RESEARCH WITHIN REACH

singteach

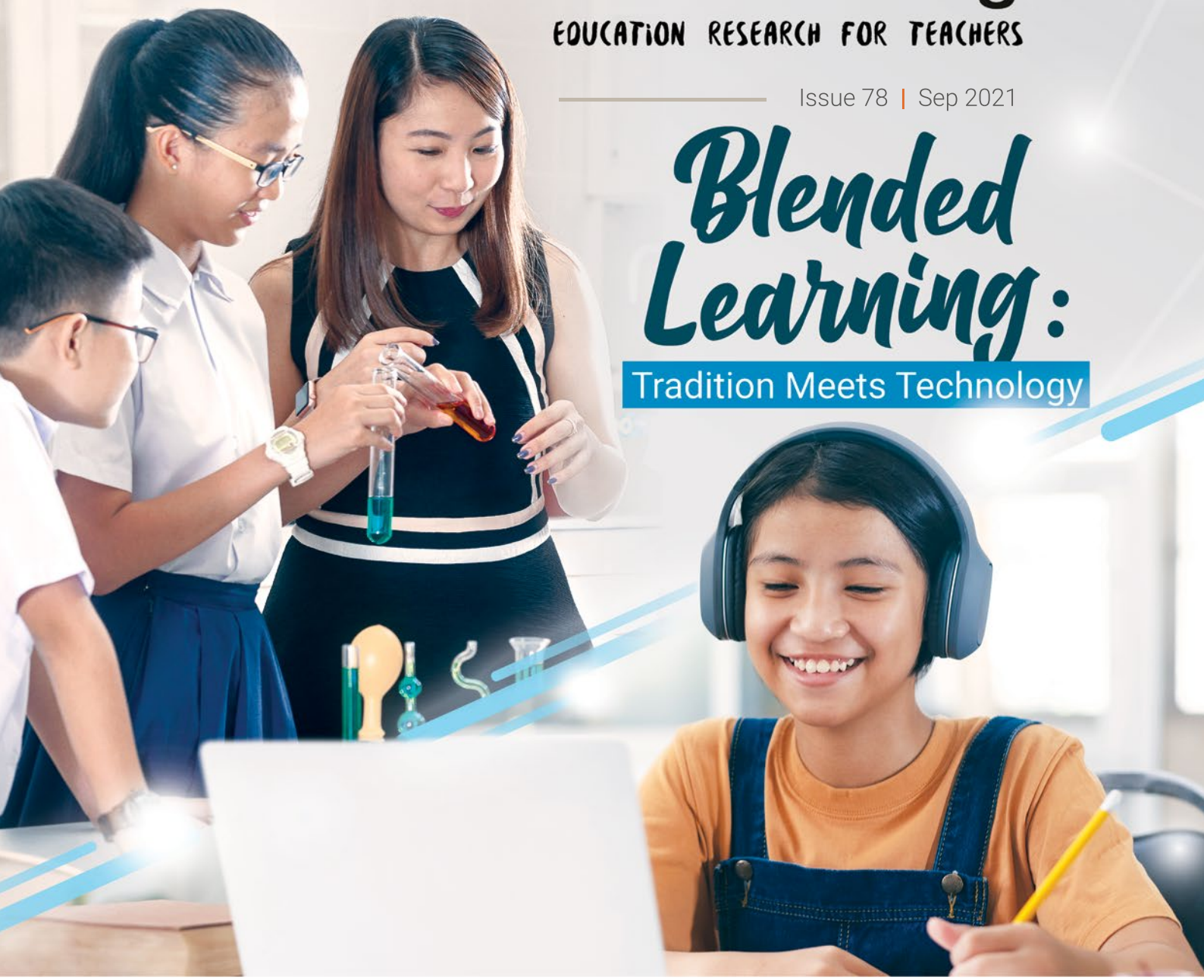
.nie.edu.sg

EDUCATION RESEARCH FOR TEACHERS

Issue 78 | Sep 2021

Blended Learning:

Tradition Meets Technology



An Institute of
NIE National Institute of Education Singapore
Nanyang Technological University Singapore

Supported by
Marshall Cavendish Education

Read *SingTeach* online!

contents

The Redesigning Pedagogy International Conference — National Institute of Education's flagship conference — will be taking place on 30 May to 1 June 2022. The theme of the upcoming conference will be on 'Transforming Education and Strengthening Society', focusing on how education can be even more transformative in line with the new and rapid local and global developments. Subscribe to the RPIC mailing list for more information: https://rebrand.ly/RPIC2022.

singteach.nie.edu.sg

We believe education research can be practical and relevant to the classroom. *SingTeach* was initiated in 2005 to bridge the gap between research and practice for you, the teacher.

Published quarterly by the Office of Education Research at the National Institute of Education, Nanyang Technological University, Singapore, *SingTeach* is a magazine dedicated to improving teaching and enhancing learning. Each article is crafted with teachers in mind.

