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Cawangan Perak

ISCU 2025

17TH RISM INTERNATIONAL SURVEYING CONFERENCE FOR UNDERGRADUATES

Embracing Construction Revolution 4.0 (CR4.0): Transforming Malaysia's Built Environment

16th - 17th May 2025 | Friday - Saturday

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WELCOME SPEECH FROM THE CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

بسم الله الرحمن الرحيم السلام

عليكم ورحمة الله وبركاته

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed “*Embracing Construction Revolution 4.0: Transforming Malaysia’s Built Environment*.” On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'

Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM CO-CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

Associates Professor Dr. Nur Hisham Ibrahim, *PMP*

Co-Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM THE PROJECT DIRECTOR

RISM 17th International Surveying Conference for Undergraduates 2025

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

Sr Dr. Nurul Fadzila Zahari

Project Director

RISM 17th ISCU 2025

KNOWLEDGE, ATTITUDES AND PRACTICES ON INDOOR AIR QUALITY IN EDUCATION INSTITUTIONS: A THEMATIC REVIEW

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ABSTRACT

A healthy environment is essential for effective and efficient learning, particularly for children who are susceptible to air pollution. Previous research indicates that indoor air quality (IAQ) in educational settings is often very poor, with IAQ parameters frequently exceeding guideline limits. This highlights the urgent need to investigate areas that can be improved to ensure healthier and more conducive learning environments. To address these issues, a thematic review was conducted to explore trends in IAQ research in Malaysia from 2011 to 2024. The study involved a systematic review of literature sourced from SCOPUS and Google Scholar. The analysis of 20 papers revealed key themes, including knowledge (awareness of pollutants), attitudes (perceptions of ventilation and health concerns), and practices (mitigation strategies). The review aimed to identify elements that could help educate teachers about IAQ, raise awareness, and foster practices that improve air quality in schools. The findings not only highlight areas for further research but also provide valuable insights that can guide the development of more effective interventions and policies to improve IAQ in educational institutions, ultimately supporting better health and academic outcomes. Furthermore, future research could focus on long-term effects of educational programs on students, teachers, and staff. Tracking changes in knowledge, attitudes, and practices over time could help assess the sustainability of these interventions and their lasting impact on IAQ.

Keywords: Indoor Air Quality, Education institution, Knowledge, Attitudes, Practices

I. INTRODUCTION

Children's health and wellbeing are greatly impacted by the IAQ in kindergartens and schools. Young children spend a lot of time indoors, thus exposure to poor IAQ can cause allergies, respiratory problems, and other health problems. IAQ is influenced by a number of elements, including as airborne contaminants, ventilation, cleaning procedures, and air conditioning systems. It has been demonstrated that proper ventilation, which includes operating exhaust fans and opening windows on a regular basis, improves air circulation and lowers carbon dioxide (CO₂) levels (Fabbri, 2014 & Annesi Maesano et al, 2013). Furthermore, using the right cleaning supplies and techniques can reduce exposure to dangerous chemicals and particulate matter (Avella et al., 2021 & Wei et al., 2016). To establish a healthy learning environment, schools must implement practical measures including routine HVAC system maintenance, the use of air purifiers, and improved housekeeping techniques (Chegini et al., 2020).

Systematic interventions and behavioral adjustments must be combined to ensure good IAQ. In order to maintain adequate air quality, educators and school administrators need to understand the significance of implementing organized programs that encourage ventilation, effective use of air conditioners, and the use of non-toxic cleaning supplies (Mohamad Nor Zaki, 2022 & Choo, 2014). Microbial contamination can be considerably decreased, respiratory health can be improved, and overall indoor environmental quality can be improved by incorporating IAQ management into daily operations, according to research. To give children a secure and comfortable learning environment, ongoing evaluation and the application of IAQ improvement strategies are therefore crucial. Thus, this paper explores the current discussions on IAQ in educational institutions, published between 2011 and 2024, categorizing them into knowledge, attitudes, and practices.

