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Building Knowledge, Building Futures IN THE AGE OF AI



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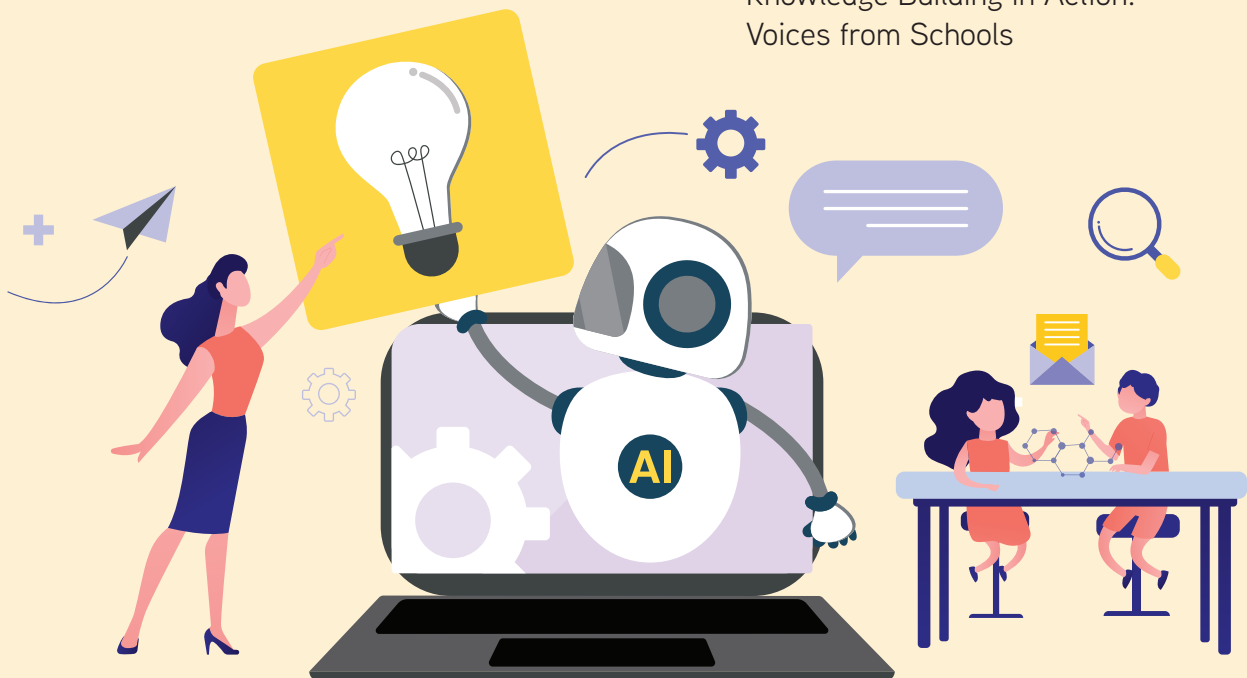
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Building Knowledge, Growing Communities



Five years ago, I guest edited a *SingTeach* issue on Knowledge Building (KB) during NIE's 70th anniversary. I'm honoured to do so again as we mark our 75th year. KB took root in Singapore two decades ago. As a Science teacher in the early 2000s (MOE Masterplan 1), I saw how KB resonated with my students—and I've not looked back since. Supported by many, KB has grown through shared spaces and opportunities. This issue marks another milestone as we trace our roots, honour the KB community, and look ahead.

What is KB? KB mirrors the work of innovative teams, turning classrooms into communities where learning is driven by the collective advancement of ideas. Guided by principles like epistemic agency and collective cognitive responsibility, KB shapes how teaching unfolds rather than prescribing fixed strategies. In practice, students generate, question, and refine ideas together, supported by tools like *Knowledge Forum*. At its core, KB builds habits of inquiry and collaboration for authentic 21st-century learning and deep understanding.

Tracing our roots. About 20 years ago, NIE Associate Professor Tan Seng Chee introduced KB to his Master's class during the early MOE Masterplan years, long before *Facebook* and *Padlet*. The idea of classrooms driven by students' ideas immediately captured my attention. In my Normal Technical class, Science lessons became discussions on nutrition, and Physics came alive when students challenged my claim that water cannot be microwaved. They were motivated, engaged and asked questions I had never considered. Later, I met Dr Katherine Bielaczyc, who inspired 10-year-olds' curiosity through the Idea-First Project. When I joined NIE, classroom visits showed me again the remarkable capacity of students to ask deep questions and build knowledge together.

