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TEACHER ED

Mentorship: A Practical Solution

Have you experienced stepping into a classroom and realizing that you were not equipped to deal with the challenges before you? Well, you are not alone. Theoretical knowledge doesn't always translate readily into practice. How can mentoring help bridge this gap between theory and practice?

Article highlights

- Why is mentoring important for novice teachers?
- Can mentoring help bridge the theory-practice gap?
- What is being done to enhance the mentorship preparation programme?

The theory-practice gap is widely acknowledged to be the bane of university-based initial teacher education programmes. Many encounter difficulties in translating what they have learnt within the campus setting to real-life classroom situations.

Obtaining field/clinical experience in schools is one of the many ways in which the theory-practice gap can be bridged. An important component in this process, especially for pre-service teachers and beginning teachers (BTs), is *mentorship*.

Mdm Noraini Abdul Rahim, a School Staff Developer at Opera Estate Primary School (OEPS), seconds this notion. "Beginning teachers may have good pedagogy knowledge and planning but the practical part can be overwhelming. Strong mentoring helps bridge practice with theory so they can enjoy their journey as a teacher."

Recommendation 3: Strengthening the theory-practice nexus

The theory-practice gap arises when we struggle to apply material learnt from teacher education programmes to the real-life setting of a classroom. There are many ways to bridge this gap.

All NIE student-teachers are currently exposed to at least four practices widely acknowledged in the research literature to help bridge the theory-practice gap: (1) reflection; (2) school-based inquiry or research projects; (3) pedagogical tools that bring the school classroom into the university; and (4) experiential learning.

In addition, teacher educators at NIE have recommended six additional approaches to strengthen the theory-practice nexus, including strengthening the role of mentorship before, during and after the school-based practicum posting and into the BT years.

Providing structured mentorship

Assigning experienced teachers to guide novice teachers is not a new practice in Singapore. A Structured Mentoring Programme has been in place since January 2006. This programme offers a systematic approach for schools to structure the learning and development of trainee teachers and BTs.

At OEPS, the mentoring process begins by first matching the BTs to experienced teachers.

"We take into consideration the subjects and levels the BTs will be teaching so they can be paired with appropriate senior teachers to get support in classroom management and pedagogy," explains Noraini.

"Formal mentoring sessions are organized once every term. These sessions serve as an important platform to gather feedback on how they are coping and the challenges they face and how best we can support them."

OEPS hopes these sessions will allow BTs to reflect on their teaching and build on their teaching capacities to become effective teachers.

Connecting theory and practice

It is an ongoing endeavour to "achieve balance between theoretical knowledge and practice-based learning" (NIE, 2009, p. 24).

The main purpose of mentorship is to help inexperienced teachers achieve the right balance between theory and

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practice, which is indispensable in the professional development of novice teachers.

“Beginning teachers must understand, and it should be communicated to them, that they can tweak the lesson plans so as to engage pupils and manage the classrooms effectively,” Noraini emphasizes. “They can always revisit the objectives, depending on the situation in the classrooms.”

“All of us come into teaching with an idealistic perspective of teaching and we try to modify our teaching practices to suit the classrooms after observing and learning from senior teachers,” says Ms Sherlyene Soh, who has been teaching at OEPS for over a year. “We learn on the job.”

Benefitting from mentoring

Mentoring can play a critical role in a young teacher’s journey. Mr Navin Chandra Manogaran, who just started teaching at OEPS in May, describes the mentoring process as essential to his “basic survival” as a teacher.

Brady et al. (1998) found the establishment of positive relationships between novice teachers and their mentors also brings theory and practice closer together:

> The relationship between theory and practice may be facilitated by the quality of the relationship between the campus-based and field-based components of the teacher education programme. This relationship can be further strengthened when both teacher educator and the school-based teacher educator work for the benefit of the student-teacher. (p. 9)

Ms Yvonne Ho, another BT at OEPS, has found this to be true. She says the positive attitudes of her mentors, coordinators and school leaders have made her transition to teaching a lot smoother.

