



Methodology for the evaluation of IEQ and comfort in schools classrooms

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ABSTRACT

Research on IEQ in schools usually refers to one or two aspects of the four, even the most recent research deals with these topics separately without considering all the factors that influence the environmental quality of the spaces. This research proposes a methodology and develops an index to evaluate IEQ in an integrated way.

KEYWORDS

Indoor environmental quality, school buildings, multicriteria analysis.

PROBLEM

The low the environmental quality (IEQ) of educational spaces has a negative effects on student's welfare and learning outcomes. To define a comfortable space, it is necessary to state a methodology to assess IEQ for students and teachers in school classrooms, considering the four aspects that define IEQ: Thermal comfort, Indoor air quality, visual comfort, acoustic comfort in an integrated manner, to then define standards that are verifiable, considering time of exposure that can ensure an educational space that delivers comfort to its occupants.

OBJECTIVE / HYPOTESIS

To develop an indicator that allows to **weigh the relevance of the four aspects of IEQ**, with respect to the general comfort, allowing evaluation and comparison. This aim arises to prove the hypothesis that **students will be forgiving** with certain aspects of IEQ while other thresholds are met.

AUDIENCE

School building managers, School buildings designers, IEQ research community, Policy makers on educational infrastructure.

RESEARCH QUESTIONS

¿What is the weighting of thermal, acoustic, light and air quality parameters when compared to overall comfort of students?

¿Will students be more forgiving to some aspect of IEQ than others? ¿with, when and why?

ORIGINALITY

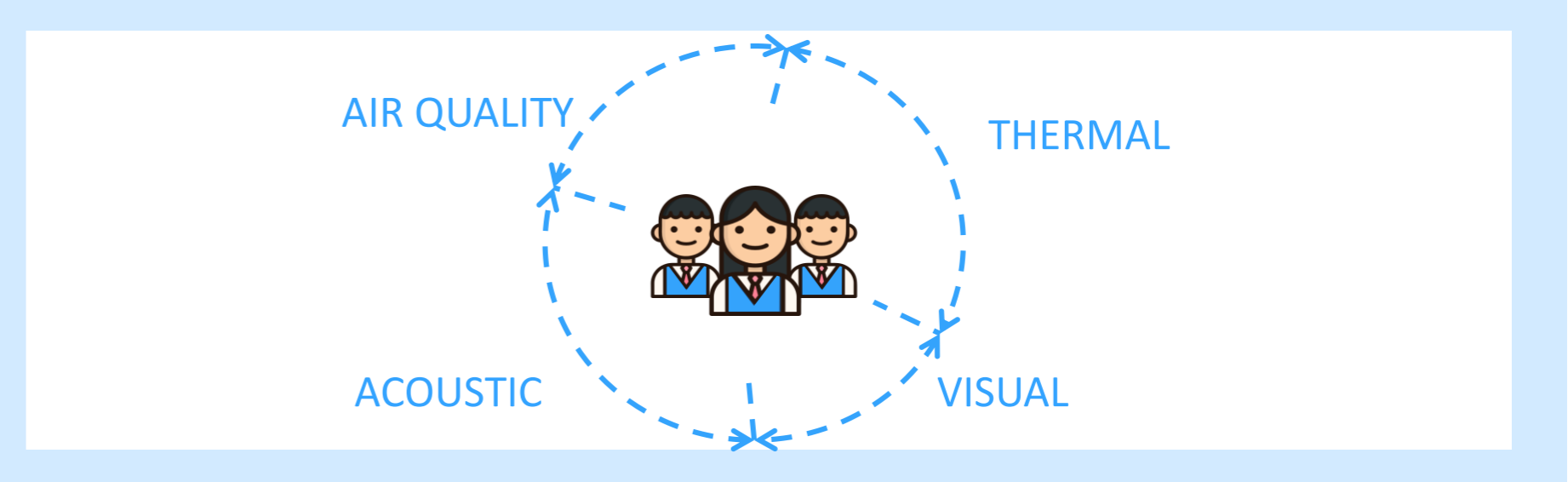
1. Development and validation of a new tool combining surveys and measurements to evaluate IEQ and Comfort of school students.
2. Better understanding of IEQ and student comfort in schools.
3. Definition of the forgiveness factor for school students by relating overall environmental comfort with IEQ thresholds through a statistical multivariable analysis.
4. This findings will help evaluate existing buildings and evaluate IEQ in the design stage of new buildings.

METHODOLOGY

Mixed method triangulation Design: this methodology aims to obtain different but complementary data on the same topic, by bringing together the strenghts of both cuali (interview) and cuanti-tative (survey, measurements) methods. To address IEQ and comfort on different levels, a multilevel research will be made, where the findings of each level will be merged together into one analysis.

RESULTS

- Modeling of a questionnaire specifically designed for evaluating IEQ and overall comfort of students in school classrooms.
- Validation of the survey for evaluation of IEQ and Comfort of school students in terms of validity, reliability, legibility and use of language according to the age of respondents and internal consistency.
- The validated survey will be administred to at least 200 students, combined with right-here right-now measurements of IEQ parameters.
- Statistical analysis will find relations between IEQ parameters and overal comfort perception that will define the forgiveness factor of students in classrooms.



- Most disturbing aspects and most disturbing combinations of aspects will be found.
- In depth interviews will be done to students, in order to get reacher cualitative data that will further explain the forgiveness factor of students in classrooms.
- A methodology to evaluate and define forgiveness factor of students in classrooms will be developed and validated

CONCLUSION

This study will provide a better understanding of the relation of overall comfort and IEQ in classrooms. It is confirmed that students will be forgiving of certain IEQ aspects provided that others are met.

It should always be considered that people may not identify certain aspects for instance high CO₂ concentration, so that the thresholds should be defined first and foremost to ensure health and then to provide comfort.

Resources

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