The goal of KB. Over the last two decades, KB has aimed to grow young minds' capacity to ask questions, pursue ideas, deepen understanding and create knowledge. From Dr Katherine Bielaczyc's Idea-First Project to recent work integrating neuroscience, discourse analyses and development grants, KB has proven its potential as a future-ready framework. Research and practice have adapted to the evolving landscape, built communities of researchers, teachers and students, and secured resources to sustain collaborative spaces where all become inventors of knowledge.

In this issue, we highlight the place for KB in education in the age of AI. The arrival of *ChatGPT* just a couple years ago turned AI into a tool for everyone. While enjoying the convenience and efficiency brought by such a personal AI tool, the one worry in educators' minds—are our students still thinking?

This issue is co-created with our KB community—the very people who have shaped, and will continue to shape, Singapore's KB journey.

Dr Teo Chew Lee

Deputy Centre Director, Centre for Research in Pedagogy & Practice
Senior Research Scientist, Office for Research
National Institute of Education, Singapore

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The Journey of Becoming a **Knowledge-Building School**

Over the past two decades of translating Knowledge Building (KB) into practice, one of the most frequently asked questions has been how to integrate KB into existing school structures. A whole-school approach represents a bold step toward transforming schools into knowledge-creating communities. Chua Chu Kang Secondary School (CCKSS) exemplifies this vision. Classrooms spark curiosity, students are partners in learning and staff are co-learners. The journey has been transformative, shaping a generation that sees learning as communal, dynamic and lifelong. Every learner is seen, every voice matters and every idea can make a difference. Hear from their teachers, students and alumni about the impact of the KB journey.

“Over the past few years, I’ve witnessed a quiet but powerful transformation sweep through the classrooms and corridors of Chua Chu Kang Secondary School. It is not just in the lessons being taught—but in how we think about learning, how we engage with ideas, and most importantly, how we treat one another as a community of learners.

This shift began when we embraced the philosophy of Knowledge Building—a belief that knowledge is best constructed socially and authentically, with every learner taking co-ownership of the problems, processes and practices. And as we did so, something profound started to happen.”

- Mr Timothy Cheng, Principal, Chua Chu Kang Secondary School

TEACHERS AS INVENTORS, STUDENTS AS KNOWLEDGE BUILDERS

By Mr Melvin Chan, Lead Teacher and Knowledge Building Lead, Chua Chu Kang Secondary School (CCKSS)

Teachers' Voices: From Instructors to Designers of Thinking Environments

In the Knowledge Building (KB) community, teachers and students are inventors of educational innovation, not passive adopters. Achieving this requires sustained, trusting partnerships with researchers at NIE. At CCKSS, I have seen a mindset shift over the years: Teachers now design lessons that amplify student voices, foster creativity and inquiry, and embrace collaborative, idea-centric, student-centered practices that are transforming the school systemically.

Our teachers have moved beyond being "the sage on the stage" to become true facilitators of deep thinking—what we now call "guides on the side." They've begun to design learning environments that breathe curiosity and welcome uncertainty, where students are encouraged to ask, not just answer.

Teacher Mdm Mohana, reflected: "I have come to realize the importance of allowing students to take ownership of their learning... My role now is not to provide answers, but to create platforms for them to widen their thinking."

This spirit of change didn't stop at individual classrooms. Teachers across different departments began collaborating as knowledge builders themselves—from Music and History to Literature and even Form Teachership.

Music teacher Mr Anthony noted how his Music lessons are no longer limited by his own expertise. "Now, the classroom is a collaborative space where students and I co-construct musical understanding together. It's made my teaching more dynamic and my students more empowered."

Students' Voices: From Passive Recipients to Community Builders of Knowledge

Just as our teachers evolved with KB, so did our students. CCKSians now build knowledge collaboratively, value each other's ideas and see every answer as a starting point. In a Literature discussion on *Lord of the Flies*, one group challenged the view of Jack as a stereotypical villain, framing his moral descent as a struggle rather than a given. Other students built on this interpretation, adding historical, psychological and personal perspectives.

"It became less about the 'right' answer," teacher Ms Klara shared, "and more about a shared exploration of possibilities. The classroom became a living, breathing conversation."

In History, students became more confident in their own voice. One student shared: "I was worried that there was a correct way to respond. But I've realized—we all manage our thinking differently. We can create our own steps to a better response. We just need to trust ourselves."

Furthermore, student Min Ho talked about how his class used learning analytics in their History inquiry: "We become reflective students... skillful in using technology and thinking scaffolds in moving forward our discussion; measuring and monitoring our learning growth; and making adjustments to our own way of learning patterns."

The self-efficacy in academic pursuit is visible in their energy and participation. Whether it's choosing their own inquiry path or giving content-specific feedback to peers using KB scaffolds or using class learning analytics to make changes to their learning, students now own their learning.