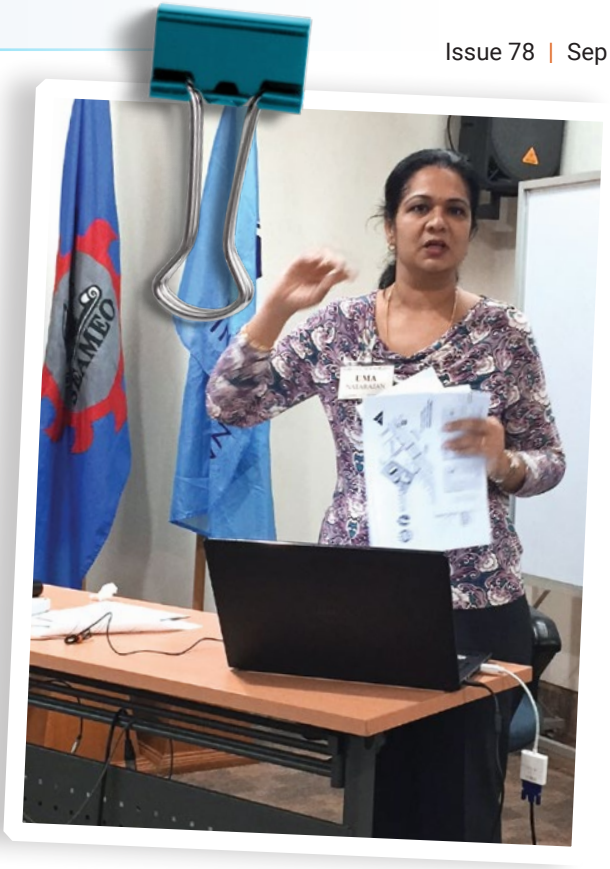
With easy access to tried-and-tested practices that work in your classroom, *SingTeach* puts research within your reach. We hope you'll be inspired.

facebook.com/**SingTeach**

instagram.com/**SingTeach_OER**

Dr Uma Natarajan

Research Manager, Centre for Research in Pedagogy and Practice (CRPP)
Office of Education Research
National Institute of Education



The terms blended and hybrid learning can be used interchangeably. Offline learning refers to the traditional face-to-face (f2f) instruction in a classroom setting, while online learning refers to using technology or a system over the Internet or Intranet. It is essential that the f2f component and the technology-driven element complement, strengthen and harmoniously balance each other.

Blended learning has become more significant than ever before, especially as COVID-19 becomes endemic. Home-based learning (HBL), as a blended learning model, has particularly gained importance in the Singapore education system. Recently, the Ministry of Education (MOE) announced that all secondary schools, junior colleges and Millennia Institute will systematically incorporate this model by the year 2022.

Blended learning has been accepted as an approach to ensure continuity in learning without disruptions, as well as to contribute to the building of resilience in the education system in a post COVID-19 world. Blended learning can cultivate self-regulation skills and technological competence in students, while also offering a customized learning experience. Concurrently, teacher training is critical to ensuring effective implementation of the blended learning model. At the National Institute of Education, we have researchers from OER's Centre for Research in Pedagogy and Practice (CRPP) who have conducted workshops and ran projects in this area.

The Student Learning Space (SLS), rolled out by MOE prior to the pandemic, is a system that supports this model and has a range of resources for teaching and learning as well as lesson preparation and assessment tools for teachers. The overall idea is to ensure an experience that blends the "ingredients" collectively to deliver a meaningful, personalized and flexible learning experience. The fully online experience, after all, lacks an irreplaceable human component in which teachers offer empathy and an invaluable human connection.

This blended learning model is here to stay as we learn to live and work with an endemic COVID-19. A few foundational life skills like time management, motivation and persistence need to be nurtured in students, as they learn to have a sense of control over their time, place and pace of learning. As the New York Times columnist Thomas Friedman recently wrote: "The most critical role for K-12 educators, therefore, will be to equip young people with the curiosity and passion to be lifelong learners who feel ownership over their education."

In this issue of *SingTeach*, we explore articles that discuss pertinent issues around the implementation of blended learning, with examples, experiences, perspectives and challenges associated with it. As a leader and school staff developer, Mr Luis Lioe reflects on the benefits he sees with the blended modes of learning, raising issues around mindset shifts and key considerations based on his practical experience. Dr Tay Lee Yong, a former teacher, school leader and now Teaching Fellow at CRPP is optimistic on the potential of technology and how it has shaped teaching and learning, underscoring the importance of learner engagement in blended learning. Associate Professor Chen Wenli, meanwhile, shares her experience from one of her technology projects, highlighting an important point about how technology is a tool that needs to be used meaningfully, and how lesson designers are key to a successful blended learning lesson.

Blended Learning:

Transforming the Traditional Modes of Teaching and Learning

As Singapore moves towards an endemic COVID-19 situation, the education landscape has seen schools re-opening and students returning to physical classrooms. There has been much talk since then about the progress made in online learning and the implementation of blended learning in schools. Blended learning has thus become the buzzword in education today. The guest editor of this issue of *SingTeach*, Dr Uma Natarajan, shares with us more about this teaching approach.

According to Uma, who is Research Manager at the Centre for Research in Pedagogy and Practice, Office of Education Research at NIE, the term "blended learning" in education was originally used to describe the combination of different instructional methods, pedagogical approaches or technologies. Over the years, however, the definition has evolved to refer to a type of learning that deliberately integrates online learning and traditional face-to-face instruction.