II. MATERIALS AND METHOD

The articles were first entered into ATLAS.ti 8 software (textual analysis software) and then categorised into the following: 1) author, 2) issue number, 3) periodical, 4) publisher, 5) volume, and 6) year of publication. Table 1 shows the search strings that were used to find relevant literature. As a result, the articles were grouped, allowing them to be evaluated based on their publication year (Table 2) and the pattern of discussion. Twenty-four articles were finalised using ATLAS.ti 8 after several rounds of screening. Over the last decade, numerous studies have examined IAQ. Publications on the subject are increasing from year to year. This field of study became popular in 2014 and has continued to progress over time.

Table 1 Search strings from SCOPUS database

Search strings from SCOPUS	TITLE-ABS-KEY ((("indoor air quality" OR "indoor air pollution") AND ("kindergarten" OR "preschool" OR "school"))
	Year: 2011-2024

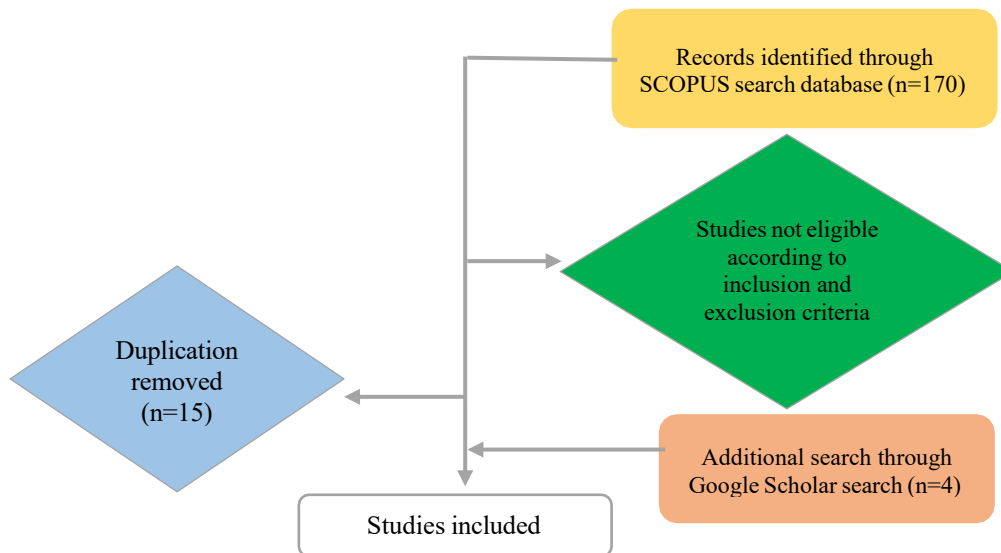


Figure 1 Screening profile for thematic review

Table 2 Reviewed articles according to year

Year	Articles
2011	2
2013	1
2014	2
2016	4
2017	2
2018	1
2020	1
2021	3
2022	2
2024	2
Total	20

14	The role of airborne microbes in school and its impact on asthma, allergy, and respiratory symptoms among school children (Yu <i>et al.</i> , 2011)	/		
15	Indoor air quality monitoring in a historic school in South Tyrol, Italy (Avella <i>et al.</i> , 2021)	/		
16	Measurement and health risk assessment of PM _{2.5} , fame retardants, carbonyls and black carbon in indoor and outdoor air in kindergartens in Hong Kong (Deng <i>et al.</i> , 2016)	/		
17	Indoor air quality and sources in school related health effects (Annesi Maesano <i>et al.</i> , 2013)	/		
18	Improving indoor air quality in primary school buildings through optimized apertures and classroom furniture layouts (Tikul <i>et al.</i> , 2022)	/		
19	Carbon dioxide as an indicator of bioaerosol activity and human health in K-12 school system (Gangwar <i>et al.</i> , 2024)	/		
21	Assessment on Level of Indoor Air Quality at Kindergartens in Ampang Jaya, Selangor (Sarijuddin <i>et al.</i> , 2018)	/		
21	Assessment of the BTEX concentrations and health risk in urban nursery schools in Gliwice, Poland (Mainka & , Kozielska, 2016)	/		
22	Microbiological evaluation of indoor air of kindergartens in Fatih District of Istanbul (Onoglu <i>et al.</i> , 2011)	/		
Total		11	5	11

