IEA ANNEX 66
OB-17 SYMPOSIUM

Occupant Behaviour Modeling and Building Typologies for Retrofitting of Educational Architectures. 01 STAGE OF THE RESEARCH

Educational building typologies.

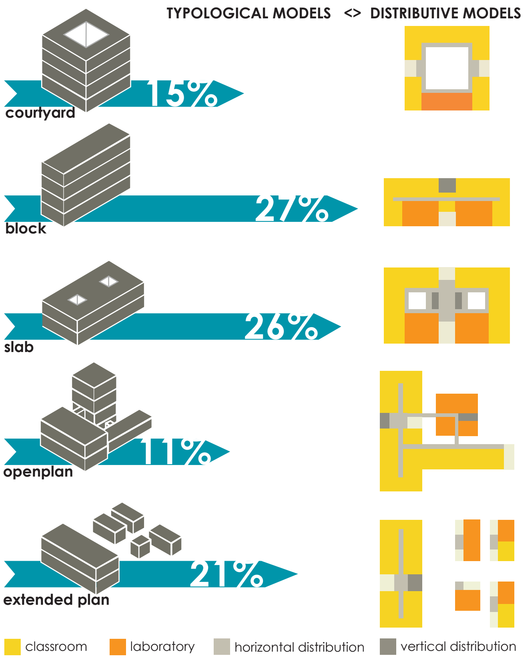
The study investigates the correlation between the innovative learning behavioural models, the thermal comfort of the **learning environments** and the **building typologies** that characterized the existing architectures for high education in Italy. The investigation is focused on the characterization of the building stock of **Rome, Italy.**

Traditional to Innovative learning spaces.

Energy analysis schedules that describe people heat gains, currently used in building energy modelling, provide a standard pattern, complying with the zoning of traditional morphology of learning environment.
A typical schedule is exemplified below.

	Ref. sensible heat gain Occupants [W/sqm]	Ref. latent heat gain Occupants [W/sqm]	Ref. occupancy density [persons/sqm]	Time of start & end for normal operation [hours]
	30	30	0.5	8am-2pm
	1.8	1.8	0	8am-2pm
	37	30	0.3	8am-2pm

The dimensional indexes complying with the italian regulatory framework (Ministerial Decree 18/12/1975)

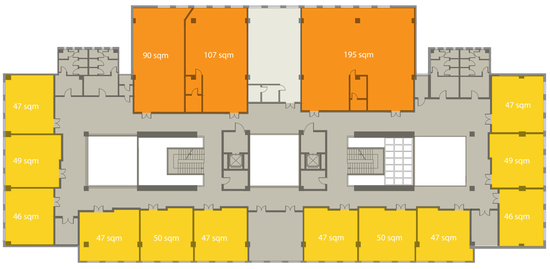


FROM TEACHING ZONING to
RELATIONAL LEARNING ENVIRONMENT

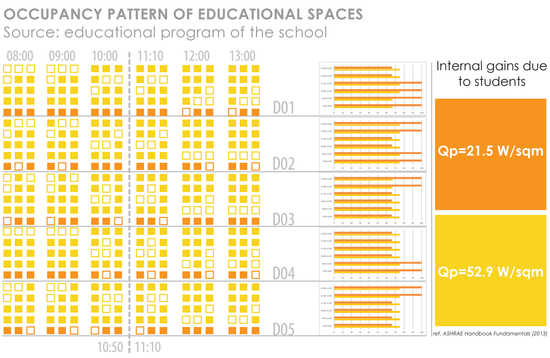
The research proposes a comparative study of the learning gruop schedule to model the passive impact of occupants in the building thermal and indoor air quality evaluation.

Case study: High school "Colomba Antonietti". Rome, Italy.

Weekly schedule of activities for each class (23 students)

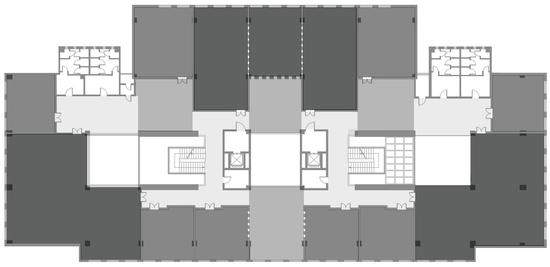


Traditional scheduling model: standard internal gain / variability of occupancy levels



Scenarios. Towards an Innovative Learning Environment.

Proposal of spatial re-modellization complying with *Cluster* spatial model.



exploration lab spaces	100% occupation | heat gain 67 W/sqm
group learning spaces	70% occupation | heat gain 60 W/sqm
informal/individual learning spaces	30% occupation | heat gain 60 W/sqm
transitional spaces	transitional spaces | heat gain 3.6 W/sqm

The definitions are desumed by the document "1+4 learning spaces" of the italian research centre *Istituto Nazionale Documentazione Innovazione Ricerca Educativa* (INDIRE)

Hypothesis of **OCCUPANCY PATTERNS** depending on the intensity of occupation and activities. Complete occupancy is ensured.

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