She shares that one of the common features of blended learning found in many classrooms today is the combination of the teaching and learning experience in which students are able to view and learn content prior to a classroom face-to-face session.

"The availability of educational technologies has allowed for content to become preparatory work prior to traditional classroom settings," she explains. "Classroom time can then be utilized for students to collaborate in groups, problem solve or work independently to arrive at solutions."

Cultivating Independent Learning

More than a year on since the pandemic, regular home-based learning (HBL) days has been implemented in local schools as part of the blended learning framework. A unique aspect of HBL days is that it is less structured than a normal day in a classroom, thus giving students the opportunity to learn how to balance curriculum expectations while pursuing their own interests that may extend beyond the curriculum.

"An important element of blended learning is that it nurtures the skills of self-directed learning. With less of content teaching from teachers, students can learn to be independent, take control over their learning and develop self-regulation skills," Uma comments.

The traditional classroom setting ensures that learners can be socially engaged with their peers, whether in group or one-to-one interactions. She notes that blended learning can potentially offer the best of both worlds: students can study independently online while being able to develop their soft skills offline.

Technology Readiness of Teachers

For blended learning to be successful, it is important that teachers are proficient in using and integrating information and communications technology (ICT) in their teaching practice. "One of the keys to an effective blended-learning programme is teacher development," Uma emphasizes.

She stresses the need for teachers to be trained in the areas of designing, planning and implementing blended learning courses, pointing out that schools play a crucial role in providing the necessary infrastructure, support and professional development training to teachers.

She also highlights another area that teachers should be skilled at—managing students who frequently get distracted when they are connected online. "There are times when students would get off track wandering in online spaces or by using social media. Although teachers may not have much control over this, they need to know how to guide their students on self-regulating and building effective time management skills," she advises.

Closing the Equity Gap

Blended learning also offers the opportunity for students to develop their competency in using technology tools. However, Uma brings up the fact that it should not be taken for granted that students who are familiar with using technology for communication and entertainment purposes will also be able to use technology for academic

purposes. There are learners, adds Uma, who lack basic digital skills such as the ability to navigate different e-learning platforms and devices.

"With COVID-19 exposing and amplifying the social inequalities that exist in society, it is essential for schools and teachers to keep a lookout for those with a lack of access to the Internet and digital devices such as laptops. It may be harder, though, to address other inequities such as a conducive home environment, a dedicated learning space as well as a student's emotional well-being at home," she remarks.

However, she is heartened to see that steps have been taken to mitigate any learning loss that students may experience. For instance, the Ministry of Education and schools have provided access to learning devices and Internet dongles for many needy students. Those who are high-needs, require closer supervision and lack a conducive home environment are also allowed to return to school on HBL days.

Blended Learning as the New Normal

Reflecting on the pandemic, Uma shares, "The pandemic crisis has created an opportunity for education administrators to create new solutions or innovate the traditional modes of schooling. The big leap in digital technology has given us a multitude of ideas on how we can enhance learning environments."

The future will see educational technologies playing a bigger role in transforming classrooms into places where knowledge is created collaboratively between teachers and students, and where higher-order skills such as problem-solving, communication and collaboration are nurtured in students.

"Singapore has adapted quickly, and is ready to learn and re-learn," she adds. She mentions how the education fraternity has been quick to embrace new ICT tools such learning analytics, which can facilitate the tracking of students' learning outcomes, and artificial intelligence, which can help create a personalized form of learning experience based on each student's needs, interests and capacities.

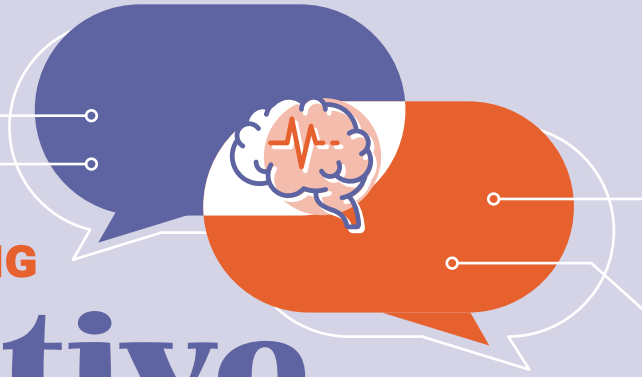
Nonetheless, there are some things which will stay the same—teachers, whiteboards, pen and paper, and physical spaces will continue to be part of the schooling experience.

"As people, technology and space are brought together in innovative ways, blended learning will continue to evolve. What is clear is that blended learning and HBL will afford continuous learning and they are certainly options we can consider as we prepare to face more threats and crises in a complex world," Uma concludes.

ABOUT THE INTERVIEWEE

Uma Natarajan is Research Manager at NIE's Centre for Research in Pedagogy and Practice (CRPP). Her research interests include education policy, teacher education, STEM and integrating technology in education.

Issue 78 | Sep 2021



TECHNOLOGY INTEGRATION DURING

Collaborative Argumentation

Successful technology integration is more than just picking the right tools for the classroom. If students were to be more engaged in and empowered over their own learning, it also has to be meaningfully and thoughtfully implemented. In this article, NIE Associate Professor Chen Wenli shares about her current research study on the design and use of a digital system for collaborative argumentation in classrooms and the benefits it brings about.