KNOWLEDGE

Knowledge of IAQ is a critical factor in creating healthy environments. When occupants are informed about the sources of indoor pollutants and the health risks associated with poor IAQ, they are more likely to take the necessary steps to improve air quality. There are several elements that affect IAQ in education setting including ventilation, flooring materials, room size, the usage of carpet, air purifier, art product, cooking activities, cleaning agent usage and pollutants relationship as in Figure 3. Air quality and occupant health may be impacted by elevated CO₂ levels brought on by inadequate ventilation (Annesi Maesano *et al.*, 2013). Research has indicated a positive correlation between classroom air velocity and PM_{2.5} concentration, indicating that higher air velocity may also lead to higher air particulate matter levels (Tikul *et al.*, 2022).

Research shows that carpeted areas have substantially higher overall mold levels, which raises the possibility of respiratory problems (Onoglu *et al.*, 2011). Moreover, volatile organic compounds (VOCs) included in paints, adhesives, and other materials used in classrooms may be the source of indoor air pollution (Marques *et al.*, 2016). The hazardous chemicals toluene, xylene, and ethylbenzene, which are frequently released from glues, paints, varnishes, and synthetic fiber products, may contaminate nursery school settings, according to a Polish study (Mainka, 2016). The use of cleaning chemicals has also been associated with exposure to primary and secondary air pollutants because of the substances they emit and the way they react with other airborne compounds (Wei *et al.*, 2016).

Daily tasks like cleaning and cooking, which emit pollutants into the air, especially when coupled with inadequate ventilation, are additional variables that contribute to poor IAQ (Sarijuddin *et al.*, 2018). In order to provide healthier interior environments for kids, these findings highlight the necessity of efficient ventilation, material selection, and air purification techniques. Classrooms should employ air purifiers to lower PM concentrations in order to lessen these dangers, especially when pollution levels rise (Abdel-Salam, 2017). Given these insights, it's clear that occupants' knowledge of these factors is crucial for maintaining good IAQ.

