Part 3 12

Integrating numeracy and literacy: a case study

Lesley Lee and Marylin Low

While Marylin Low approaches literacy from a content and language perspective, where the learning of English must be tied to particular content areas, Lesley Lee has been preoccupied with the language of mathematics, or mathematics as a language, for a number of years. Towards the end of 2004, both authors were asked by Pacific Resources for Education and Learning (PREL) to commit to a two-year pilot project called ASCEND-Mindanao—Lesley Lee as the mathematics specialist and Marylin Low as the English specialist. The project involved them in a larger endeavour in the southern Philippines headed by Save the Children Federation. PREL was to work with a group of about a hundred educators from seven of the poorest school districts in the region to improve the teaching and learning of English, mathematics and science.

School visits and early work with the local educators—not to mention their own backgrounds and beliefs—led them to begin developing an integrated approach to teaching. Thus their work in the Philippines was the trigger and opportunity to bring together the two fields of expertise and to create an approach to integrating numeracy and literacy where communication and problem-solving are emphasised
The basics of learning

and embedded in everyday contexts. The approach they call PRIME—Pacific Region Integrated Mathematics and English—takes hold of what it means to teach meaningful and empowering mathematics and English in ways that take into account the needs and experiences of linguistically and culturally diverse learners. In this chapter, the authors provide a theoretical background from each of their perspectives and the principles and practices that grew out of it to become PRIME.

Pacific contexts

In most Pacific communities, mathematics is taught in English, a second or third language for many students. In some jurisdictions, such as Hawai‘i, the medium of instruction is English, the dominant language of the community, and English learners (ELs) are included in mainstream classrooms; in other jurisdictions, such as Samoa, indigenous languages are the language of home and community and most if not all students are ELs. Furthermore, in some island nations, schooling begins in the local language and transitions to English in grades 3, 4, or 5, depending on the language education policy. For much of the Pacific, school is the primary source for learning English.

The English of mathematics is not, however, everyday English. The language of mathematics, or the mathematics register, is considered a second language for all learners—all students can be categorised as mathematics language learners (MLLs). The school mathematics register, or the language of western mathematics, typically is not used in Pacific communities outside the school, where it may co-exist with or even be eclipsed by indigenous mathematics. Being an EL and an MLL makes learning school mathematics challenging. Additionally, classroom teachers who are fluent in English and the languages their students speak, as well as fluent in the mathematics registers of both languages and confident in teaching mathematics, are hard to find.

Up until this time, attempts to improve mathematics teaching and learning in Pacific schools have focused on mathematical content and pedagogy, including current reforms that aim to embed students’ mathematical learning in everyday situations and emphasise mathematical talk. Other interventions work on improving
students’ competence in English. While both interventions are necessary, the English of mathematics—the very narrow and sometimes unusual use of certain English words in the mathematical register, the new mathematics vocabulary, the symbolism and syntax of mathematics, the language of hypothesising, conjecturing, generalising and proving—is not typically addressed. While the second language field has developed and implemented language and content approaches across disciplines with considerable success in Canada and on the US mainland, and the language of mathematics has been explored in the field of mathematics and education research, few have taken an interdisciplinary perspective.

Why integration?

Language and content within second language education

Language and content approaches have developed rapidly in the last decade in response to two major shifts in North American classrooms: a dramatic rise in the number of ELs in school and the growth of foreign language programmes and immersion classrooms. Research on immersion contexts closely matches environments in the Pacific, where the language of instruction is not the language of the community. Although immersion programmes have a double goal of both language and content learning, the majority of immersion research has focused on language learning. What we have learned from this research in Canada and the United States is that a language and content approach is more effective than teaching language in isolation (Mohan, 1986, 1990; Swain, 1996).

