

## TEACHER ED

### The competent teacher

*“Competencies.” This word is increasingly being used in education circles today. It is a description of one’s ability, a measure of one’s performance. What are the competencies that matter among educators? And are these the same qualities that will be valued in the teachers of tomorrow?*

#### Article highlights

- How does the concept of competencies relate to teachers?
- What are the competencies that teachers today need to develop?
- How can you become more competent as a teacher?

A person’s competencies may be defined in terms of one’s knowledge, skills and behaviours. To understand the competencies required of a teacher, we must first define the job of a teacher.

The task of a teacher is closely tied to the nature of the classroom. Today’s classrooms call for teachers to “prepare virtually all students for higher order thinking and performance skills once reserved to only a few” (Darling-Hammond, 2006, p. 300).

Researchers and practitioners are becoming increasingly aware that the character of the 21st century classroom—and thus the demands on both students and teachers—is undergoing significant change.

#### Core competencies

*What are the roles of the teacher in the 21st century? What are the competencies teachers need to fulfil these roles? What can our teacher education programmes provide to help them with this task?*

A team of teacher educators from NIE sat down and asked themselves these questions. Some of the roles they identified included: nurturing the whole child, providing quality learning, working with others, and developing a strong set of personal values.

They then made a list of core competencies that every trained teacher should have. These competencies were classified into three broad performance dimensions: **professional practice, leadership and management, and personal effectiveness.**

- **Professional practice**  
A competent teacher seizes every opportunity to encourage learning, believing that all students can learn. And learning isn’t limited to the classroom. To this end, the teacher takes every opportunity to improve on his or her own professional practice, in order to provide quality learning.
- **Leadership and management**  
A competent teacher is a leader who wins the hearts and minds of the students. Such a teacher sees the value in developing and working with others, including parents and colleagues, and actively seeks out opportunities for professional collaboration within and beyond the school.
- **Personal effectiveness**  
A good teacher understands the importance of developing oneself before he or she is able to provide support for others. As a professional, this teacher maintains high standards of personal and professional integrity when carrying out all duties and responsibilities.

These performance dimensions align with MOE’s Enhanced Performance Management System (EPMS), which spells out the knowledge, skills and professional characteristics for teachers at different stages of their career.

#### Essential prerequisites

Good teaching does not occur in a vacuum. Every competent teacher also needs to possess a strong set of **values, skills and knowledge.**

The NIE team identified three key values that are important for the 21st century teaching professional: learner-centredness, teacher identity, and service to the profession and community. These values guide the application of relevant skills and knowledge on a day-to-day basis.

Teachers today need to develop a holistic array of skills—for teaching and thinking, administration and management; as well as knowledge—of self and pupils, community and pedagogy, among many others.

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## Developing teacher competencies

Not all teachers will have the same level of competence in all areas from the outset. What can teachers do to build and sustain the relevant competencies? This is where the Graduated Teacher Competencies Framework (GTCF) comes in handy, especially for new teachers.

“The GTCF is divided into levels—capacity building and awareness raising,” explains Professor Goh Kim Chuan, who was instrumental in leading this initiative. “The former is the demonstrable achievement of a specific competency, while the latter indicates the awareness of the competency though they may not yet be able to demonstrate its achievement.”

To develop competence, teachers need to progress from *awareness* to *capacity building*. The GTCF can help teachers identify the competencies they need and continue to build on them throughout their teaching career, through practice and professional development.

Prof Goh suggests that “some practical ways of bringing up awareness-level competencies to capacity building would be through induction and mentoring within the school, professional development courses at NIE or other providers, or learning with more experienced teachers through professional learning communities.”

American physician, writer and Harvard professor Oliver Wendell Holmes once said, “The great thing in the world is not so much where we stand, as in what direction we are moving.” The next step forward, therefore, is up to us!

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## Mapping the teacher’s learning journey

These and other recommendations are set out as part of NIE’s teacher education model for the 21st century (TE<sup>21</sup>; see Low, Taylor, Joseph, & Atienza, 2009). This article describes the first two recommendations.