Alumni's Voice: From the Classroom to the World

The KB culture doesn't stop at graduation. Isyraf, CCKSS alumni and the participants of the first KB Design Studio (KBDS) participants in 2019, now serving National Service, shared: "KB has become a way of life. In my unit, I actively apply KB to team projects and improvement ideas. It's all about creating a space where everyone feels safe to contribute—and that's something I first experienced in CCKSS."

Zachary, who is currently in polytechnic and was a participant of the first KBDS, said: "KB scaffolds help us tackle projects with creativity, empathy and depth. The 'Consider' scaffold alone pushes us to explore sensitive issues in ways we couldn't before."

And Priya, a current CCKSian, summed it up perfectly: "We're no longer satisfied with surface learning. We seek feedback—from peers, experts and even parents. Learning has become a social, community-driven act."

WHAT MAKES THIS KB RESEARCH UNIQUE

What sets KB research apart from many other educational initiatives is the deeply reciprocal and co-constructive nature of the research-practice partnership.

Since I began my KB journey in 2012 and later co-founded the KB Collaborative Network Learning (KBCNL) with NIE's Dr Teo Chew Lee, I have been privileged to engage in a range of research-practice nexus work, from leading as Principal Investigator for the Tier 2 EduLab KB Project on *Curriculum-in-Analytics (CiA)*, to writing and presenting KB practitioner papers in conferences locally and internationally.

This philosophy of co-agency extends to students as well. Unlike conventional research where students are



From left to right: Mr Melvin Chan and Mr Timothy Cheng.

often positioned as test subjects, KB projects position them as active learners. They are given autonomy, tools to analyse their own learning, and the power to refine or co-design digital platforms like *Curriculum Cloud* or *Promising Ideas*. This rare level of trust transforms learning from compliance to co-creation and from passive consumption to ownership of ideas.

At the heart of KB research is the centrality of ideas. Rather than focusing on “right” answers, we track the trajectory of students’ thinking, placing sustained creative inquiry at the core of pedagogy and research.

This aligns with the MOE EdTech Masterplan 2030, empowering students as creators and contributors and supporting teachers as collaborative, data-literate guides. Emerging tools, including AI analytics, enhance rather than replace judgment or agency.

In short, what makes KB research unique is its commitment to Collaborative professionalism, Student epistemic agency, and the growth of Ideas within a community. KB research is not just research on education—it’s research *with* educators and *for* the students, where everyone involved is part of a knowledge-creating culture. ■



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An Institute of



Idea-Centric Practice in the Age of AI



Artificial intelligence (AI) is rapidly transforming the way students learn, how teachers teach and how knowledge flows in classrooms. But does this also signal the end of the human element that teachers bring to learning?

In this article, Dr Alwyn Lee from NIE shares his insights on how AI can extend knowledge building opportunities, deepen collaboration and support holistic growth—without replacing the critical role of teachers as designers of learning and stewards of well-being.

BALANCING INNOVATION AND STUDENT WELL-BEING

In recent years, Singapore has made significant strides in exploring how AI can shape the future of education. Researchers, practitioners and policymakers have been observing the emergence of a range of technological advancements, from adaptive learning platforms that personalize instruction to automated assessment tools that provide rapid feedback.

“AI has been positioned as a catalyst for rethinking teaching and learning,” Dr Alwyn Lee, an Education Research Scientist from the Office for Research at NIE, says. “Singapore has set up initiatives that are built on national efforts to cultivate 21st Century Competencies (21CC). This ensures that students not only excel academically but also develop the critical thinking, adaptability and resilience needed in an uncertain world.”

However, he cautions that alongside these technological possibilities lies an equally important consideration: students’ use of AI and its impact on their well-being.

He raises a timely question: *As classrooms become increasingly digitalized, how can we safeguard students’ emotional and cognitive balance while preparing them for the demands of the future?*

UNDERSTANDING STUDENTS’ LEARNING THROUGH AI

NIE has been playing a vital role in developing AI-enabled platforms that offer deeper insights into how students learn. One such research-based innovation is *EmoSense*, an AI tool designed to detect students’ epistemic emotions—such as enjoyment, boredom, and confusion—during learning activities.

Currently implemented in the student Knowledge Building Design Studio (sKBDS), *EmoSense* provides teachers with valuable information about students’ emotional states that were once difficult to observe.

“By making these signals more visible, the tool does not replace the teacher but enhances the teacher’s ability to respond empathetically and adaptively to students’ learning needs during Knowledge Building (KB),” he notes.

At the same time, he emphasizes that AI in classrooms must be approached with care to ensure that students do not become passive recipients of machine-driven decisions.

“A critical balance lies in promoting student agency that help learners make inquiries, reflect and even challenge the feedback that AI systems provide,” he explains.