“One thing we are working towards is to bring mentors together to have a common understanding of the important aspects of mentoring and inform them about the key areas that they can help beginning teachers with,” Noraini comments.

Enhancing the role of mentorship

Evertson and Smithey (in Holloway, 2001) found that novice teachers working with trained mentors possessed a higher level of teaching skills than new teachers whose mentors were not trained. This means that the mentor’s knowledge of how to support new teachers and his other skills at providing guidance are crucial.

Currently, mentorship is provided during the practicum and induction period, with as much as 40% of PGDE programmes (or Semester 1) devoted to the practicum.

While this percentage of field exposure is highly commendable, young teachers stand to gain more if the mentorship process could be introduced at an earlier stage. The outcomes of this field exposure can be further enhanced by strengthening mentorship provided *before*, *during* and *after* the practicum.

Strengthening mentorship

In order to further strengthen mentorship, NIE’s report on teacher education model for the 21st century (TE[21]) recommended that School Coordinating Mentors (SCMs) take on new and extended roles. The list of additional roles for SCMs includes the following:

- Before practicum
  - Explore and discuss expectations and preparation for practicum by leading pre-practicum Professional Learning Inquiry Sessions (PLIS)
  - Induct student-teacher into the school systems and arrange meetings with Cooperating Teachers
- During practicum
  - Act as group mentors and group coaches
  - Be equipped with expertise and time to observe lessons, provide non-judgmental feedback, provide inputs for assessment and conduct PLIS for ongoing practicum reflections
- After practicum
  - Lead post-practicum PLIS to reflect on practicum experience
  - Meet student-teachers for closure on practicum

A key role of the SCM will be to lead the PLIS, which are meant to initiate student-teachers to the idea of Professional Learning Communities.

The proposed enhancements aim to give novice teachers a strong start to their career, by providing a continuum of mentorship from before the practicum all the way through the initial years. Additional training to prepare mentors will strengthen their roles in the professional development of teachers from the pre-service through the BT years to that of a professional teacher.

NIE’s Associate Professor Low Ee Ling comments: “The success in the proposed enhancements to the role of mentors before, during and after practicum relies on a crucial tripartite partnership between NIE, MOE and the schools.”

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Read more about the TE21 recommendations in our previous issues of SingTeach.

MATH ED

Mathematical Modelling in a Problem-based Learning Setting

by Chan Chun Ming Eric

Problem-based learning as an instructional approach helps pupils to develop mathematical thinking skills. This article shows us how it can be used to teach mathematical modelling by using a real-life task.

Article highlights

- Why use problem-based learning in teaching math?
- How can PBL be applied to a modelling task?
- What are some outcomes of this instructional approach for learning?

In a problem-based learning (PBL) session, pupils work in small collaborative groups to solve a task situated in the real world, in this case a modelling task. The teacher functions as a cognitive coach while pupils develop, test and refine their models towards goal resolution.

Understanding the use of PBL

In this article, mathematical modelling takes on a models-and-modelling perspective (Lesh & Doerr, 2003), which asserts that pupils develop conceptual representations or models that are expressed using spoken language, written symbols, concrete materials, diagrams, pictures, or other representational media.

When pupils are given non-trivial problems to solve—ones that relate to their lives—they develop models that are continually being projected onto the external world. These models are given mathematical meanings as the pupils interpret and refine them to solve the problem.

For example, when pupils identify the quantities and variables in a problem and establish relationships between them, they are using mathematical knowledge to give meaning to the problem. In doing so, they are developing a mathematical model and using it as a tool for thinking.

Expressions of such modelling include pupils' ability to aggregate scores; to weigh or rank data for decision making; or to generate tables, graphs or lists for comparing, combining or eliminating data.

PBL in the math classroom

The use of a PBL platform to drive the learning of mathematical modelling is a fitting instructional approach (Hjalmarson & Diefes-Dux, 2008). Because the design of the modelling tasks is guided by modelling principles (Lesh, Cramer, Doerr, Post, & Zawojewski, 2003), the type of tasks used in a problem-based setting reflects reality.