Value-Add Learning with Technology

There is no denying that technology introduces a wide variety of tools that can help stimulate real-time and authentic student-teacher and student-student interactions. However, for technology to effect teaching and learning positively, it has to be purposefully and carefully incorporated.

"Traditional methods work, but meaningful integration of technology can make teaching and learning better," Wenli, who is also Head of the Learning Sciences and Assessment Academic Group at NIE, shares. When mindfully and purposefully integrated, the use of technology can increase students' learning motivation and open up more room for learning opportunities for them.

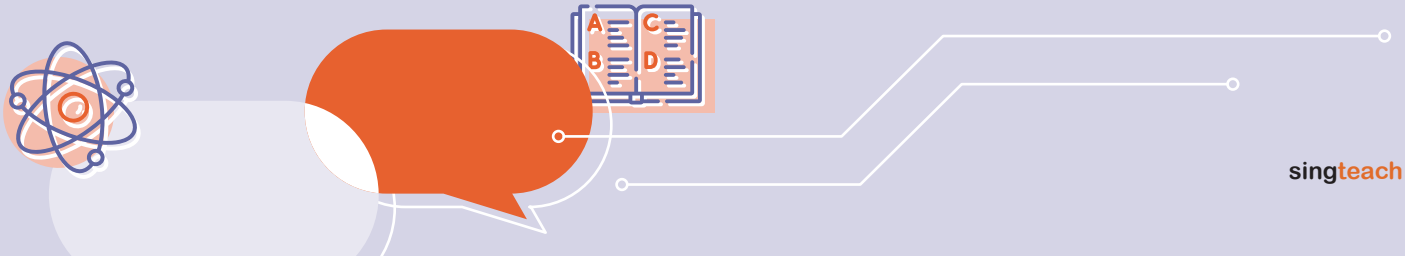
She also adds that the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) guides teachers on the integration of technology to design meaningful learning environments and experiences for students. "The framework attempts to identify the nature of knowledge required by teachers for technology integration in their teaching while addressing the complex, multifaceted and situated nature of teacher knowledge."

For Wenli's research project, she and her team collaborate with a number of primary and secondary schools in Singapore to support the enactment of collaborative argumentation in Science, English, Social Studies and History, and project works with the integration of a digital system.

So what is collaborative argumentation and how can technology support it?

Technology-Supported Collaborative Argumentation

From a constructivist perspective, interaction plays a vital role in an individual's learning because it is through that that one has his or her thinking and perspectives challenged.



"Generating and assessing arguments is essential in these inquiry and authentic learning experiences. Developing students' argumentation skills is an important component of developing students' 21st century competencies, in particular, critical and reflective thinking," Wenli explains.

This approach typically begins with questions and requires students to analyse, interpret and evaluate a range of evidence and information sources to develop their conclusions and make claims, as opposed to taking claims as given. "These are crucial steps to developing sound argumentation skills. Much effective argumentation happens between multiple participants who engage in evaluation, reflection, reasoning and decision making through arguments and counterarguments in relation to a specific topic," she adds.

However, Wenli notes that effective collaborative argumentation rarely occurs in classrooms because one of the critical issues contributing to that is the lack of technological and pedagogical support in designing, implementing, evaluating and reflecting on the argumentation for both teachers and students.

"According to existing literature, individual students in a group do not automatically collaborate and argue as a group," she explains. "Scaffolds need to be provided to bring the group work into fruition." This is where technology can aid effective collaborative argumentation.

Embracing Technology in Classrooms with *AppleTree*

A large part of Wenli's research project involves conceptualizing, designing and eventually integrating a digital system to support students' collaborative argumentation in classrooms.

"We developed a system called *AppleTree*, which incorporates mechanisms for scripting collaborative argumentation and supporting real-time formative (diagnostic) learning analytics and assessment that enhance the process and outcome of collaborative argumentation to improve students' learning and cultivate their 21st century competencies," she shares.

AppleTree embeds a pedagogical model called Spiral Model of Collaborative Knowledge Improvement which provides the support necessary for a smooth transition between work in solitude and collaborative learning within a classroom setting.

"*AppleTree* provides real-time learning analytics and assessment of students' collaborative argumentation. The real-time assessment allows teachers and students to have a quick evaluation and reflection of their collaborative argumentation process and outcome from the aspects of social participation, collaboration and cognitive quality."

Wenli notes that as of today, there are more than 300 students who have used *AppleTree* for collaborative argumentation in Science, English, Social Studies and project works. Her research findings have also shown that the use of this digital system not only helps students develop a deeper understanding of content knowledge, but also their 21st century competencies, in particular, communication and collaboration, and creative and inventive thinking.