In an idea-centric KB environment enhanced by AI, he notes that students should be encouraged not only to ask questions, but also to engage with AI as a co-creator of knowledge.

“For example, by correcting an idea proposed by the AI or affirming their epistemic emotion determined by AI-enabled EmoSense, students are not only exercising autonomy but also developing metacognitive awareness of their own learning and emotional processes in the midst of AI agents,” he says.

CO-DESIGNING AI IN THE CLASSROOM

For educators, the growing presence of AI in schools presents both opportunity and reflection. Alwyn reminds us that while it is easy to be fascinated by the latest tools and technologies, the true focus of education should remain on nurturing students’ capacity to think, create and connect ideas meaningfully.

“Our larger concern should still revolve around idea-centric practice that delivers relevant and authentic content that elevates students’ understanding,” he notes. “One of the key questions that we should be asking is: how do we use AI to extend the possibilities of KB, deepen collaboration and support holistic growth in our students?”

One of the ways AI could be meaningfully integrated in schools is through deepening collaborative efforts between researchers and teachers. A recent partnership between NIE and Fairfield Methodist School (Primary) on a Generative Pre-Trained Transformers (GPT) chatbot called *Fairbot* exemplifies this approach¹. Together, the team co-developed Fairbot’s prompt flows and lesson plans, aligning them with subject-specific frameworks such as the FAST model in Chinese and KB principles in Science.

“The partnership enabled teachers and researchers to jointly deliver lessons and conduct classroom observations with 94 Primary 5 students. The team also used thematic coding to capture both pedagogical design insights and student learning experiences,”

Dr Katherine Yuan, Education Research Scientist from NIE’s Centre for Research in Pedagogy & Practice and Office for Research, explains.

The results have been encouraging. What began as a classroom collaboration has since grown into scholarly dissemination, with findings presented at international conferences such as ICLS 2025.

“Our work highlights how co-designing AI integration supports both student learning and teacher professional growth, offering a new approach for advancing classroom innovation with generative AI,” Katherine notes.

Agreeing, Alwyn adds that the role of teachers remains as vital as ever in the age of AI.

“In the age of AI, the teacher’s role is to provide additional value to the classroom as a designer of learning, a guide to agency and a steward of well-being, all of which are no less essential, just because we have added AI into our learning environments,” he affirms. ■

¹ The Fairbot team that contributed to this article consists of Dr Katherine Yuan from NIE, and Mrs Soh Mei Foong, Mrs Yap Tsui Lan, Mrs Chen Siyun and Mrs Joy Au from Fairfield Methodist School (Primary).



ABOUT THE INTERVIEWEE

Dr Alwyn Lee is Education Research Scientist at the Centre for Research in Pedagogy & Practice, Office for Research at the National Institute of Education, Singapore.



Research–Practice Partnerships in Action

Implementing KB and AI in Schools

At Pioneer Primary School, teachers are discovering new ways to learn and teach with the help of AI. Partnering with researchers from the National Institute of Education, the school piloted the Knowledge Building Learning Companion for Teachers (KBLCT), a chatbot that supports lesson design and reflection. Mr Shaun Kuat, Head of Department (Information & Communication Technology and Media Resource Library), and school leaders from Pioneer Primary School share how this innovation is shaping teacher learning and collaboration.

By Mr Shaun Kuat, HOD/Information & Communication Technology and Media Resource Library; Mdm Loke Wai Ling, Principal; Mdm Wong Wei Yi, Vice-Principal, Pioneer Primary School

A FRUITFUL COLLABORATION WITH NIE

In the age of AI, where information and answers are available at the click of a button, students must shift from being passive recipients to active creators of knowledge. To thrive, they need to think critically, make meaningful connections, and generate new ideas and solutions. Simply using tools like *ChatGPT* is not enough—educators now face the important challenge of thoughtfully integrating AI into teaching and learning.

Early adopters of Knowledge Building (KB) in local schools have seen a shift in classroom dynamics, with student voice and agency taking center stage, and the teacher's role refocused. The *KB Learning Companion for Teachers (KBLCT)* supports lesson planning and implementation, and through collaboration with NIE researchers, teachers at Pioneer Primary School have identified natural pathways for AI integration. This partnership allows educators to personalize KB experiences to suit students' needs, enhancing both teaching and learning.

KB'S POSITIVE IMPACT ON CLASSROOM PRACTICE

The implementation of KB at Pioneer Primary School has had a positive impact, evident in the transformative conversations among our teachers. Initially seen as just another framework, KB took on new meaning after teachers engaged with the KBLCT, shifting their pedagogical beliefs. They began to view KB as a lens connecting approaches across subjects, sparking excitement as they questioned assumptions, built on each other's ideas and deepened their collective understanding of effective pedagogy.