PBL tasks thus require pupils to construct knowledge, self-assess, make their thinking visible, adapt or transfer ideas to other similar situations, and establish relationships between variables in a situation.

An example of a PBL task is the floor-modelling problem (on p. 4). It is a modification and expansion of a similar modelling task by Gravemeijer, Pligge and Clarke (1998). This task is particularly suitable for upper primary pupils.

The problem-solving process

Understanding the goal of a task

In this problem, pupils have to determine an appropriate choice of floor-covering material and its layout design for covering the floor of a study room.

The goal of the task lies in the statement: "*Explain clearly and mathematically your best choice and how you arrive at your decision*." In solving the problem, pupils need to unpack the meaning of "best choice".

There are two main expectations related to the pupils' development of models:

1. The construction of layout designs, which requires a manipulation of the dimensions of the floor-covering materials to fit the dimensions of the study room; and
2. The ability to associate area and cost relationships.

The problem also presents opportunities for pupils to factor in personal knowledge or experiences and make assumptions.

Considering different ways of solving the task

A plausible solution model would be one where the pupils are able to attain a layout design that is value for money and that would fit the floor dimensions. Pupils can be encouraged to determine if they could optimize their solutions through cost and material savings.

As there are multiple ways to solve the problem, teachers need to acquaint themselves with the task first. This will help them to anticipate the various possible layout designs (models) and orientations of floor coverings.

This preparation will enable the teachers not only to make better sense of the pupils' mathematical reasoning when solving the problem, but also to help them facilitate the session more assuredly.

Outcomes for learning

This modelling task was one of several tasks used to investigate Primary 6 pupils' mathematical modelling process in a PBL setting.

It was found that the pupils were able to develop various layout designs as they worked on the dimensions and orientations of the materials towards covering the floor. In doing so, they engaged in manipulating geometrical and measurement aspects.

The pupils were able to establish area-cost relationships and demonstrated their ability to relate cost aspects (cost per unit area).

The pupils also acquired new learning through engaging in collaborative discourse. As they worked to refine their models, some pupils were able to improve on their initial models, resulting in further cost and material savings.

A promising method

When pupils are engaged in mathematical modelling tasks in a PBL setting, the interaction between pupils and the teacher produces a learning situation where cognitive immersion takes place.

PBL is in stark contrast to solving "tidy" problems found in textbooks, where there are assured ways of finding the solution, involving neat numerical figures. In a PBL setting, pupils develop problem-solving skills and habits of mind that are valued in the mathematics curriculum.

Because of the nature of the task, which requires pupils to test and revise their designs to refine their models, a high demand is placed on their metacognitive capabilities. Situating mathematical modelling in a PBL setting therefore holds promise as an excellent platform for developing pupils' mathematical thinking.

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Further readings are available on the SingTeach *website.*

About the author

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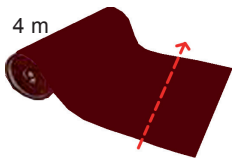
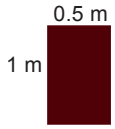
The floor-covering problem

You have been asked by your mother to suggest a covering for the floor of your study room. The room is rectangular and measures 4.3 m by 3 m. There are three ways to cover the floor. You can use a carpet, mat or tiles, but they are of different costs. Explain clearly and mathematically your best choice and how you arrive at your decision. Drawing diagrams may make your explanation clearer.

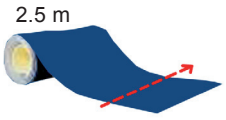


Carpet at $12 per m²

Can be cut in only one direction as indicated by dotted arrow.

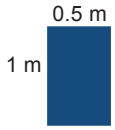


Loose carpet of 0.5 m by 1 m for patchwork at $6 per piece. Each piece can be further cut to fit size.

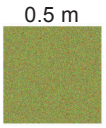


Mat at $11 per m²

Can be cut in only one direction as indicated by dotted arrow.



Loose mat of 0.5 m by 1 m for patchwork at $5 per piece. Each piece can be further cut to fit size.



