A11

Preliminary design of a Smart Logic, Electronic and Green Public Health Questionnaire (SLE-GPHQ) for investigating the proper compatibility between people and green facilities

Spyridon K. Chronopoulos[1,2], Evangelia I. Kosma[3,4], Dionysios Tafiadis[5], Periklis Papadopoulos[6], Ngoc-Tu Nguyen[7], Pantelis Angelidis[2], Panos Kostarakis[1]

[1]Physics Department, Electronics-Telecommunications and Applications Laboratory, University of Ioannina, Ioannina, Greece; [2]Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece; [3]Faculty of Medicine, School of Health Sciences, University of Thessaly, Biopolis, Larissa, Greece; [4]Psychologist, Private Practice, Ioannina, Greece; [5]Department of Speech & Language Therapy, Technological Educational Institute of Epirus, Ioannina, Greece; [6]Physics Department, University of Ioannina, Ioannina, Greece; [7]Department of Computer Science & Engineering, University of Minnesota, Twin Cities, Minneapolis, MN 55455, USA

Correspondence: Evangelia I. Kosma - ekosma@med.uth.gr; evikosma@gmail.com

Background: The new era of the continuous deployment of wireless and sensory technology in conjunction to the rapid expansion of Green Buildings' has led to a point of developing and enforcing specific rules and conditions. These conditions depend on the proper matching of Peoples' temperament and Green Smart Buildings. In parallel, the rules are relevant to the constructed Protocols for accomplishing the most efficient result relevant to the proper implementation of Green Buildings (LEED—Leadership in Energy and Environmental Design). This preliminary work is intended to find the best match between Habitants (or Workers) and Green Buildings based on an already proposed Protocol named as REFF (Reduced Ecological Footprints of Modern Facilities) [1].

Materials and methods: This work will firstly focus on the needed conditions in order to obtain a health green environment which should be consisted of nine fundamental elements which are proposed in [2]. These will include high quality of air quality (Indoor Air Quality—IAQ), the use of proper ventilation, thermal health, high water quality, minimized moisture, safety and security, reduced noise, proper lighting (frequencies below 100 Hz are prohibited) and absence of dust. Secondly our already constructed protocol of REFF [1] will be applied and readjusted relevant to the aforementioned. Then, 40 people will be tested into various green environments inside the same LEED Building (for 2 weeks) while using various personality tests [3] and productivity measurements in order to construct a map of Green Environment to Character Correspondence named as GEtoBCC. After this procedure, an electronic questionnaire will be constructed which will primarily be constituted of nine parts. Each part will correspond to one of the nine fundamental elements in conjunction to REFF. The Smart Logic will be based on Python, HTML and/or MATLAB code in order to rearrange the questionnaire relevant to each personality. This will conclude into better foreseeing the proper environment for each Habitant/Worker.

Results: Twenty people (10 men and 10 women) along with a control group of twenty people (10 men and 10 women) will be tested under different green environmental conditions. The control group will correspond to people working in a typical conventional building. In general, smokers will be excluded from the sample [4–6] and thus it will probably be split into independent subgroups relevant to character correspondence [3]. Consequently ANOVA will be employed in order to compare the unrelated "character" groups. In turn, and if the distribution of different populations is normal, a t-test will be used to compare each population with the mean of the control group. Then, Kruskal–Wallis tests will be conducted as they are the most appropriate for such small samples exhibiting exceptional results. Also, in the occasion of skewed variables, Mann–Whitney U tests will compare the different "character" groups relevant to a same data type collection. It is expected that the different "character" groups will interact differently inside altered green environments. This will help scientists, ranging from engineers to psychologists and other clinicians, to find and determine a viable solution relevant to the proper correspondence of population to various types of green buildings.

Conclusions: This work is focused on the construction of a new questionnaire named as SLEGPHQ in conjunction to the rules proposed by REFF protocol [1]. This electronic questionnaire will be self-adaptive to different types of answers and consequently will lead to the proper estimation of the appropriate "character" corresponding to the compatible LEED Building. If the aforementioned tactics will be employed in the case of people being moved at LEED Buildings then the final resulting populations of these facilities will be cohesive and will act towards the best possible maintenance of the new micro-environment.

References

1. Chronopoulos S, Kosma E, Tafiadis D et al. Reduced Ecological Footprints of Modern Facilities Introducing the Implementation of Advanced Wireless Technologies, and Human Resources' Benefits. Communications and Network. 2018;10(01):11-29. https://doi.org/10.4236/cn.2018.101002
2. Cedeno-Laurent J, Williams A, MacNaughton P et al. Building Evidence for Health: Green Buildings, Current Science, and Future Challenges. Annu Rev Public Health. 2018;39(1):291-308. https://doi.org/10.1146/annurev-publhealth-031816-044420
3. Loehlin J, Martin N. Personality types: A twin study. Pers Individ Dif. 2018;122:99-103. https://doi.org/10.1016/j.paid.2017.10.012
4. Tafiadis D, Chronopoulos S K, Kosma E I et al. Using Receiver Operating Characteristic Curve to Define the Cutoff Points of Voice Handicap Index Applied to Young Adult Male Smokers. Journal of Voice. 2018;32(4):443-448. https://doi.org/10.1016/j.jvoice.2017.06.007
5. Tafiadis D, Kosma E I, Chronopoulos S K et al. Voice Handicap Index and Interpretation of the Cutoff Points Using Receiver Operating Characteristic Curve as Screening for Young Adult Female Smokers. Journal of Voice. 2018;32(1):64-69. https://doi.org/10.1016/j.jvoice.2017.03.009
6. Tafiadis D, Chronopoulos S, Siafaka V et al. Comparison of Voice Handicap Index Scores Between Female Students of Speech Therapy and Other Health Professions. Journal of Voice. 2017;31(5):583-588. https://doi.org/10.1016/j.jvoice.2017.01.013