### *Recommendation 1: New V<sup>3</sup>SK Model*

The new *Values<sup>3</sup>, Skills and Knowledge (V<sup>3</sup>SK) Model* highlights the essential prerequisites that teachers need in order to meet the challenges of the 21st century classroom. It comprises three value paradigms as well as the requisite skills and knowledge that teachers need. The model also represents the philosophy underpinning the design and delivery of teacher education at NIE, which puts the learner at the centre of the equation.

### *Recommendation 2: GTC Framework*

The *Graduated Teacher Competencies Framework (GTCF)* articulates a set of professional standards or benchmarks for all who graduate from NIE’s teacher preparation programmes. It specifies the competencies that teachers should be equipped with at the point of graduation. The GTCF also serves as a developmental framework to guide

teachers in further strengthening other competencies through the course of their teaching career.

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# MATH ED

## Real-life math in the classroom

**“What does math have to do with my everyday life?” your student might ask. To some, solving math questions has no relation to the problems they encounter in their daily lives. But math questions that draw on real-life scenarios can help us appreciate the usefulness of math.**

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## Article highlights

- What is performance assessment?
- What are the benefits of performance assessment?
- How can we overcome some of the challenges of using performance assessment?

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One of the aims of math education is to teach students the value of math in their daily lives.

According to Math professor Alan Schoenfeld, well-known for his book *Mathematical Problem Solving*, many students feel that math has little or no relation to the real world (cited in Fan et al., 2008). Many also mistakenly assume that there can only be one answer to any math problem.

Consider this question:

Mrs Lim intends to take her class of 50 students for a river cruise. There are two types of charges: The big boat, which can carry 6 people, charges a fare of \$10 per boat; and the small boat, which can carry 4 people, charges a fare of \$8 per boat.

What are the possible options of renting the boats: (a) with a minimum cost; (b) with a minimum number of boats; (c) with a minimum number of empty seats?

From your solution, choose an option of renting the boats that you think is the best.

(Source: Adapted from Fan, 2008, pp. 21 & 23)

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How many answers can you come up with? Does your answer include Mrs Lim joining the cruise?

This is an example of a performance task. There is more than one answer for this question, and more than one way to go about solving the problem.

### What is performance assessment?

Performance tasks are used in *performance assessment*. The math tasks are usually open-ended and authentic. They use real-life scenarios to assess students' learning and often have more than one solution.

"Such tasks cannot be answered by simple recall," explains Associate Professor Fan Lianghuo, who teaches math education at NIE. "Students need to explore and engage in processes such as looking for patterns, gathering data, and logical reasoning."

Performance assessment is useful for gathering data on students' learning. Lianghuo was interested to find out how such assessment can affect students' learning of math.

### Alternative methods of assessment

In recent years, greater emphasis has been placed on developing students' skills in problem solving, higher-order thinking, co-operation and communication.

Traditional methods have been useful in assessing recall of knowledge, often acquired through rote learning. But these methods have been found to be inadequate in testing areas such as students' learning processes, interests and appreciation of math.

Lianghuo says that when using traditional assessment methods like MCQs, the teacher may not know if the students' thinking processes are wrong, even though they get the right answer.

"Teachers need to know their students' thinking processes," he emphasizes. "That's where performance tasks come in. When students do performance tasks, teachers can understand their students better—their thinking processes, their weaknesses, their strengths—so they can make informed instructional decisions."

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### A study of new assessment strategies

Lianghuo and team were interested to find out how new assessment strategies can affect students' learning of math and how they can be effectively used in math classrooms. They studied its implementation in 8 primary and 8 secondary schools over a period of 3 semesters.

Four alternative assessment strategies were explored: *performance assessment*, *project assessment*, where students work on project tasks; *student self-assessment*, where students reflect on and evaluate their learning; and *communication assessment*, where they

communicate what they learn through journal writing and oral presentations.