Key to language and content approaches is a focus on relating form (grammar) and function (meaning). In language and content classrooms, language is used in the service of other learning, with planned integrations of content and language that promote culturally contextualised teaching practices. Language and content teachers are concerned with the functionality of language and the need to take advantage of the learners’ communicative environment. They use a number of pedagogical strategies and techniques: student grouping strategies; active participation in concrete task-based or experiential, inquiry-based learning; graphic organisers; and a whole language approach (Crandall, 1992). In her research, Short (1993: 595) studied the language and content of social studies
classrooms, defining the academic language of social studies broadly to include, “[s]emantic and syntactic features (such as vocabulary items, sentence structure, transition markers, and cohesive ties), and language functions and tasks that are part of social studies classroom routines”. Mohan (1986, 1990, 2001) claims that linguistic content is inseparable from linguistic expression and offers the notion of knowledge structures as an organising framework for language and content integration. It is a view of functional grammar in which context (content) and language relations play a central role.

Effective language and content teaching and learning includes explicit and intentional use of language to learn about subject matter and a supportive, risk-taking environment. Models of language presented are understandable to the learner and provide new ways of constructing and extending meaning through peer and teacher interaction that is structured into daily activities (Echevarria, Vogt & Short, 2004; Calderón & Minaya-Rowe in press; Gibbons, 1993, 1998, 2002). Focusing on content alone in the content classroom makes language the invisible curriculum. Teachers, aware of the language they use, deliberately create opportunities for students to hear and use it in the construction of their own content knowledge—language becomes a routine aspect of lesson-planning and teaching and learning in the content classroom. The dynamic nature of language and content provides students with an opportunity to learn what is most relevant at that time (language and/or content) while being fully engaged in learning activities and challenged at an appropriate conceptual level.

Mathematics and language

Many mathematicians and mathematics educators claim mathematics is a language—with its forms, functions and meanings, and its highly developed syntax and rather narrow semantics (Lee, 1997). The language view has served mathematics educators well, since it has allowed the community to become more aware of the nature of the mathematical language—or mathematics register as it is generally referred to—and the complexities of teaching and learning it.

Halliday (1975:65), a sociolinguist, defines a register as a ‘set of meanings that is appropriate to a particular function of language, together with the words and
structures which express these meanings’. Schleppegrell (1998), using a functional grammar analysis of science, and Gibbons (1998), using scaffolding student-teacher interactions in content classrooms, are two examples of register-based research approaches to the study of more formal school registers by English learners. Pimm (1989), a mathematics educator, devoted a large part of his book, Speaking Mathematically, to an analysis of the mathematics register. Some important characteristics of the mathematics register are:

- specialised words rarely occurring outside mathematics (multiplicand, parallelogram, asymptote, isosceles, hypotenuse…)
- words taken from everyday English but given restricted or new meaning (diagonal, straight, equality, face, degree, relation, power…)
- phrases or ways of putting English words together to produce new meaning (simultaneous equations, absolute value, right-angled triangle, square root …)
- modes of arguing and proving (reductio ad absurdum, induction, deduction, use of counterexamples …)
- particular sentence constructions characterised by greater use of the passive voice (a line is drawn to bisect…), gerunds (addend, integrand, multiplicand…), a range of imperative forms (let, suppose, define, consider…)

Written mathematics has additional peculiarities; it is not just spoken mathematics written down in words. By middle school, students in mathematics are expected to use a highly symbolic and succinct notational form which includes the use of letters of the alphabet as non-alphabetical symbols, the use of Greek letters as fixed constants (π for the fixed ratio of a circle’s circumference to its diameter), variables (3α + 2β) or abbreviations for operations (Σn for the sum of the numbers from 1 to n), the positioning of numbers and letters as superscripts (sometimes to indicate powers or exponents) or subscripts, and a whole collection of symbols for operations (=, +, ÷) and relationships (≥, ≈, ≠).

Pimm (1989: 88) states that ‘Most math classes are conducted in a mixture of the registers of ordinary English and mathematical English, and failure to distinguish between these two can result in incongruous errors and breakdowns in communication’. Pimm claimed that teachers are often not aware of moving from one register to another and do not appreciate the pitfalls for the learner.
In 1994, the National Council of Teachers of Mathematics (NCTM, 1994) published a position statement on language minority students, which essentially says that “cultural background and language must not be a barrier” to the study of a full curriculum in mathematics. The NCTM (1989) goals for mathematical literacy are that students: learn to value mathematics, become confident in their ability to do mathematics, become mathematical problem solvers, learn to communicate mathematically, and learn to reason mathematically.