Significantly, teachers' discussions about lesson design showed greater intentionality in amplifying student voice—a sign of professional growth and engagement. As KB principles were integrated into classrooms, teachers connected curriculum and pedagogy more coherently.

Over time, this fostered a KB culture in the school—one marked by intrinsic motivation, empowerment, collaborative learning and positive dispositions toward inquiry. Ongoing reflection and dialogue enriched this experience, helping teachers continually improve ideas and advance knowledge.



A group photo of teachers from Pioneer Primary School.

RESEARCH-INFORMED LEADERSHIP AND PROFESSIONAL DEVELOPMENT

Participating in KB research, particularly in introducing KBLCT to teachers, has transformed our understanding of effective middle leadership and professional development. The experience revealed the limits of traditional one-size-fits-all professional development and highlighted the need for responsive, context-sensitive approaches.

Rather than relying on prescriptive workshops, we used KBLCT to create spaces where teachers could make sense of KB practices and apply them within their subjects and classrooms. A phased approach allowed us to develop "trainers of trainers," leveraging distributed expertise and fostering peer-to-peer, community learning aligned with KB principles.

Most importantly, the research taught us that intellectual humility is a leadership strength. Embracing not knowing everything and inviting teachers into a collective sense-making journey proved more powerful than positioning ourselves as sole experts. KB research has fostered genuine collaborative inquiry, creating conditions where leaders and teachers engage as co-learners and advance collective understanding.

CHALLENGES OF SUSTAINING KB

Sustaining KB requires learning and relearning as it becomes integrated into practice. Common misconceptions include:

1. KB is a checklist. In reality, it is principle-based, aiming to shift school culture and transform classrooms into communities where ideas are continuously improved, making learning deeper and more meaningful for teachers and students.
2. KB lessons are separate from "regular" lessons. KB is not a compartmentalized approach but a

lens through which all pedagogical decisions can be viewed and applied across everyday learning.

3. KB lessons must be high-energy and activity-packed. Some teachers labelled them "ra-ra lessons," raising practical questions about sustainability.

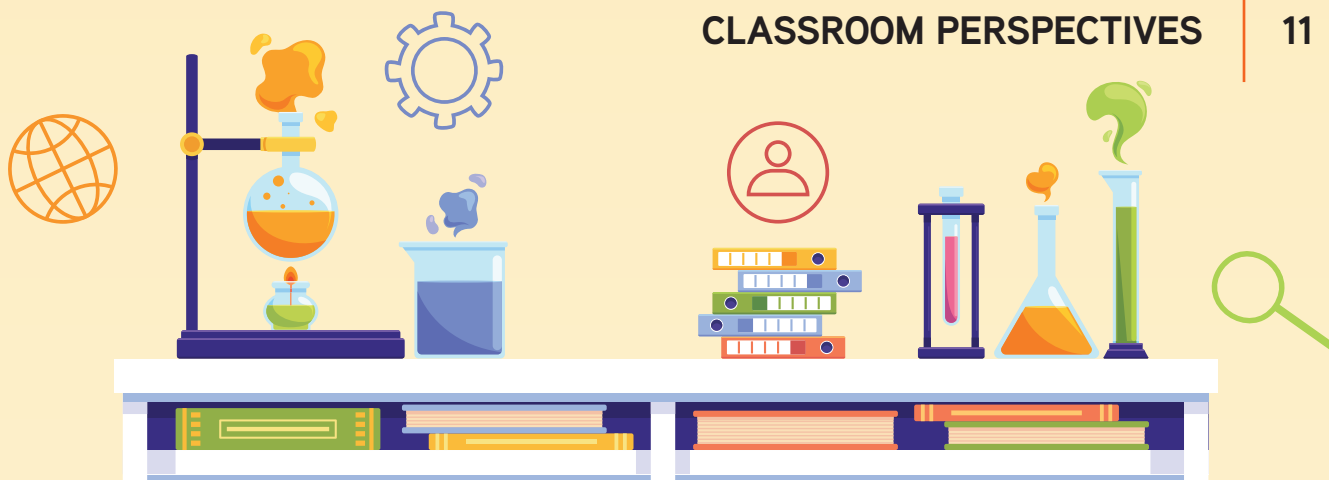
These challenges highlight that embedding KB sustainably requires seeing it not just as teaching strategies but as a mindset and culture that permeates all learning contexts. Ongoing reflection and nuanced understanding help integrate KB principles into diverse classroom scenarios.

ENVISIONING SCHOOLS AS KNOWLEDGE-CREATING ORGANIZATIONS IN THE NEXT DECADE

Building on the success of introducing the KBLCT to teachers, the next step is exploring student-focused AI as a learning companion to foster curiosity, metacognition and collaborative learning, complementing teachers' KB lesson designs.