A Blend of Technology and Traditional Practices

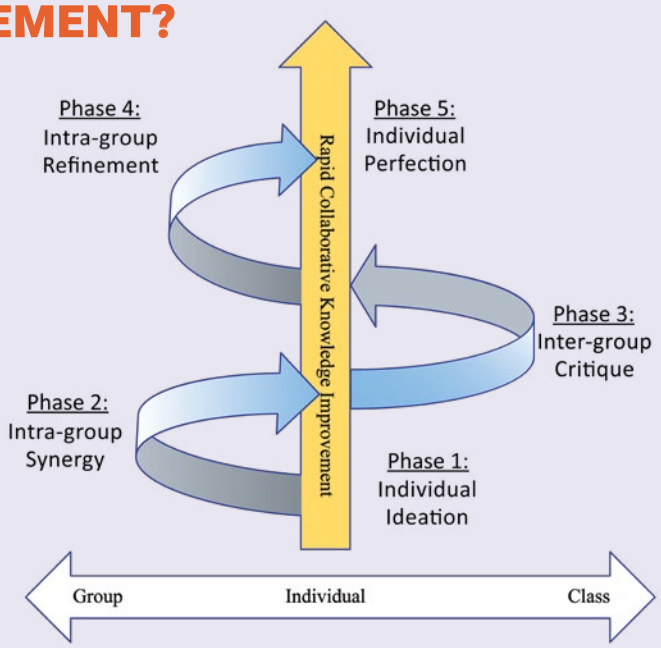
Education is no longer just pen and paper, and memorizing of facts. Today, educators far and wide are improving their teaching practices through the use of technology. The current pandemic has further fuelled the rapid adoption of technology-assisted pedagogies and blended learning models.

Wenli advises teachers who may wish to start incorporating technologies into their daily classroom practices, "When designing a technology-integrated lesson, teachers can first choose the learning outcomes (content) of that class session. The learning outcomes are the content. The second step is to decide how the

WHAT IS THE SPIRAL MODEL OF COLLABORATIVE KNOWLEDGE IMPROVEMENT?

According to education researchers Chen, Tan and Pi (2021), The Spiral Model of Collaborative Knowledge Improvement (SMCKI) is a 5-phase pedagogical model that was developed to strengthen the connection between the individual and group.

It starts with a phase of individual ideation, the model leads to phases of intra-group and inter-group knowledge improvement and refinement through peer critique, which will lead to the advancement of the knowledge of students (see figure on the right).



students are going to learn the content (pedagogy). Finally, teachers can choose technologies that will support the pedagogy and aid the students in learning the content."

However, some teachers may still find it a struggle to adapt to these changing teaching and learning landscapes. After all, teaching practices are in fact the key to effective instruction and matter more than the presence or absence of specific tools.

At the end of the day, for Wenli, she feels that if the traditional pen-and-paper approach can achieve the same level of learning outcomes, the use of technology may not always be necessary. "When integrating technology in teaching and learning, teachers need to be clear about the value-added part of the technology," she concludes.

ABOUT THE INTERVIEWEE

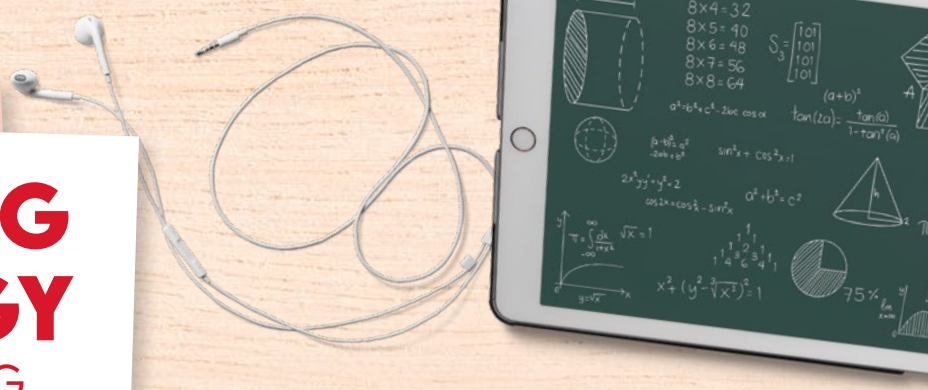
Associate Professor Chen Wenli is Head of Learning Sciences and Assessment Academic Group at NIE. Her research interests include Computer-Supported Collaborative Learning (CSCL), learning analytics, AI for Education and mobile learning. This article is based on her research projects titled "Assessment and Visualization of Collaborative Argumentation in Science Classroom" and "Computer-Supported Collaborative Argumentation in Social Studies and History Classrooms".

References

Chen, W., Tan, J. S. H., & Pi, Z. (2021). The spiral model of collaborative knowledge improvement: an exploratory study of a networked collaborative classroom. *International Journal of Computer-Supported Collaborative Learning*, *16*, 7–35.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.

INTEGRATING TECHNOLOGY
IN BLENDED LEARNING



With the integration of home-based learning as a regular part of the school curriculum, technology has become a central part of the classroom experience. Mr Luis Tirtasanjaya Lioe, a School Staff Developer from Nanyang Girls' High School, shares with us more about the observations, positives and challenges he experienced with implementing blended learning in the classroom.

Adapting to the New Normal

A significant impact the pandemic has on education is that it has sped up our reliance on technology and pushed us to adapt quickly to new ways of teaching and learning.

Luis, who is also a Math teacher at Nanyang Girls High School (NYGH), says, "In the past, there was a tendency for us to regard technology as a good-to-have resource to supplement our teaching strategy. We may see it as a useful tool, but not necessarily the most essential component in, for example, teaching and learning Math."