Although getting started was challenging, it was found that given enough support and help, teachers were able to implement these assessment methods.

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### The benefits

According to research, higher-order thinking processes and problem-solving skills can be better assessed by performance assessments (Fan, 2006).

The teachers in this study found that complementing their teaching with performance tasks helped them gain an understanding of their students' learning.

The students also enjoyed doing the performance tasks. They had to apply different methods to solve the problems, which helped them develop their creativity in problem solving.

These methods helped develop their higher-order thinking skills, and they were able to use these tasks to reflect on their own learning process. (Fan et al., 2008)

### The challenges

As with any new method, however, the students and teachers encountered several challenges.

- **Time constraints**  
Finding time to implement this method was an issue as teachers are constantly under pressure to complete the syllabus.  
  
Teachers should decide on the frequency of using these tasks and implement them gradually into their teaching to avoid a sudden increase in workload.
- **Lack of resources**  
Although the resources available online are growing, there is still a lack of resources suitable for the local context. Teachers can work together to develop these materials.  
  
Lianghuo recommends attending professional workshops and seminars, such as those organized by NIE's Math department, to gain knowledge on how to design these tasks.
- **Feeling lost**  
A number of students found some of the tasks too challenging, and some felt lost when doing these tasks (Fan et al., 2008). "Students may have no idea what to do, especially at the beginning," explains Lianghuo.  
  
"Teachers must make their expectations clear and show them how they can approach the task," he suggests. "At the later stage, they should give their students more freedom to be more independent."

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## Worth it all

“Schools need to create a culture that encourages the use of performance assessment,” stresses Lianghuo. Already, some schools are using performance tasks in their continual assessments. Increasingly, such questions are also being included in the PSLE.

The benefits of performance assessment may not be immediately evident in the exam results, but Lianghuo assures us that these efforts are worthwhile.

“Using performance tasks, students can appreciate the relevance of math in their daily lives,” he says, “and they can show creativity and make their own decisions.”

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# LANGUAGE ED

## Using popular culture in the primary school classroom

By Koh Guat Hua

*Our students are exposed to television programmes and computer games daily. Yet, it is not something that often features in school, especially in the Primary 1 classroom. Perhaps it is time teachers consider the use of popular culture to enhance learning in the language classroom.*

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## Article highlights

- What are the different profiles of Primary 1 children?
- How do primary school children engage with popular culture?

- How can popular culture be used in the primary classroom?

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Primary 1 teachers know that young children are differentially prepared for school when they enter primary school. A brief description of five preschool children illustrates this point:

- **Emmanuel** loves reading and possesses a wide vocabulary. For example, he is able to describe the owl as a “nocturnal” animal. He can effectively describe the effects of brain waves. He plays language games on the computer and watches DVDs of his favourite movies.
- **Laura** is deeply immersed in popular culture. She loves stories about princesses, mermaids and Barbie dolls. She spends a lot of her time at home watching television while doing art and craft work.
- **Callie** loves reading. When she was in K2, she was already reading stories written by Enid Blyton. When she is not reading, she spends a lot of her time doing exercises from assessment books. She hardly watches television.
- **Finn** attends several tuition classes in English, Math and Art throughout the week. Much of his time at home is spent completing homework assigned by his tuition teacher and mother. When he reads books, a lot of effort is spent understanding individual words.
- **Zan** attended a neighbourhood kindergarten. When he is at home, there is nothing for him to do. As a result of that, he spends most of his time watching television. His parents do not interfere with the way he spends his time.

## The Primary 1 classroom

In any Primary 1 classroom, there would be a combination of “highly proficient” students like Emmanuel and Callie, as well as “high support” students like Zan and Finn (Unsworth, 2001). Laura seems to represent the average student.

How then do Primary 1 teachers customize their lessons to meet the needs of students with varying proficiencies?

As a start, teachers could try to learn more about their children’s common interests.

One thing these five children have in common is their interest in the use of the computer. Another area that they have in common is their engagement with popular culture—television programmes, computer games, movies, storybooks and comics.