Looking ahead, our school aims to make KB an integrative, foundational approach to everyday learning that authentically develops 21st Century Competencies. Central to this vision is cultivating a robust culture of collaborative KB, where individual achievements and collective effort are equally valued.

We also aim to shift focus from learning as a product to learning as a process, helping teachers and students appreciate the intellectual work of questioning, theorizing, evidence gathering and improving ideas. Most importantly, we envision a culture where every member of the learning community is recognized as a capable contributor with unique insights. Success will be measured not by isolated KB lessons, but by how deeply the KB culture and understanding are embodied across all school learning. ■



Enhancing Chemistry and Social Studies through Knowledge Building

Anglican High School took part in the 3rd Research-Practice Connection@ East Zone, co-organized by the School Partnership Unit at the National Institute of Education, the Academy of Singapore Teachers and the East Zone Cluster. The engagement began with a research-practice sharing session, followed 6 months later by teachers presenting how they had applied the ideas. On 8 March 2025, the team from Anglican High School shared how learning analytics can support Knowledge Building (KB) discourse. In this article, three experienced teachers reflect on integrating KB into Chemistry and Social Studies.

MRS CHUA SHU-HUI AUDREY, LEAD TEACHER (CHEMISTRY)

I have always been drawn to pedagogies that amplify student voices. When I encountered Knowledge Building (KB), I saw how it complemented approaches I already used, such as Modelling Instruction. While Modelling engages students in scientific discourse and model construction, KB—through *Knowledge Forum* (KF) and principles like Idea Diversity and Rise Above—enables equitable idea development and avoids premature consensus.

Before introducing KB to students, I involved teachers as facilitators. We constructed a Knowledge Wall on “Facilitating Knowledge Building” and applied scaffolds such as “My new idea is...” and “I read and found out...” to sustain inquiry, affirming KB’s alignment with our school’s focus on enriching learning. Together with my colleague,

Noriff, we designed a KB workshop for teachers, trialled it with students and refined scaffolds based on feedback.

In my Secondary 4 Chemistry class, students explored “What makes a reaction exothermic or endothermic?” They generated theories, tested ideas and connected concepts, with questions on the KB Wall guiding subsequent experiments and problem-solving tasks. In Secondary 3, students posted ideas on KF to investigate reactant mixtures, prompting peers to rethink methods and move from rote formula use to deeper reasoning.

These experiences showed me how KB empowers both teachers and students. Facilitating intentionally alongside colleagues, we developed an Anglican High School (AHS) KB starter kit. For students, KB nurtures questioning, testing, refining, self-directed learning, confidence and meaningful contribution to collective understanding.



The three teachers from Anglican High School.

MDM NORIFF ELYN MOHD ARIFFIN, LEAD TEACHER (SOCIAL STUDIES)

As a teacher, I constantly seek ways to engage students and deepen learning. My journey with KB began with the goal of helping students develop E21CC and become active co-creators of knowledge. This was strengthened during the East Zone Research-Practice Connection networking session in 2025, where Audrey and Keng Wei introduced me to KB and Dr Teo Chew Lee's idea of shared improvement. Inspired, we incorporated KB into lessons and professional development, resulting in the AHS KB Starter Kit.

KB shifted my focus from “what I teach” to “what students learn and build together.” Lessons became dynamic spaces of inquiry, where students question, critique and improve each other's ideas. One Social Studies lesson stood out: while exploring what allows diverse societies to live harmoniously, students initially gave predictable answers. Reading each other's posts on KF led a student to highlight that conflict is inevitable, and harmony depends on how societies manage it. This sparked rich discussions connecting ideas to real-world examples and shared values, demonstrating KB's power to cultivate critical and collaborative thinking.

My vision is for KB to become a cornerstone of our pedagogy. I plan to dedicate time each term for students to engage on KF, fostering a culture of inquiry where learning is active, collaborative and prepares students for adaptive, problem-solving challenges in the real world.

MS TAY KENG WEI, COVERING SUBJECT HEAD (CHEMISTRY)

Audrey and I attended the East Zone Research-Practice Connection sharing by Dr Teo Chew Lee and were inspired by how KB aligns with 21CC. We decided to embark on KB, which emphasizes co-construction of ideas and sustained inquiry, fostering richer learning, deeper thinking and student agency. Participating in KB has also strengthened my pedagogical leadership as a covering subject head, giving me new ideas to integrate KB into the curriculum and lead planning with a research-informed perspective.

Since adopting KB, I have used more open-ended tasks to help students co-construct explanations on chemical reactions. Students ask more questions, clarify peers' ideas and build knowledge collectively. KB has also enhanced collaboration among chemistry teachers—Audrey and I regularly exchange ideas and refine lessons. This reflective practice has improved professional learning and will help anchor KB in the curriculum, supporting instructional consistency and shifting the department from content delivery to student-driven investigations.

