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Numeracy & Environmental Awareness of Kindergarten Children in Singapore

Pamela J. Sharpe



Introduction

This paper highlights some of the major features of the new kindergarten curriculum, in particular the learning areas of numeracy and environmental awareness. In doing so, some reference will be made to the curriculum framework with its emphasis on the desired outcomes for preschool education and the six key principles upon which the curriculum is based. It will be evident that a more interactive, holistic approach to active learning has been adopted in the overall integrated design, with a supportive learning approach provided through opportunities for structured play, observation, investigation, and discovery. This new approach to learning is evident in the provision for six areas of learning experience: language and literacy, numeracy, creative and aesthetic awareness, environmental awareness, self,

social, and health awareness, and motor skills development.

Background to the content and organisation

Until quite recently the aims of pre-school have focused on bilingualism and preparation for primary one, with the content of kindergarten classes in pre-schools linked to an academic-type curriculum, typically stressing a subject centred, teacher directed, and achievement-orientated environment.

Individual childcare centres, catering to children, from below 2, to 6 years of age including children in kindergarten classes aged between 4 and 6 years, have been encouraged to maintain their own goals and philosophies about the care and education of children and are required to follow guidelines provided by the Ministry of

Community Development and Sport for licensing purposes.

The Ministry of Education, licenses kindergartens, monitors the physical standards and is responsible for the registration of teachers. However, it does not plan to assume total responsibility for kindergarten education, which continues to be provided independently by the private sector and community groups. Kindergartens have been free to maintain their own goals and philosophies about the care and education of young children and until the recent publication of the new Pre-school Curriculum Framework (2003), the Ministry of Education has provided curriculum guidelines for the education of kindergarten children between the ages of 3 and 6 years.

During the period January 2001 to November 2002, the Ministry of Education initiated a pilot project with early childhood experts from the National Institute of Education, to ascertain how this provision could be improved. The project focused on features such as the desired outcomes of pre-school education, the design of a new

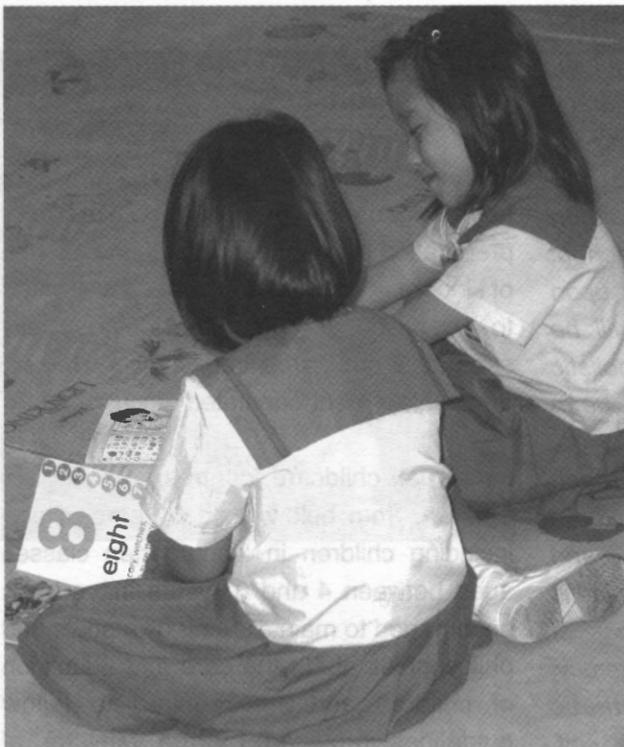
curriculum framework, the improvement of teacher quality and regulatory quality. In addition, a longitudinal study is continuing into the benefits of the new curriculum for children's learning and development as they progress through primary school.

The pilot project aimed at improving quality pre-school provision in non-profit making centres and especially those catering to children from lower socio-economic and non-English speaking backgrounds. In addition, the pilot project involved around sixty pre-school teachers who received training at the National Institute of Education on the preparation of teaching resources and the delivery of the new curriculum to the children in the selected centres.

The New Curriculum Framework

In line with the policy of strengthening Singapore's human and social capital through its education system the purpose of pre-school education has been redefined to prepare children for life-long learning where global mindsets and strong national values will be nurtured. No longer is the focus on an academic curriculum with a stress on bilingualism to prepare children for primary school. Instead, children will experience a curriculum based on six principles, which aim to foster holistic development, and the desired outcomes of pre-school education have been identified for this purpose. Hence, by the end of their pre-school education children should:

- Know what is right and what is wrong
- Be willing to share and take turns with others
- Be able to relate to others
- Be curious and able to explore



- Be able to listen and speak with understanding
- Be comfortable and happy with themselves
- Have developed physical coordination and healthy habits
- Love their friends, families, teachers, and school.

Provision is made in the curriculum for experiences in areas of:

- Aesthetics and creative awareness
- Language and literacy
- Motor skills development
- Numeracy
- Environmental awareness
- Self, social and health awareness

The teaching approach is integrated providing opportunities for meaningful interaction and play across six curriculum areas. Children experience both large and small group as well as individualized activities. Teachers are encouraged to be supportive in providing for children's holistic development and learning and development and to monitor their aural and oral skills, social skills, and creative and problem solving skills. Childcare centres and kindergartens are encouraged to follow the new curriculum.