"The pandemic, however, has made us realize that technology will play a far more crucial role in how we engage our students and improve their learning outcomes."

He shares that NYGH is implementing a home-based learning (HBL) day every fortnight as part of the blended learning plan. This means that teachers will have to include HBL components in their lesson plans.

"For example, I often assign self-quizzes through online platforms, such as the Student Learning Space (SLS), so that students can get immediate feedback. I also use an online chat group and *Padlet* for students to continue their discussions beyond their lessons, when they do self-practice or revisions," he adds.

Asynchronous and Synchronous Learning

Luis defines blended learning as an approach that integrates both aspects of when students study on their own (asynchronous activities) and in the presence of teachers (synchronous activities), either at home (online) or in school (offline).

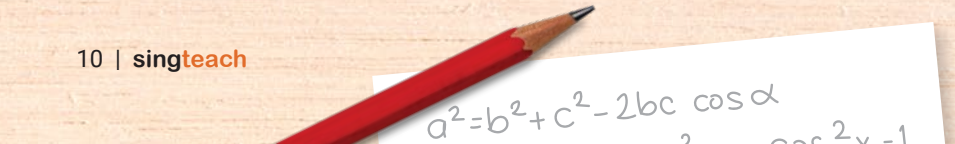
He emphasizes that when integrating both asynchronous and synchronous activities, it is vital that teachers communicate clearly the objectives, instructions and criteria of success to their students.

"For asynchronous activities, I either assign reading materials and worked examples from textbooks, or create explanation videos that teach the basic concepts and assign students a learning package from the SLS that has been customized to each student's needs," he explains.

"After watching the videos, students can either complete self-quizzes in SLS or submit 'exit cards' into *Google Classroom*. These are cards that contain questions or prompts that they can answer," he adds. He uses these tools as a way to collate their misconceptions or common mistakes and assess their readiness before synchronous activities.

Synchronous activities, meanwhile, could be held through *Zoom* or face-to-face discussions. Using information extracted from the exit cards, Luis will highlight the common mistakes made, discuss various misconceptions and share the different approaches other students have taken to answer the same question. The purpose of the discourse during synchronous activities is hence directed towards clarifying and synthesizing concepts.

"It is important to remember that the purpose of such assessments is not merely to know whether a student has answered all the exit card questions correctly, but to understand each student's learning processes. Based on this assessment, teachers should include a follow-up plan that addresses the students' mistakes or gaps, as well as the effectiveness of the methods used although the students got the right answer," he remarks.



He stresses that although students are learning independently when interacting with these resources, it is necessary to establish a continuous assessment of students' learning and understanding.

Key Considerations for Blended Learning

Based on his experience during the full online learning period, Luis notes that the scope of online lessons could not mimic those of offline ones. This is where blended learning could be the solution but teachers need to keep in mind certain considerations.

"During the full HBL, I made the mistake of planning a lesson to cover the same amount of materials as an in-person class. The mode of learning, the types of guidance, the skills that the students need, including note taking, are quite different in these two environments. We need to consider all these aspects when teaching Math online and offline," he states.

When developing blended learning lessons, teachers also need to take into account there are students who may have difficulties in keeping up with online lessons. If not identified early enough, these students may fall behind in their learning.

He reiterates that it is important to establish trust and empathy that will facilitate the way we incorporate check-points frequently at appropriate junctures. "Build a positive relationship with your students so that they feel safe in sharing with us their difficulties. We should create a safe space for them to explore, make mistakes and share them with you."

Fostering an Encouraging Environment

Luis shares that as a School Staff Developer, he works with various professional development (PD) teams such as Senior Teachers and Educational Technologies (EdTech) committee to support teachers in their PD. In 2021, NYGH created a Blended Learning taskforce to explore the integration of blended learning in the curriculum and he works closely with them in this journey.

"The school management has given us support, space and autonomy in exploring the way we do blended learning. Much of the actual work, though, is involved at the team and individual level. The process requires a lot of brainstorming, exchanging of tips and learning from one another," he says.

He advises teachers not to be afraid in approaching their colleagues and the wider community of educators for help and encouragement. "You will find people on the same boat driven by the same objective: to make students' learning effective and fruitful," he adds.

Shifts in Mindset and Familiarity

According to Luis, the main difference before COVID-19 and now lies in the teachers' and students' *mindset* and *familiarity* of using technology in teaching and learning.

There are strengths in full HBL that can be carried forward to in-person sessions, such as using technologies to assess students' learning quickly and facilitating students' collaborative learning.

"With that said, technology can never replace our presence and facilitation of students' learning. When they ask questions, it is their teachers and not the machines who guide them," he points out.

"Blended learning empowers students to take ownership of their learning, to set goals and plan their own learning and to choose what they want to learn. If we can integrate these strengths effectively in our lesson units, we can have the best of both worlds," he affirms. ▮

ABOUT THE INTERVIEWEE

Luis Tirtasanjaya Lioe is a School Staff Developer from Nanyang Girls' High School. Prior to taking up the role of an SSD, he served as Head of Department (Mathematics) for 2 years, where he discovered that enacted curriculum is an art that requires teachers' collaboration and shared expertise to take place in order to make students' learning meaningful in the classroom. He believes that creating a safe environment for teachers to experiment and share with one another is essential for effective PD.