Challenges include limited time for deep discussions and varying student readiness, as KB relies on collaboration and engagement. Nevertheless, I see these as part of the ongoing design challenge that drives continual innovation. ■



From Participation to Insight: Lessons from a Knowledge Building Project

In its journey with Knowledge Building (KB), Chua Chu Kang Secondary School (CCKSS) has come to see it as more than a pedagogical method—it is a mindset and cultural shift. Participation in KB research and projects has profoundly influenced how CCKSS educators view teaching and learning and has reshaped their understanding of professional development in powerful, lasting ways.

By Mr Melvin Chan, Lead Teacher and Knowledge Building Lead, Chua Chu Kang Secondary School (CCKSS)

TRANSFORMING UNDERSTANDING OF TEACHING AND LEARNING

“I now see my role as that of a facilitator and co-learner—someone who nurtures a climate where students’ curiosity and interpretations drive learning,” shared teacher Ms Klara. This shift is perhaps the most fundamental change many teachers have experienced. Classrooms are becoming Knowledge Building (KB) communities, where student voices drive inquiry and teachers adopt more collaborative, less authoritative roles.

In Literature, students don’t just interpret texts—they challenge assumptions, reimagine narratives, and build deeper meanings together. As Klara describes the focus is now on how ideas evolve through collective inquiry: “We actively improve on each other’s ideas, think about what we agree with and stretch each other’s thinking.”

In Music, Mr Anthony reflects on how KB has turned performance and composition into shared acts of

listening and empathy. Students learn to listen to one another, building skills and community through inquiry.

For Mrs Vena Foo, the shift means recognizing that “all learning is social and all learning is emotional.” Feedback-rich cultures and thoughtful use of technology have transformed her classroom into a lively space of shared meaning-making.

REDEFINING THE TEACHER'S ROLE

We remain the subject experts but no longer the sole experts. We focus less on delivering content and more about designing conditions for inquiry, dialogue and metacognition to happen. And in doing so, we, too, grow alongside our students.

We remain content specialists and pedagogical designers—but we are now also co-learners, idea nurturers and culture builders. The value of a lesson lies not in how quickly students find the right answer, but in how deeply they engage in the KB process. We now ask: *How can we support students to improve their ideas over time, build shared understanding and navigate ambiguity together?*

KNOWLEDGE BUILDING PROFESSIONAL DEVELOPMENT

For those in teacher leadership, the KB journey has reshaped how we approach adult learning and professional growth. My role as KB lead has led to the creation of a CAN PD culture, where:

- Collaboration is foundational: Every CCKSS educator contributes to shared instructional excellence;
- Adaptability is essential: Every CCKSS educator engages in active cycles of inquiry, innovation and reflection; and
- Networking is encouraged: Every CCKSS educator connects with other schools, NIE researchers and national KB communities.

Professional development is no longer passive or top-down. It's now about co-design, co-inquiry and co-innovation. This spirit led to three key initiatives:

- Ideas Café: a platform for teachers across departments to reflect and share KB designs;
- Cross-school collaborations: through *The History Times*, CCKSS and partner schools create interdisciplinary KB artefacts for the wider community; and
- KB distilled: the 12 principles were streamlined into three core ideas to anchor and guide lesson design, feedback and discourse.

STAYING RELEVANT AND RESPONSIVE THROUGH RESEARCH PARTNERSHIP

Being part of the research team has taught us the importance of relevance and responsiveness in practice. The partnership reinforces that innovation must address real needs and be driven by reflection, data and shared insights within the KB community.

It has given us the space to embed differentiated instruction principles into our KB framework, experiment with AI tools like the KBLCT Chatbot for just-in-time planning and feedback and use learning analytics to measure not only student performance but also the quality of idea improvement and discourse patterns.

More than a research project, KB has become a professional identity—challenging us to think deeply, act collectively and aspire boldly. Ultimately, teaching is not just about what we deliver—but what we help communities discover, build and become.

HOPE FOR KNOWLEDGE BUILDING IN SINGAPORE

As we reflect on the journey of KB in Singapore so far, and begin to imagine what lies ahead, one thing is clear: We are not simply equipping learners to absorb knowledge—we are nurturing communities that create knowledge.

Mr Timothy Cheng, Principal of CCKSS, says: "My hope (they are the hopes of my colleagues too) for the next phase of KB is rooted in this conviction—that schools will evolve into knowledge-creating organizations where every learner, educator and stakeholder plays an active role in shaping ideas that matter."