The new curriculum framework provides the basis for the teachers' handbooks and is published in the form of an introductory booklet with links to guidelines for implementing the curriculum: Putting Principles into Practice. Each of the six handbooks for teachers, correspond to each of the six areas of experience (Ministry of Education, 2003). Features of the development of two of these areas will be described in more detail here.

Curriculum experiences – numeracy

The term “numeracy” is used to describe the processes involved in using numbers in ways that relationships and connections are made, and in awareness of a system of signs and symbols in real-life situations, and when children are engaged in mathematical activities.



In observing responses of some kindergarten children to the original numeracy syllabus (Sharpe 2002), it was observed that most children were conditioned into the completion of worksheets after instruction and were unable to transfer any learning to the same tasks when worksheets were replaced.

Most activities in the workbooks and worksheets required the completion of written tasks where instructions were vague and where teachers assumed the role of explaining the requirements of the worksheets rather than teaching and guiding emerging mathematical understanding. For example, children frequently miscounted when asked to count and give or share a number of objects. They confused ordinal numbers with cardinal numbers: when asked for 1st, 2nd and 3rd, children often described order in terms of numbers 1, 2 and 3. The “third” object was often seen as the “last” even when there were more than 3 objects. “Next” and “last” were often confused.



Children experienced great difficulties with the use of coins. For most of the children in the study, all coins were assumed to be one cent, where 50 cents were seen as the same value as 50 dollars. Whilst many children could identify coins they couldn't combine them to buy items or know how much change would be expected.

Manipulating numbers and handling coins involve the same kinds of part-whole relationships and combinations with whole numbers, yet few children had experience with coins in the real world and rarely were activities with manipulatives understood in the same way as with the worksheets.

To ensure understanding of numbers, the system of signs and symbols, and their relationships and connections in real-life situations, the numeracy area of the new curriculum was created to correspond to the naturally developing numeracy sequence which emerges and which needs to be guided through opportunities for play, exploration, investigation, and discovery. Teachers are therefore required to provide manipulatives and real-life experiences

where children will recognise and coordinate their use and understanding of numbers and their relationships.

New features include: the use of fingers, multi-link cubes, lollypop sticks, card and board games, number stories and number sentences using number and sign cards, coins and play money, non-standard units of measure, solid and plane shapes, the creation and completion of repeating patterns. These kinds of activities are vital if children are to be competent in using their emerging understanding of numbers, to manipulate numbers, shapes, and measurements, to notice and create patterns and relationships

and connections involving mathematical ideas in real-life situations.

As such, detailed guidance is provided in the numeracy handbook for teachers to create experiences and opportunities for children to move towards mathematical outcomes in practical ways where activities are linked to real-life events and challenges. Teachers are encouraged to monitor progress according to the sequence of numeracy development outcomes provided in the booklet.

Curriculum experiences – environmental awareness

This aspect is a new addition to the weekly curriculum and incorporates science and nature, geography, and history. In line with the curriculum framework, experiences are designed to build on children's ideas and interests so that they increase their understanding of the world around them. In addition, is a focus on the promotion of positive attitudes to learning about living and non-living things. Teachers are required to provide experiences for children

to observe, and where the holistic focus requires them to build on their senses and their thoughts.

Provision for hands-on activity enables play, exploration, investigation, discovery and prediction. The encouragement of oral and aural language enables descriptions, comparisons, measurements, judgments, and explanations to be elicited. These opportunities for interaction depend on teacher guidance and support and enable further opportunities for communicating and recording findings. Children are also encouraged to find relationships and connections which may include references to other areas of experience as part of the integrated organisation of the curriculum.

The environmental awareness handbook provides teachers with practical advice for selecting themes or topics, setting up experiments and investigations, organising and following up on field trips and creating and providing appropriate resources and materials to ensure children are engaged, interested and challenged.

Regulation and quality assurance

With this new curriculum frame work it is the government's intention to improve the quality of pre-school education especially in the non-profit centres. Whilst quality assurance is subsumed under licensing regulations for childcare centres, the new curriculum framework will provide all centres with guidelines for monitoring the effectiveness of teaching approaches, curriculum content, resources, and children's learning and development. For the new curriculum to be effective, the government recognises the need to provide teachers with continual opportunities for

professional upgrading. Hence, the new teacher training and accreditation framework, jointly administered by both ministries, is designed to support the continuing efforts to improve the overall quality of pre-school education.

Conclusion

The development of the new curriculum is a positive step in the improvement of quality of pre-school education in Singapore, and involves a range of professionals who are working closely with teachers in pre-school centres to test ideas, to monitor effectiveness of the plans, to review teaching approaches, to observe the communication, problem-solving and social skills of children, and to try out a range of resources. In such a short time-frame, some clearly observable changes have been recorded which augurs well for pre-school children in Singapore.

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