What numeracy and literacy integration looks like

PRIME is an example of a language-focused approach to improve the learning and teaching of mathematics. It is based on the four key principles offered below. These are followed by an outline of an integrated lesson that puts these principles into practice.

1. The mathematics classroom provides a comfortable/risk-taking learning environment.

   In order to facilitate learning by all students, teachers must also be perceptive and skilful in analysing the culture of the classroom, looking out for patterns of inequality, dominance and low expectations that are the primary causes of non-participation by many students (NCTM, 1991: 34).

   Certain rules of classroom behaviour involving active participation, listening and mutual respect need to be established and sustained. If learners feel supported and secure, they will be willing to risk using their language resources to make mathematical meaning; if they feel comfortable, they will risk sharing with peers and teachers their ideas about their mathematical work.

2. English is used in the service of learning mathematics, with planned integration of mathematics content and language.

   In the mathematics classroom the focus is on the mathematics and the mathematical tasks the students are engaged in. In the course of these activities, students need to
formulate questions, make conjectures, present solutions, and write for themselves or publicly. Words needed from the mathematical register or the school English register are picked up from peers, the teacher and written and electronic material. In other words, they learn the language of mathematics and of the mathematics classroom because they are immersed and engaged in a mathematical community of inquiry (Lee, 1996, 1997).

3. There are planned opportunities for meaningful, comprehensible interaction in the mathematics classroom (e.g. among peers, students and teachers).

The peer group is a powerful resource to the learner, providing a wide range of models of language use, and the need to communicate offers the learner strong motivation to use language in the mathematics classroom.

Students must talk, with one another as well as in response to the teacher. When the teacher talks most, the flow of ideas and knowledge is primarily from teacher to student. When students make public conjectures and reason with others about mathematics, ideas and knowledge are developed collaboratively, revealing mathematics as constructed by human beings within an intellectual community (NCTM, 1991: 34).

Peer interaction can be organised in multiple ways—small and large cooperative or collaborative groups—and different classroom organisations entail different discourse needs (Slovin, Zenigami & Venenciano, 2005). A classroom that uses a wide variety of peer interaction from whole group to small group organisations allows for the widest range of mathematical discourse. Teacher scaffolding\(^1\) makes explicit the academic register of school. Scaffolding interactions between teacher and student have a significant role in developing content, language and literacy within and across disciplines (Gibbons, 1998). Teacher–student interaction is also part of the ongoing and embedded everyday assessment teachers do in the classroom (e.g. observation and discussion, conferencing, discussions about task work). Such assessment practices help teachers learn about and act on the diverse strengths and needs of each child (Black & Wiliam, 1998; Low, 1999, 2003).
In classrooms where meaningful interaction occurs, models of language presented are understandable to the learner and provide new ways of constructing and extending mathematics meaning. Learners hear models of literacy that will extend their own language use and meaning making. Such models include scaffolding and recasting\(^2\) strategies in support of language and mathematics learning, and offer students multiple representations of meaning (e.g. experiential, graphs, charts, visual, oral, print, technology) that they can explore, manipulate, and create anew (Calderón & Minaya-Rowe in press; Echevarria et al., 2004; Gibbons, 2002; Low, 1999, 2003).

4. **Learners have opportunities to be mathematics ‘problem solvers’ rather than ‘information receivers’**.

Students need to have opportunities to be ‘problem posers’ as well. The central activity of problem solving and problem posing in the mathematical community is the cornerstone of the NCTM’s *Principles and Standards for School Mathematics* (2000). Besides recognising the central role of problem solving (routine, non-routine, open-ended) in all students’ learning, the NCTM recognises its crucial role in the development of mathematics discourse:

> The teacher of mathematics should promote classroom discourse in which students … use a variety of tools to reason, make connections, solve problems and communicate; initiate problems and questions; make conjectures and present solutions; explore examples and counter-examples to investigate a conjecture; try to convince themselves and one another of the validity of particular representations, solutions, conjectures, and answers… . (NCTM 1991: 45).