There may be some teachers who object: “What? Popular culture?” Technology, “Yes.” But popular culture, “No!”

Popular culture seems to belong to the category of “things that are considered objectionable” in the classroom, even today. But a combination of popular culture with

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technology presents teachers with a potentially powerful pedagogical tool.

### Why popular culture?

Children do learn a lot from popular culture, as evidenced by these five children.

Emmanuel was already able to produce an imaginary running commentary on a “grand tournament” when he entered Primary 1. He was able to do this because of his exposure to *Knights’ Kingdom*, a popular online game.

Laura knows the names of the Barbie characters and various place names. She even knows the meaning of the phrase “The First Lady of America”—the name of one of her Barbie dolls. She is able to talk about her dolls at length with adults.

Callie only came into contact with popular culture when she was in Primary 2, when she was given a *Tamagotchi* digital pet as a present. Through learning to care for the digital pet, she has learnt to read the instruction manual.

Finn started reading the story *Cars* after watching the movie of the same name. He is also able to pronounce the character names found on the *Pokémon* cards. He understands the rules of the game and plays it with his younger brother.

Zan learns a lot through watching television. Usually very quiet, he would try to describe specific scenes in his favourite shows using his limited command of English.

### Popular culture in the classroom

How then can we make use of popular culture in our primary classroom?

Let’s take, for example, a current favourite among young children—the popular cartoon series *SpongeBob SquarePants*.

While there are some characters in the cartoon who are rude and could influence children negatively, there are enough positive elements in the programme which teachers could use.

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### The case of *SpongeBob SquarePants*

We can use *SpongeBob SquarePants* to teach children to be critical viewers. Children can be challenged to identify rude behaviours they see on the screen, asked to explain why they consider the particular behaviour as being rude, and encouraged to provide polite alternatives.

The *SpongeBob SquarePants* website <<http://spongebob.nicksplat.com>> also provides opportunities for teaching literacy. Most children enjoy learning “big words” and using them in their writing. Teachers can select video titles that lend themselves to teaching vocabulary.

Introducing the word *crustacean*, and then having the children view a snippet from the episode “Mid-Life Crustacean”, for example, will surely make the word more meaningful than simply writing it on the whiteboard.

Children who remember the content of certain episodes could be called upon to recount the story to the class or to each other. Those who are able to write extensively can even produce the story in their own words for their classmates to read.

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The vast amount of knowledge that children acquire outside of the classroom is known as their *funds of knowledge* (González, Moll, & Amanti, 2005). Teachers can make use of these funds of knowledge as springboards to their English Language lessons.

In this case, by using something the children are interested in, such a popular cartoon, they are exposed to the use of language, a range of vocabulary, and a variety of genres.

Like it or not, many of our children are exposed to popular culture, and they become very excited when they discuss their favourite programmes. You may wish to try incorporating other forms of popular culture into your language classroom. You’ll be surprised how well your students take to it!

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## SCIENCE ED

### Bridging the classroom and the world

*Science education goes beyond teaching and learning. It’s also about understanding what is taught, and then applying it. As teachers, we hope*

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*that what we teach our students will be useful to them, even in their daily lives.*

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### Article highlights

- Can science education make a real difference in the lives of our students?
  - How can lessons on science and the environment be applied to their everyday lives?
  - Can we successfully make our students more environmentally conscious?
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We teach and we test, and hope that our students learn the lessons we seek to impart to them. But what are they really learning?

If an understanding of scientific knowledge is the aim, then many of us have been successful. But the application of this knowledge is also a key goal of the science curriculum (Ministry of Education, 2008).

Assistant Professor Kim Mijung from the National Institute of Education says that science education can provide students “with a means of linking what they learn in science classrooms and their everyday world outside” (Kim & Roth, 2008, p. 516).

And science education gives us a unique opportunity to help our students make this important link. Through the science classroom, we are able to “address the importance of the *practice* [emphasis added] of scientific knowledge in real life situations” (Kim & Roth, 2008, p. 521).