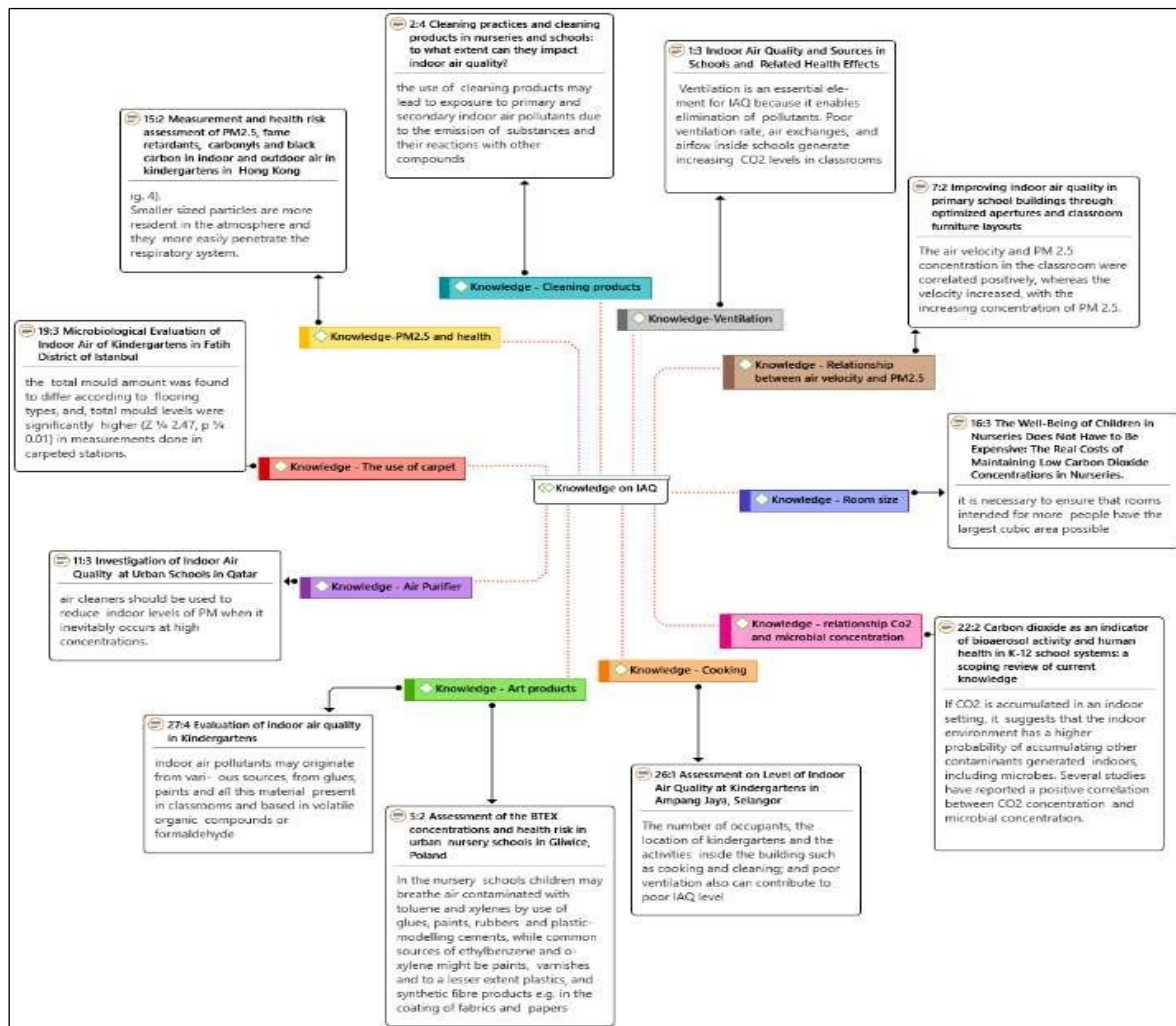


Figure 3 Network view of main publication on knowledge

ATTITUDES

Attitude plays a significant role in shaping how individuals perceive and respond to IAQ. In the context of educational settings, occupants' attitudes toward IAQ can influence their awareness of potential risks and their willingness to adopt measures to improve air quality. Among attitudes identified in Figure 4 are proper management, housekeeping program, usage of IAQ device and air purifier. Since routine classroom maintenance and cleaning improve airflow and lower airborne contaminants, housekeeping programs are one of the most important ways to improve IAQ (Asrul & Jalaludin, 2017). Even though the effects of airborne microbes on schoolchildren's respiratory symptoms, allergies, and asthma are becoming more widely recognized, there are still relatively few programs in place in some nations, such as Malaysia, to improve IAQ (Yu *et al.*, 2011).

Monitoring tools and air purification techniques are also crucial for preserving a healthy IAQ. Additionally, schools are now using smart IAQ monitoring systems, which notify residents when to open windows to allow for air exchange. According to a study, although the initial usage of such a device did not result in a significant reduction in CO₂ levels, improvements were noted as users gained experience with how it worked (Avella *et al.*, 2021). Children can learn in a healthier environment when appropriate management, housekeeping programs, air purifiers, and monitoring tools are used in tandem. Preschools and schools need to understand the significance of these steps and take them methodically. Schools can greatly lower the health hazards associated with poor air quality by making sure that IAQ techniques are properly maintained and continuously enhanced, which will ultimately benefit both staff and children.