THE Evolutionary Role of ICT IN BLENDED LEARNING

When the Ministry of Education (Singapore) laid out the first Information and Communications Technology (ICT) Masterplan in 1997, Dr Tay Lee Yong was teaching at Henderson Primary School. He was then nominated by his principal to learn more about ICT and help lead the school in its implementations. Just prior to joining NIE, he was with Beacon Primary School, one of the schools under the FutureSchools@Singapore programme. Now Teaching Fellow at NIE's Centre for Research in Pedagogy and Practice, he talks to *SingTeach* about his experiences with the Masterplan, ICT in education and how this has paved the way for online and blended learning in Singapore.

The first Information and Communications Technology (ICT) Masterplan laid the foundation for schools to harness ICT in education by providing basic infrastructure and equipping teachers with a basic level of digital competency. Several rounds of upgrades have taken place since the first ICT Masterplan in 1997, such as the ICON email system, the installation of broadband Internet in schools, and, in recent years, the development of the Student Learning Space (SLS) by the Ministry of Education, Singapore (MOE)—an online platform containing tools and curriculum-aligned resources for students to reinforce their learning at their own pace.

"Today, students and teachers are not only equipped with the necessary ICT hardware and software applications, but teachers also undergo professional development in how to leverage ICT in their teaching. Since the first Masterplan, we have learned how to use ICT more effectively to enhance and facilitate students' learning. Teachers are now able to pivot from face-to-face to online learning easily," Lee Yong comments.

The Impact of the Pandemic on Blended Learning

Lee Yong observes that the pandemic has made a "sudden catalytic push for ICT" and has accelerated the pace and timescale for online learning. He points out that as teachers had to adopt and integrate ICT in their lesson plans, attention was redirected towards the use of ICT in schools. This has led to an evolution in our approach towards blended learning.

"When schools transited to full home-based learning (HBL), concerns with accessibility and e-pedagogy arose, resulting in the acceleration of the Personalized Digital Learning Programme (PDLP). To better support HBL, the PDLP has been brought forward by a few years and all secondary school students will be secured with a personal leaning device by the end of 2021," he shares.

SLS was also utilized heavily through the HBL period, as the functions offered such as the *Interactive Thinking Tool*, or the ability to create

varied questionnaires and quizzes, allowed teachers to put a creative touch in their lessons and find new ways to engage their students online. The curriculum-aligned resources available on SLS also allowed students to revisit ideas and concepts touched upon in the lesson, and helped teachers in their lesson planning.

"With the prolonged pandemic situation," Lee Yong remarks, "the potential of online and blended learning have been felt more authentically. It goes to show that after more than 20 years of ICT use in schools, the country's investment in infrastructure and teacher training has been put to very good use. Whilst these efforts were largely not noticed by many before, ICT has now become another critical medium of instruction as blended learning becomes an integral feature of Singapore's curriculum."

Facing the Challenges Head-on

Implementing online learning comes with its own set of challenges. Lee Yong highlights the problems associated with online learning. "According to the literature in this field, there are three types of interactions inherent in effective online courses: *learner-to-learner* interaction, *learner-to-content* interaction and *learner-to-instructor* interaction," he shares. In his words, "this adds at least another layer of complexity."

He adds that while students are able to carry out learner-to-instructor interactions, two clear challenges of online learning are students' engagement (learner-to-content) and the lack of interaction with their peers (learner-to-learner).

"The lack of interaction with peers during full online learning can affect students' engagement levels, as well as their socioemotional well-being. In this sense, blended learning may be the answer as it comprises face-to-face interaction and is able to 'compensate' for the disadvantages of full online learning," he says.

It still remains, however, that virtual classrooms have proven to be a challenge for younger students to navigate, and even older students can struggle to stay engaged over a prolonged period of time.

So what can be done to address these issues?

Strengthening Efforts to Advance Blended Learning

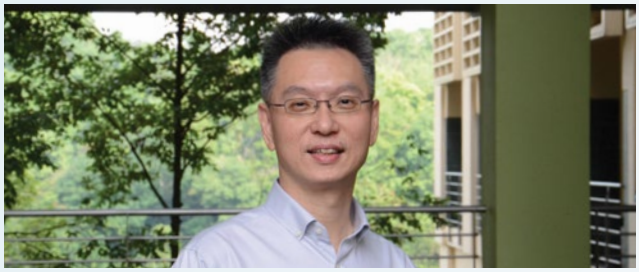
To overcome these challenges, Lee Yong advises that teachers need to be more mindful in the design of the lessons, consider different learning needs, and provide different and more bite-sized ways of accessing the information and allowing students to respond.

"Moving forward with blended learning, we must keep in mind that while ICT plays a key role, the considerations to design online learning environments that meaningfully engage students are more important but are also complex," he says.

Teachers and students will also need to constantly learn new skills and keep up-to-date with technology, be it for home-based, blended, or face-to-face learning contexts. According to Lee Yong, the main goal of implementing blended learning is to ensure that learning is not disrupted due to any unforeseen circumstances. He reminds us that it is crucial to always strive to further enhance online and blended learning even after COVID-19.