Square tile at $5 each

If a tile cannot completely fit part of the floor space, professional help is required to cut the tile to fit.

(Note: The pictures are not printed to scale.)

LANGUAGE ED

Giving Reading a Makeover

by Jason Loh

We need to read for all kinds of reasons, yet there seems to be a declining interest in the written word. How can students be encouraged to become lifelong readers? And what can be done in schools to make the whole reading experience more enjoyable?

Article highlights

- Why should students be encouraged to read more?
- What methods encourage sustained silent reading?
- Why is it important for teachers to model reading?

In a fast-paced society like Singapore, the ability to read and to comprehend what you read can and does make a huge difference to a person's academic performance, career potential, and even personal success (Kearsley, 2002; Lo Bianco & Freebody, 1997).

Teachers play a critical role not only in helping students become independent and proficient readers, but also in deriving the full value of reading.

Reading requires practice

Children are taught to read and learn so that they can eventually read to learn. Reading is a tool that allows one to acquire knowledge and understanding.

As in so many activities, such as walking, cooking, or piloting an aeroplane, one gets better at it by frequently repeating the activity. The principle is universal. Reading, like these activities, also needs to be practised.

Many primary schools in Singapore have implemented an extensive reading programme known as Uninterrupted Sustained Silent Reading (USSR). During USSR, students and teachers usually sit in the school hall or assembly area and read for 20–30 minutes daily.

Despite schools' efforts, there are many students who are not "turned onto reading" (Saxby, 1997, p. 215) or "hooked on books" (Pilgreen, 2000, p. 12). As they do not read well, they refrain from taking part in any reading activities, especially during reading periods. This can become a vicious cycle, and their reading ability will make no progress as there is no practice involved.

Making reading a regular practice

What are some of the factors that contribute to students' reading behaviour?

Time

In order for our children to get better at reading, they must have time to read. Time to do nothing else but enjoy a good book. Time that is sacrosanct—that will not be "stolen" for other tasks such as completing their homework.

Environment

Besides time, the other essential condition is a conducive environment. However, during USSR, students and teachers usually sit in the school assembly area. As all the students and teachers are gathered in one confined area, the warmth from the close proximity of the physical bodies can reach an uncomfortable level, which may affect the whole reading experience.

Children should be provided with an environment that permits them to enjoy the activity of reading, to have solitude and to savour the beauty of the written word without having to defend that decision to read.

Role models

Teachers have been known to mark or chat with each other during USSR instead of read. This creates a perception among the students that reading as an activity is not at all that important. In a recent study (Loh, 2009), the students pointed out that since teachers did not read during the extensive reading period, it implied that reading is not important.

Other studies have shown that students' on-task reading behaviour increases when the teachers also participate in this reading activity. Clearly, it is important to provide students with exemplary models of silent reading behaviour.

Drop Everything And Read

Instead of the traditional USSR, schools might like to think about promoting another variant of extensive reading through DEAR (Drop Everything And Read) time.

A regular time

Time needs to be provided for this sustained silent reading activity. Reading daily for 10–15 minutes is more beneficial for the students than a 50–75 minutes reading period held once a week. Because of the regularity of the reading activity, students would be less likely to forget their books and more likely to form a reading habit.

A conducive environment

The venue for DEAR time is the classroom, rather than the school assembly area. In a classroom, the number of students within a confined area is dramatically reduced and there is better air circulation, thus ensuring a uniform and comfortable classroom temperature.

With fewer distractions in a classroom, there is also greater motivation to read. Moreover, as many primary school classrooms have class libraries, the children have access to a selection of books if they wish to read a different book during DEAR time.

A good role model

Teachers can demonstrate the importance of reading by modelling the reading behaviour during DEAR time. Being the only adult in the classroom, the teacher is more accountable to the students. It is important for students to see that the teacher also takes time to read. This will indicate to them that reading is not a disciplinary or classroom management tool but a habit that is important enough that even the teacher engages in it.

Even though these factors may not completely solve the aliteracy malaise that is evident in many schools, they go a long way in ensuring that important conditions are in place for an effective and sustained reading programme to take root (Pilgreen, 2000). In fact, they can be put in place by any teacher easily and almost immediately.

