake demaster gescheren generalienije?	Spilds me me tikeful (0) Velika jana jana jana jana jana jana jana ja	(1) O Male manjite, kat cen prikakensite (2)	(3) O Taka, ko sem prickersi (3)	6 C Mala kar pricals 6	o i i restin o	Zelo ne slovij (8) O Vidito veljo, kot sena privlačnost (8)
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Q4 – A3 var skolet glede rak ennetes gesternt gesternt protoson versastensje? Q5 – Children et reachen realization versastensje protoson versastensje	Spibh me se tkrii O Vellis maajis, ket sm prikalovalis O Zdo nikla	C) Male manifus, but reas problems (2) (2)	(d) Taka, ko sea pricakonal (d) () ()	e Malo Bar pricisk 6 C	0 rekja, realija 0	Zelo ne skrbi (8) Vidlos večjs, bor son, prekskovala (8) Zelo visuka (5)

ICARUS VPRAŠALNIK GLEDE IZKUŠNJE PROSTOVOLJCEV nadaljevanje	5mm 3 ed 3
Q? – Aliste se kom pogeveriligkele svsjik remlister?	O Da O Ne
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O Drago, a kom	
O deal these pogrataplic	
Qu - Antonin antiqua para na manina, anticipa propia: Antici	OBIOM
Q9 – Procins, spiliterprenember vrajh itvljenjskih navadah, ki su jih sprejeluaradi sofe	levanje v
Q9 – Presin, spillte spemember svejh litijenjskih navadah, ki su jih specjelizavadi sofe razlakavi.	levanje v
Q ⁰ - Prein, spillerpernenber regh ibijogiski nevskih, kise jik spejskanski sole radomi	lovnaja v
Q ⁴ - Paula, spillerpresenter reghtelpnjala avadal, kirojli sprjekandi sole renikeri	lovanje v
Q ⁴ – Penda, spillerspermenher regli lirijnjikli noradal, kinejli spejetanedi ode radiketi.	levanja v
QF - Paula, qillir qomonler rojh lifqajdih arralık, kira ji qoqidaardi ole roblari.	levanja v
QF - Ponda-spillergenometer regit infysjelde arodek, kins fik gogekaardi ode resklart	levanja v
QF - Poetin, spiller gemeinder versjälteligigi det nerodek, ktore jär specjalanski ode reaktion	levanje v
QP - Pavila, qu'ill'approximater regit lift qu'als senside, Lieu ji spegita and note mathèni	levanje v
QI - Twein, qu'illespennenter esplit litipajuli avaide, Lien ju spejitanet set entaint. QI - Tala histolist setereire realizes A ten ik realit?	leranje v
Q8 - Forein, geller genomenter reigt intjesjeldt anstalet, klim jit sprojetanset, net resteller, Q8 - Kele Intelefjeld gestrerine reactions, klim jit gespild*	leranje v
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O' Aryan, gifte primater e cyll is fyngikk nordak, hin jik oppfansik and makket. Qi Aska biskeljelt preferetor meðren, kin jik priptil	levanje v
 Andra, alfin yearander sogli ih lyngi bla sondali. Um jih yegi basoli ode makan. Sala Mahajid yedroche randomi. Min jih yeği b 	levenjev
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Gr. Angen, gelfen presenter e ogli is fyngi kla sordal, ki o jil oppfanssk ode mekket. Gr. Anko kiskeljelt posterior mekken, ki o jil prejekt	lovanje v
 Ansis, splitte promoter wijk it bygdyk to odde, kim jk projektorek odd makan. Maka Makajid protector weben, Min jk projektor. 	levaj i v
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49 Argun, göller presenter i egilt ti fyrigi kla sordal, ki si jä sprigidansid solo makkat. 49 Ala kähdigi at pastarelse medinen ki si jä prigid 40 Ala kähdigi at pastarelse medinen ki si jä prigid 40 Ala kähdigi at pastarelse in begin pagi påri vidipi soldensnji e makken?	Bronjav
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 Alexis, yillis yanandar i niji iti juqi ki sonda, ki n ji yuqi hasha da mikasi. Qii - Kiki kidajid palamini mahani. Min ji pajiji? Qii - Kiki kidajid palamini mahani. Min ji pajiji? Qii - Mit hidi yanadali ki kujdaggi jida naga nahangi rankani? 	hemper

General ICARUS questionnaires

Questionnaires for participants/households:

- Sociodemographic
- Time-location patterns
- Medical history
- Type of dwelling
- Living habits (cooking, cleanin ventilating, pets, pollution sources...)