"As a researcher, I feel that it is even more important now to continue our research efforts to better understand how to improve our online teaching pedagogy. We also need to understand, from the local context, how to make blended learning even more effective. In the future, what I hope to see is how machine learning and artificial intelligence could be harnessed to enhance teaching and learning for all," Lee Yong concludes. ▮

ABOUT THE INTERVIEWEE



Tay Lee Yong is currently Teaching Fellow at the Centre for Research in Pedagogy and Practice (CRPP), NIE, with research interests in the use of ICT in schools and education, design thinking and ICT integration, teacher professional development and metacognition. Before joining NIE, he was a teacher and school leader (Dean for Development, Research and Technology) who has vast experience in using technology in his classroom.

TEACHING WITH Technology IN THE Classroom

The role of teachers is crucial in the effective implementation of blended learning. The shift away from more traditional means of instructions means that teachers have to wear many new hats—from designing offline and online lessons to guiding students on how to be independent learners. Two educators share their experiences and insights on this approach to learning.

Dr Vanessa Vinodhen
Level Head, Lower Secondary Science
Junyuan Secondary School

Did you start adopting blended learning approaches due to the pandemic or was this something that you had already started on?

Blended learning was something that we started on during the pandemic. However, for lower secondary science in my school, we were already doing some essence of flipped classroom in which the students did embark on certain aspects of their learning using technology at home. Leading up to blended learning, e-pedagogy was something everyone was trying to pick up.

Therefore, when blended learning did start, most teachers had an inkling of what to do and what to expect. This made the whole transition a lot smoother.

What is the main challenge you faced integrating blended learning in your classroom and how did you overcome it?

When integrating blended learning into the science classroom, the most challenging aspect was continuing with science practical work to reinforce learning. Science practical work can be an extension of science learning and an essential aspect of the active learning process. It is an effective way to enhance students' motivation and extend their knowledge in understanding theories and ideas about the natural world.

However, due to the pandemic and social distancing measures, the science laboratory was not available for teaching and learning purposes for some time. In addition, blended learning took place remotely which contributed to the logistical constraints in conducting science practical work.

Therefore, what we did was to conduct home-based science practicals. We had to ensure that despite the limitations, the practical was effective and learning was meaningful. An effective practical is one that is designed to link the objectives of what students are intended to learn and what they are intended to do. Specific, clear and structured instructions are necessary as there is little room for clarification. We adopted the active learning approach. We revisited learning outcomes through the Student Learning Space or *Google Classroom*. We activated learning by guiding students to craft a hypothesis to test the relationship of science concepts (for example, the relationship between effect of area on pressure). We then encouraged them to think and discuss with their peers through *Google Meet*.

Lui Yan Ling Esther
Senior Teacher (Biology)
Bukit Merah Secondary School

How has the blended learning approach added value to your teaching practices?

As I dive deep into the intricacies of blended learning, I am inspired to translate the theoretical knowledge learnt into practical applications in my teaching. As a designer of lessons, I feel empowered by the concepts of blended learning to harness the affordances of both face-to-face and online learning modes to create a unique and personalized learning experience for my students.

One of the critical advantages of blended learning is that it provides opportunities for the students to learn at their own pace, anywhere and anytime. When they do not understand specific segments of the videos, they will be able to re-watch and review them to reinforce their understanding of the concepts taught. I carefully curate resources, such as recorded lecture videos and simulations uploaded on the information and communications technology (ICT) platform, to maximize the value of learning while minimizing the amount of screen time.

Another affordance of blended learning is that it provides significant opportunities to engage students in meaningful and higher-order thinking tasks with the teacher's guidance. Class time is spent consolidating students' learning using their online responses and clarifying misconceptions. As a teacher, I play the role of the facilitator to guide students in the assimilation of information. Through these constant interactions with peers and teachers, students can clarify their doubts and learn better from one another.

What are some tips for creating an engaging blended learning experience?

The first element of designing an engaging blended learning experience is to frame the mindset of students. Rules and classroom routines should be set for students to understand and adhere to, depending on class and online activities requirements. It is also crucial to demonstrate how to use the various features of the ICT platform so that students are aware of how to complete the task.

Throughout the blended learning lessons, I provide many opportunities for students to engage in peer discussion, to interact with, discuss and learn from one another. Using the collaborative practical activities, students can derive their learnings based on their experimental results instead of relying on the teacher for content knowledge.

Students can demonstrate their learning through their responses on an online platform and various online quizzes. I provide targeted feedback and opportunities for students to discuss and further improve their answers. In designing the lesson, it is also vital to ensure constructive alignment of learning objectives, learning activities and assessment tasks.

The journey of developing blended learning lessons might be fraught with challenges and obstacles along the way. Nevertheless, it is important to be reflective and persevere in our efforts to create a unique learning experience for all learners.

singteach is an e-magazine by

Office of Education Research

National Institute of Education,
Nanyang Technological University,
Singapore

www.nie.edu.sg/oer

facebook.com/**nieoer**

instagram.com/**oer_nie**

twitter.com/**oer_nie**

bit.do/**oeryoutube**