Since these conditions are so easy to put in place, why not give it a try? Your students will thank you for it in years to come!

Useful resource

A good book that describes the benefits accrued from reading is Stephen Krashen's *The Power of Reading*.

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About the author

Jason Loh was a primary school teacher and Head of Department (English Language) before he became a Lecturer at NIE. He advocated and oversaw the revamp of extensive reading in two schools he was in, and implemented the DEAR time in all his form classes.

SCIENCE ED

Stirring the Spirit of Inquiry

The spirit of inquiry is an important motivating factor in inquiry science. With science as a natural site for inquiry, science teachers have an added advantage in helping our students become spirited inquirers.

Article highlights

- Why use inquiry for science education?
- How can teachers become leaders of inquiry?
- How can the spirit of inquiry be developed in students?

An effective teaching tool

The late Dr Ruth Wong, NIE's founding director and a chief architect of Singapore's education system, once said:

> A teacher who is not an inquirer nor a problem-solver is hardly likely to provide the right intellectual climate for his pupils to ask constructive questions or develop critical ability. (as cited in Ho & Wong, in press)

This aptly describes the core of Singapore's Science Curriculum Framework, which aims to make the "student as an inquirer" and the "teacher the leader of inquiry" (Ministry of Education, 2008, p. 2).

Inquiry-based learning, especially in science, is a potentially powerful tool to get students to learn. Assistant Professor Lee Yew Jin from NIE's Natural Sciences and Science Education Academic Group sees inquiry as "a powerful way of knowing science, knowing about science, and appreciating how scientists work".

"As a teaching tool, inquiry is effective because it encompasses a number of important pedagogies such as group work/collaboration, challenge, motivation, raising questions, argument and reasoning in science. These significantly contribute to student learning," says Yew Jin.

How do we provide our students with the right intellectual climate for inquiry?

Creating inquiring teachers

Here's a novel outlook on teachers as leaders of inquiry:

> If our aim is to help students become lifelong learners by cultivating a spirit of inquiry and the capacity for inquiry, then we must provide the same conditions for teachers. (Sergiovanni, as cited in Hord, 1997)

In order to get students to inquire, we first need to create those same conditions of cultivating a *spirit* of inquiry and the *capacity* for inquiry in teachers.

Afterall, science is all about discovering, exploring, experimenting and learning. For science teachers, it relates directly to teaching through inquiry.

Inquiry is also useful for the professional development of teachers, enabling them to identify student learning difficulties and evaluate teaching methods, for example.

But all this has to be driven by a teacher's curiosity. Without this motivating spirit, applying inquiry as a teaching and learning tool can be very difficult.

Developing inquirers for life

So how do we stir our students' desire for discovery?

The inquiring student should be able to do certain things by himself, such as make observations, define problems, form questions, investigate and state the expectations, carry out experiments, examine the results, reflect on the findings, and produce a solution.

The main problem is that our students aren't motivated to inquire about science; they learn only to pass exams.

Teachers as inquiry leaders will realize that the goal of inquiry science is not that students master the syllabus by themselves—while teachers become facilitators. The objective is to make them lifelong learners.

When we focus on ensuring that students see how the knowledge learnt in school is applicable to their lives, they will naturally become curious and interested to learn more.

But for them to engage in this learning process, the spirit of inquiry must be present to motivate them.

"Not all inquiry is hands-on"

Simply using any hands-on activities is "not...necessarily indicative of an inquiry-based approach" (Rankin, 2000, p. 34).

Hands-on activities based on inquiry occur only when students "have opportunities to raise their own questions, and then plan, design, and conduct investigations to help them answer some of those questions" (p. 34).

To give them this opportunity, we can introduce the element of unpredictability into a pre-planned experiment of the syllabus. Instead of demonstrating the correct procedure, we can change an ingredient, omit a step, or introduce a foreign element that will distort the result. Then let them figure out what went wrong.