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Participant experience data

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Motivation

To help science and society

Interested in the topic

Interested in ones living environment

Curiosity

Possibility to participate

Personal benefit

External motivation

See my open access review paper about motivation etc: Johanna Amalia Robinson, David Kocman, Orestis Speyer & Evangelos Gerasopoulos (2021) Meeting volunteer expectations — a review of volunteer motivations in citizen science and best practices for their retention through implementation of functional features in CS tools, Journal of Environmental Planning and Management, DOI: 10.1080/09640568.2020.1853507

Want to see (real time) results



But...Agent Based Modelling

- People are agents that communicate with each other and with the environment
- Input data:
 - Behavior patterns for population groups
 - Road infrastructure
 - Use of space
 - Spatial AQ model
- Validation using measured data



Silicon wristband for organic chemicals



Smart Activity Tracker Garmin vivosmart 3







ICARUS Portable Particulate Matter sensing device



Imagine you wanted a portable high-tech device

What you had in mind





ICARUS Portable Particulate Matter sensing device



Data loss?

 Not a big deal for researcher if one week of data is missing, but for a volunteer who participated for 1 week, it is devastating



Campaign experience

- They liked how the campaign was designed and executed, how it was easy to get involved and cooperate
- Opportunity to carry Garmin
- Feeling of importance
- Compliments for researchers



Behavioural change

- Ventilate more
 - Cooking
 - Shower
 - Sleeping
- Use more sustainable forms of transport
- Avoid busy roads
- Avoid exess exposure
 - Less use of scented candles
 - Less use of aggressive cleanign products
- More time outdoors
- Stop smoking



Impacts on risk perception

- Before vs after
- Still to be analysed
- Worry and perceived risk to air polltion





(Integrated Climate forcing and Air pollution Reduction in Urban Systems)





Results report

- Introduction
 - Part A: overview of general objectives of the campaign and parameters measured
- Part B: results in individual household
- Part C: personal exposure data
- Guidance how to recude ones exposure and general info about the pollutants

Participant experience paper to be submitted



JMIR Public Health and Surveillance

A multidisciplinary journal that focuses on the intersection of public health and technology, public health informatics, mass media campaigns, surveillance, participatory epidemiology, and innovation in public health practice and research

See our COVID-19 Papers and Special Issues >

Journal Description

JMIR Public Health & Surveillance (JPHS, Editor-in-chief: Travis Sanchez, Emory University/Rollins School of Public Health) is an ESCI, Clarivate (SCIE, SSCI etc), Scopus, PMC/PubMed- and MEDLINE-indexed, peer-reviewed international multidisciplinary journal with a unique focus on the intersection of **innovation and technology in public health**, and includes topics like public health informatics, surveillance (surveillance systems and rapid reports), participatory epidemiology, infodemiology and infoveillance, digital disease detection, digital epidemiology, electronic public health interventions, mass media/social media campaigns, health communication, and emerging population health analysis systems and tools. The 2020 Journal Impact Factor is expected to be released in 2021 by Clarivate and is expected to be >3.5.

JPHS has an international author- and readership and welcomes submissions from around the world.

We publish **regular articles, reviews, protocols/system descriptions and viewpoint** papers on all aspects of public health, with a focus on innovation and technology in public health. The main themes/topics covered by this journal can be found here.



Questions?



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https://www.researchgate.net/ profile/Johanna_Robinson3

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