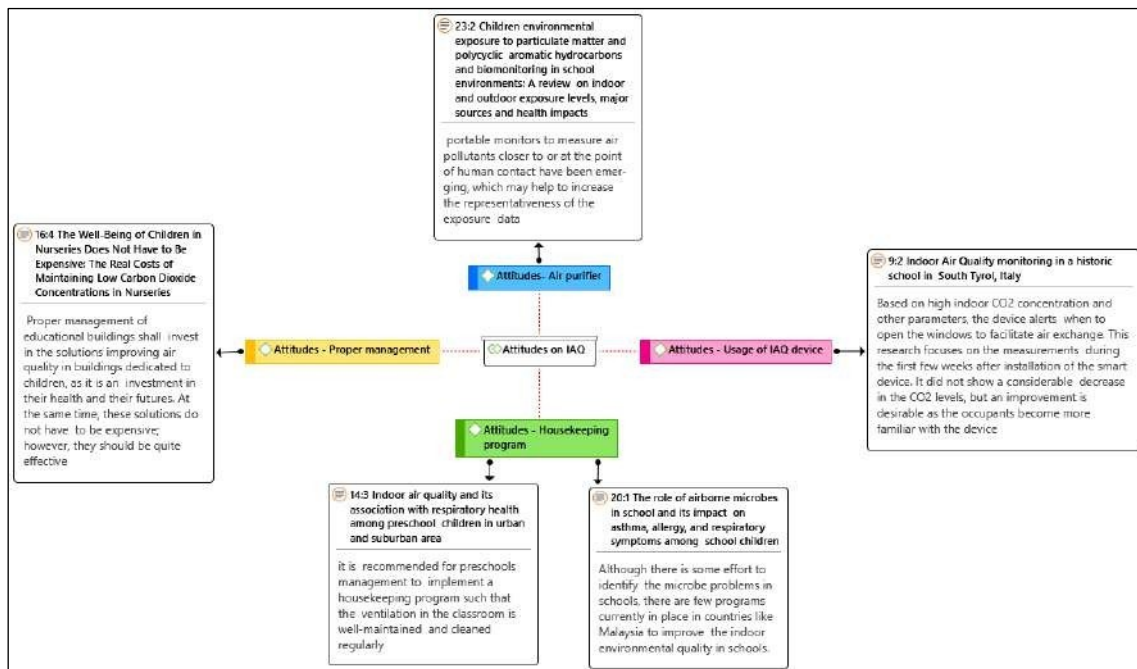


Figure 4 Network view of main publication on attitudes

PRACTICES

Practices refer to the actions, behaviours, and strategies that individuals or organizations implement to manage and improve the quality of the air in a specific environment. Example of practices are window opening, usage of exhaust fan, air conditioning system, air purifier, ventilation strategies and cleaning activities (Figure 5). One efficient strategy to increase air circulation and reduce CO₂ levels is to keep windows and doors open during specific times of the day (Choo *et al.*, 2014). Research has demonstrated that altering building occupants' attitudes and behaviors can also improve IAQ, with small changes like increasing window opening frequency having a big effect (Marques *et al.*, 2016). Furthermore, some window-opening techniques, including those used during snack and lunch breaks, have resulted in a discernible drop in CO₂ concentrations in classrooms (Fabbri, 2014). Regular maintenance and inspections are essential in air-conditioned spaces to guarantee efficient external air filtering and to supply residents with enough fresh air (Abdel-Salam, 2017). Additionally, to ensure a cozy and healthful indoor environment, kindergarten heating systems should be regularly checked and adjusted as necessary (Manuel *et al.*, 2021).

IAQ management heavily relies on cleaning activities, however the selection of cleaning supplies and techniques is critical. Since wet mopping removes tiny particle matter from indoor spaces, it has been shown to be a more effective technique than sweeping (Asrul & Jalaludin, 2017). But choosing the right cleaning supplies is also important; to lessen exposure to dangerous chemicals, use eco-friendly or non-chemical cleaners (Mohamad Nor Zaki, 2022). Airing out rooms after employing chemical cleaning agents is one cleaning technique that can help reduce the number of hazardous materials that kids are exposed to (Wei *et al.*, 2016). Exhaust fans in kitchens and bathrooms can also aid in eliminating airborne pollutants from indoor areas when natural ventilation is inadequate (Mohd Sidek *et al.*, 2024). According to studies, kindergartens that use portable air purifiers saw a decrease in the quantities of germs and fungi, which can enhance the quality of the air overall. Furthermore, kindergartens with inadequate ventilation likely to have greater levels of bacterial and fungal contamination, which emphasizes the necessity of proper air circulation and filtration (Chegini *et al.*, 2020).