Lessons on science and the environment is one area in which we can show our students how to practise science. But “environmental knowledge alone is not sufficient to bring about pro-environmental behavioural changes” (Kim & Roth, 2008, p. 521).

How can we make these lessons come alive to students?

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### Redefining science education

When we think of science, we often think of physics, chemistry and biology. But science also covers topics like technology, the environment, and even society.

*Science, Technology, Society and the Environment (STSE) education* is the term used to describe this aspect of science education. This perspective broadens the way we look at science.

STSE highlights the relationships among these areas. It helps us see how science affects our lives outside the confines of the classroom or laboratory, and how it relates to our environment, the society they live in, and our daily lives.

This idea is not new to us. Our science curriculum does include ideas of nature, technology, how science affects our society. But when we consciously teach with this outlook, we excite our students to discover the possibilities of using science in their everyday lives.

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### Minds on, hearts on, hands on

In recent years, environmental issues have become a hot topic in the science classroom and in society. One Singapore primary school is providing its students with opportunities to think critically about and act on their knowledge of caring for the environment.

Zhenghua Primary School has implemented a “Care for the Environment” programme since 2001. They want their pupils to become good and useful citizens with a strong sense of social responsibility. This is expressed in caring for the environment.

Says Mdm Lim Min Chern, Head of the Science Department, “When we show the young how easy it is to care for the environment, through simple yet concrete actions, we can all make environmental consciousness a way of life.”

To this end, Zhenghua Primary has launched several initiatives to promote environmental consciousness. These initiatives align with what the pupils are learning about the environment in the Science and Life Science curriculum, which is also in line with the Singapore Green Plan 2012.

The school believes that the pupils should take an active ownership when it comes to caring for the environment. They have adopted a multi-pronged approach to raise awareness (*Minds On*), encourage participation (*Hearts On*) and involvement (*Hands On*).

Pupil volunteers are appointed as Environmental Champions (ECs) and Green Ambassadors (GAs) of the school and classes, respectively. They serve as role models to other pupils in environmental activities like:

- practising the 4Rs—Reduce, Reuse, Recycle and Recommend
- reciting the Zhenghua “Green Pledge” at assembly and “green” events
- leading weekly sharing sessions with the teachers
- looking after a plant as a class or group

The teachers are also actively involved in facilitating and modelling this environmental consciousness.

Min Chern believes that these programmes help the pupils to link what they are learning in the classroom to what is going on in the world around them. And so far, the response has been positive.

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## Making an impact

To ascertain how successful their efforts at cultivating environmental consciousness have been, the school engaged the help of Mijung.

Mijung has been involved in a comparative study of young people's understanding of environment issues across three countries. In her survey of the pupils at Zhenghua Primary, the ECs and GAs (referred to as the Eco-group) were compared with the general school population (the non-Eco-group).

The survey measured two dimensions of environmental consciousness: *belief* and *willingness to act*. Based on the survey data, Mijung found that those who are actively involved in environmental activities (the Eco-group) showed a significant difference in their beliefs and willingness to act on their beliefs.

The Eco-group was keen to recycle, to plant more trees, and to be energy efficient, among other things. And they would readily recommend that others make an effort to conserve the environment as well.

Mijung's findings matched the findings from a survey by the National Environment Agency on the "Knowledge, Attitude, Beliefs and Practices" of Zhenghua's pupils with regard to issues on climate change.

The survey findings confirm that the school is on the right track. By raising awareness of environmental issues and enabling the pupils to act on this knowledge, their attitudes and behaviours have become "greener".

## Beyond the classroom

Learning science can be more than just gaining knowledge. It can be used by students to improve the environment and continue in responsible efforts to care for their society.

The pupils at Zhenghua Primary are clearly conscious of this. Says Min Chern, "It is heartening to see and to know that we had somehow helped the pupils appreciate the environment more."