SUSTAINABILITY EDUCATION MEETS KNOWLEDGE BUILDING

By Dr Tricia Seow, Senior Lecturer, NIE

Working with the Knowledge Building Design Studio (KBDS)* the past 2 years have been deeply enriching and eye-opening for me as a sustainability educator. What stood out was the chance to work in an interdisciplinary team spanning generative AI, learning analytics and sustainability. Dr Teo Chew Lee's team provided the platform and resources for my graduate student to develop her research on nature-connectedness through multiple rounds of the student KBDS (sKBDS) programme at NIE. This allowed us to iteratively design an intervention that crossed disciplinary boundaries and centred on student agency and curiosity.

In these sessions, students asked their own questions, explored diverse perspectives and co-created knowledge in meaningful ways. This encouraged systemic thinking, collaboration and ownership of learning—resonating with my belief that sustainability education must touch the heart and hands, not just the head. It also aligns with broader views of good sustainability education as action-oriented, place-based and transformative. I deeply appreciate the KBDS approach, which affirms my commitment to sustainability education as a shared journey of learning together. ■

*KBDS is a holiday programme for primary and secondary students, exploring sustainable living and nature through collaborative inquiry. Grounded in KB principles, pedagogies and technologies, KBDS nurtures curiosity, creativity and community. The October 2025 run marks its 12th edition since its launch in 2019.

Knowledge Building in Action:

VOICES FROM SCHOOLS

Discover how Knowledge Building (KB) is transforming teaching and learning in Singapore schools. Through the eyes of educators at Damai Secondary School and St. Hilda's Primary School, this article highlights student-centered classrooms, collaborative idea growth and the professional development opportunities that emerge when teachers and students become co-creators of knowledge. See how KB fosters critical thinking, creativity and agency for both learners and educators.

MR LIN JIE HUI, DAMAI SECONDARY SCHOOL

I discovered Knowledge Building (KB) whilst exploring approaches to increase student engagement. What intrigued me was not just its student-centric approach, but its recognition that students learn best as active contributors rather than being passive consumers of ideas and knowledge.

Since implementing KB in Social Studies and Mathematics, I consistently observed meaningful student engagement. Students became active contributors, sharing initial ideas across topics from Citizenship, Diversity and Globalization to Mathematical concepts. Discussions extended beyond these ideas as students sought improvements, engaged in meaningful discourse, and co-constructed deeper understanding through collaborative idea refinement.

I'm professionally supported by the KB Network Learning Community and NIE researchers who truly appreciate practitioners' groundwork. This community enabled new experiences: writing research papers, presenting at conferences and conducting workshops. Through these experiences, I gained valuable insights from collaborative discourse with fellow practitioners and cultivated essential competencies to navigate education's evolving demands.

KB offers practitioners lifelong intellectual stimulation. Each lesson brings new questions and insights. As a research-grounded approach with key guiding principles, KB represents an innovative frontier for engaging more meaningfully with students.

MDM USHANTHINI ARUMUGAM, ST. HILDA'S PRIMARY SCHOOL

A student-idea-centric classroom leaves a lasting impact on both students and teachers. I vividly remember my

first KB lesson: as one group's ideas were spotlighted, the entire class built upon them. Surprisingly, learning objectives were met, yet discussions remained candid and fluid, with students' perspectives guiding my teaching.

Using KB prompts such as "I need to understand" or "This theory doesn't explain," students engage in critical and inventive thinking while communicating their ideas mindfully. Their voices take centre-stage, shaping discussions and demonstrating agency, while teachers shift from content providers to facilitators of idea growth.

At St. Hilda's Primary, KB enacts MOE's 21st Century Competencies. Through the KB pedagogical cycle, students develop critical thinking, collaboration and communication skills, becoming confident and adaptable learners prepared for a complex, changing world.

My first KB Cloud revealed students' naïve ideas and misconceptions far more effectively than pre-quizzes or guides, transforming the way I frame questions and lessons. Over time, KB prompts and sentence starters became a natural part of classroom culture, fostering ownership and collective advancement of knowledge.

Equally inspiring is the KB teacher community. Witnessing colleagues engage deeply with student ideas, adapt practices, and grow professionally has become as rewarding as seeing students thrive. KB captures the essence of both student and teacher agency. ■



Scan to read about the **Principal's perspective on how KB transforms teaching and learning at St. Hilda's Primary School**

20 Years 20 stories

20 Years 20 Stories is a special campaign first launched on Instagram to mark *SingTeach*'s 20th anniversary—a celebration of two decades of bridging education research and classroom practice. In this series, we feature personal reflections from educators, researchers and long-time supporters who have grown with us through the years. Now curated here on our website, these stories that are published every other week offer insights into the evolving landscape of teaching and learning in Singapore, and how research continues to inspire real-world impact in our schools.



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