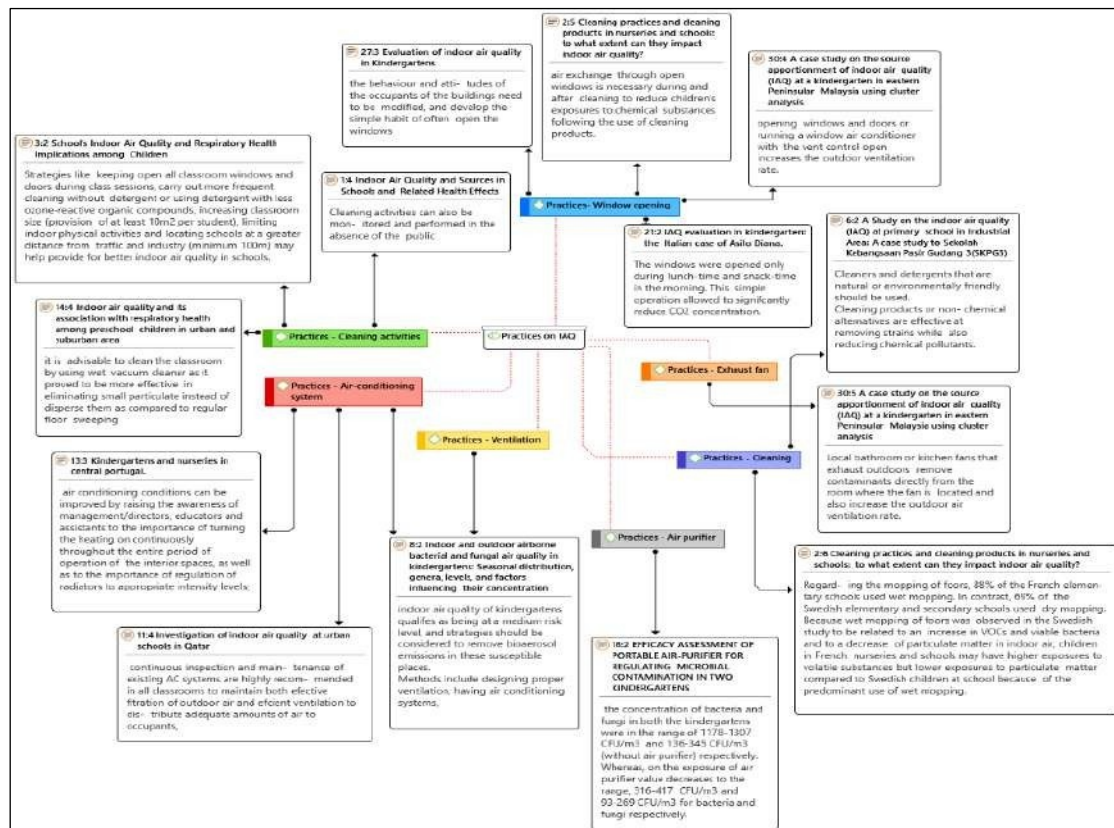


Figure 5 Network view of main publication on Practices

CONCLUSION AND RECOMMENDATION

In conclusion, knowledge, attitude, and practices are key to reducing indoor air pollution. There are 21 sub activities that related to education institution that helps to reduce pollutants. For example, when occupants are aware that indoor pollutants like mold or VOCs can affect health (knowledge), they are more likely to develop a positive attitude toward maintaining a clean and well-ventilated environment (attitude). This leads to practices such as using air purifiers, improving ventilation, and choosing low-emission materials (practices). By combining these elements, IAQ can be effectively improved, creating healthier environments for everyone. Furthermore, future research could focus on long-term effects of educational programs on students, teachers, and staff. Tracking changes in knowledge, attitudes, and practices over time could help assess the sustainability of these interventions and their lasting impact on IAQ.

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