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## HOT TOPIC

### Leadership and its relationship with teaching and learning

*Running a school today is a complex affair. And it's not just the responsibility of school administrators and leaders. Even teachers are expected to take up the mantle of leadership. Professor Clive Dimmock gives us a summary of what we know and don't know about leadership and how that relates to teaching and learning.*

The last 20 years have seen a remarkable turnaround in the acceptance and authenticity of research results showing connections between leadership and improvement of student outcomes.

### What we know

We now have evidence confirming that leadership can make a considerable difference to the learning and achievement of students (Robinson, Lloyd, & Rowe, 2008). Leithwood (2006), for example, reports that of all the school factors contributing to student learning, leadership comes second only to the quality of teaching in its effect.

For leadership to contribute to learning outcomes, it needs to be of a certain type and conform to certain dimensions. Here are some of the things researchers have found:

- Leadership must focus on teaching and learning, rather than just on other administrative and management tasks. This form of leadership is traditionally called *instructional leadership*. Other names include *learning-centred leadership* (Dimmock, 2000), *leadership for learning*, or *leadership of teaching and learning*.
- Leadership appears to have greater effects on teaching and learning if it is not monopolized by the principal, but distributed across other senior- and middle-level leaders in school, even teachers (Leithwood, 2006). In other words, leadership makes a larger contribution to teaching and learning if it is seen as a process that can be grown, shared and distributed.

- For leadership to be effective in improving student learning, it matters what practices principals and other school leaders focus on, even within the instructional domain. For example, it was traditionally thought that time spent by the principal in classrooms, or the number of visits made by the principal to classrooms, is an effective instructional practice. Recent evidence suggests, however, that it is what the leader does qualitatively as a result of classroom visits—particularly in terms of evaluating and giving positive feedback to teachers—that really matters, not the time spent.
- The higher the hierarchical position of the leader, the greater the likelihood that effects on teaching and learning will be indirect. The converse is also true: the lower the hierarchical position of the leader, that is, the closer they are to the class, the more direct the effects of instructional leadership.
- Of all the leadership practices, the largest effect on student outcomes, according to Robinson et al. (2008), is “promoting and participating in teacher learning and development”. This is followed by two other practices: “establishing goals and expectations” and “planning, co-ordinating and evaluating teaching and the curriculum”.
- Research on principal leadership confirms mostly small, indirect effects on student outcomes (Hallinger & Heck, 1998). The leadership practices with greatest effect on student achievement were: “establishing shared academic goals”, “building social networks and structures that enable goal achievement”, “being directly involved in instructional supervision and support”, “building teacher capacity and providing high quality teacher learning”, “caring for staff as individuals”, and having “good problem-solving and conflict resolution skills”.

### What we don't know

If we aim to maximize the efficacy of leadership practices on student outcomes, then we need to clarify which leadership practices strongly connect to specific effective teaching and learning behaviours. Research designs that focus on, and measure, those particular leadership practices are thus needed.

These are some of the areas where we need to devote more research effort:

- Although we are confident that the more leadership is distributed in schools, the larger is its effect on student achievement, research is still in its infancy as to what form distributed leadership should take.
- Research evidence points to “promoting and participating in teacher learning and development” being the most important leadership influence on

student outcomes. One way in which this might be done is through professional learning communities. But what form and composition should they take? How should they function? Are some forms more effective than others?

- Generally, it seems clear that leadership effects are mediated through teachers and teaching to improve student learning and outcomes. A key implication is how leaders motivate and inspire teachers to improve the quality of their teaching. Leader motivation of teachers is thus an important and promising area for further research.
- The relative absence of leadership research cross-culturally—and in Asia, specifically—means we have little idea whether the positive effects of processes such as distributed leadership apply equally to traditionally hierarchical cultures and organizational structures such as those found in Singapore. And if it does, how does the form of leadership need to change in order to accommodate Singaporean and Asian cultures?

Leadership research in Singapore schools to date has been largely non-existent. It is for this reason that NIE hopes to launch a major research programme this year.

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