This lets them internalize the content in their own terms through the process inquiry. As they have hands-on experience of asking their own questions, students are imbued with the spirit of inquiry, to ask more so as to understand more.

As we provide the conditions of "cultivating a spirit of inquiry and the capacity for inquiry", we find that inquiry not only helps in subject learning but also in lifelong learning—both for ourselves and our students.

And though the use of inquiry in its true spirit may seem daunting, Yew Jin's encouragement is that "practice makes perfect". In the spirit of inquiry, you can start by discovering what interests your students and perfect it through experimentation.

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HOT TOPIC

The Important Role of Non-cognitive Factors in School Performance

by Lazar Stankov

For many years, schools and teachers have focused almost exclusively on student performance. The teaching community is starting to realize the importance of non-cognitive factors such as school climate and family background. Professor Lazar Stankov enlightens us on this often overlooked aspect of teaching.

The list of important attributes that psychologists think students should have to succeed in school is growing.

For many years, the emphasis was on cognitive variables like memory, verbal abilities and aptitudes for reasoning. These can be measured using performance and achievements tasks, where the answers given can be grouped as correct or incorrect.

While these cognitive factors remain important, of interest recently have been non-cognitive factors that affect learning. In fact, it has emerged over the years that these factors are equally important for learning.

An extensive literature review by Lee and Shute (in press) in the fields of educational, social, and cognitive psychology has led them to identify about a dozen variables that demonstrate direct empirical links to academic achievement at the primary and secondary school levels.

Three major groups of psychological variables—student engagement, perceived school climate, and social-familial influences—appear to be most relevant.

Student engagement

Student engagement is classified as a personal factor. It has three components: behavioural, cognitive-motivational and emotional engagement.

Behavioural engagement is manifested in students attending classes, following rules, and participating in school activities.

Cognitive-motivational engagement is expressed in a preference for challenge, intrinsic motivation, investment in learning, academic self-beliefs and confidence.

Emotional engagement is displayed as interest, curiosity, a sense of belonging, and the feelings of students.

Evidence from longitudinal studies of school achievement indicates significant correlations between student engagement variables at an early age with school performance 3 or 4 years later.

School climate

School climate is a social-contextual factor, and includes: academic emphasis, teacher variables and principal leadership.

Academic emphasis refers to expectations that schools have of their students as well as positive reactions from the school community. Measures of academic emphasis in schools have been found to account for up to 50% of variability in the school's overall achievement scores.

Teacher variables such as teacher empowerment (teachers' belief that they play a critical role in school-wide decisions) and affiliation (their sense of belonging to the school) contribute to creating a positive school climate. Teachers in a positive environment are committed to their students' learning, possess high drive and self-confidence, and feel good about their teaching and the professional support system provided to them. In addition, positive feelings such as trust, collegiality and closeness are likely to be shared among teachers.

Principal leadership is important for developing collegiality among the teaching staff, setting high morale, and clearly conveying goals.

Social-familial influences

Another category of social-contextual factors is the influence of family and peers.

Parental involvement encompasses parents' attitudinal, behavioural and stylistic approach to their child's rearing and education. When sub-components of parental involvement were examined, parental expectations/aspirations showed the strongest correlation to academic achievement. This variable had larger correlations than other aspects of parental involvement, such as home supervision, communication, and school participation (Fan & Chen, 2001).

Peer influences include peer support, norms, attitude and behaviour, including achievement. In one study (Johnson, 2000), peer attitude was assessed via one item, "My friends make fun of people who try to do well in school." Johnson reported that 4th-graders who agreed with this statement scored significantly lower on the reading test compared to the 4th-graders who disagreed with the statement.

It has become clear through some of the new research that in addition to teaching students how to achieve and how to solve problems, we have to take into account the psychological makeup of a child.

Some of them are introverts, some of them are extroverts. Some might have better knowledge and better motivation, while some are extremely anxious when they have to solve problems and their anxieties can impede their performance during exams.

Research is showing that these non-cognitive factors are much more important than in the past. We need to find out which factors are more important in order to help teachers teach their students in a more effective way.

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