**Principles into practice**

At the end of this chapter there is an outline of a PRIME lesson, offering an example of a classroom activity that promotes integrated numeracy and literacy learning and is culturally contextualised. As part of a larger unit on comparing quantities, students in this lesson are learning to compare the areas of different types of locally found leaves in preparation for covering/protecting young
plantings in a taro patch. Language resources that teachers model and students apply in carrying out the task are highlighted. Teachers use oral strategies to develop students’ fluency in their use of mathematical language and English. Such fluency requires frequent and deliberate uses of language in mathematics activities. Working orally in groups on problem-solving tasks, such as the one on comparing area, invites students to talk like mathematicians. Extensions of this activity may involve writing and/or visual literacy, where students write and/or illustrate the mathematics they are learning. It is one way for students to learn what constitutes clear, valid mathematical communication.

Bringing together a language and content approach from the field of second language education and a mathematics and language perspective from the field of mathematics education offers a powerful and dynamic way of teaching and learning mathematics in the Pacific. Multiple and planned opportunities to talk and write mathematics within and beyond culturally contextualised tasks is a vital process for student learning. To create these conditions, teachers must develop a deep and substantive knowledge of mathematics, including its register, and of the culture and language of their students. They must use this knowledge to find or develop tasks that are both mathematically sound and culturally contextualised. It is hoped that teachers’ use of an integrated curriculum will begin to create such conditions in the classroom.

Conclusion

Using a case study approach, we have provided an example of how the Pacific Regional Integrated Mathematics and English approach can work in the Pacific region. This language-focused approach can be taken to improve the teaching and learning of mathematics. In as many ways as possible, teachers and teacher educators in the fields of English (or vernacular) literacy and mathematics education are encouraged to integrate literacy and numeracy in their work.
Task: Compare the areas of these two leaves.

This comparison can be set in a context of choosing what type of leaves to use to cover/protect plantings in a Taro patch (where the leaf that covers the biggest area is preferred).

Is the area (B) of the broad leaf greater than, less than, or equal to the area (T) of the thin leaf?

Or

Which of the following is true?

B > T  B < T  B = T

Are there any conjectures? How can we test our conjectures?

Here is a list of available materials to use in our investigation:

1. Scissors and glue
2. String and 30 cm. wood ruler
3. Plastic cubic centimetres
4. Pennies or one cent coins
5. Triangle & rhombus pieces from a set of pattern blocks
6. Square grid paper

Six teams form around the six materials and work on accomplishing the comparison task (testing conjectures, answering the question).

A plenary session follows where each team presents its work and answer to the question. Because the leaves are very close in area, teams may vary on their answers. A discussion follows on the advantages and disadvantages of the different materials and which team’s answer might inspire more confidence.

The materials used by the second team (string and ruler) give rise to some interesting discussions if the team used the string to compare perimeters. The relationship between perimeter and area can become the subject of another lesson. Question: If the perimeter of one leaf is bigger than the other, is its area bigger too?
Teacher draws attention to ‘mathematics talk’ by modeling and encouraging students to use such talk as s/he pushes them to explain their thinking and how they figured out the answer to the question.

**Comparison structures & symbols:**
is greater than (>), is less than (<), is equal to (=)
Words and their symbols are written on the board or chart paper and students are encouraged to use them. Other comparative forms using ‘er’ are modeled:

B is larger than T    T is smaller than B

**Conjecturing** requires students to make an ‘informed guess.’ In this task, the conjectures describe. For example,
I think B is larger than T
T is smaller than B
They have the same area.

Note the use of ‘to be’ and ‘to have’ verb forms. Present tense is used in conjectures of this type. In other tasks, students might need to use an ‘if…then’ form of conjecture.

**Testing conjectures** requires the use of a variety of imperatives:
Cover the leaf with these coins. Count them.

**Vocabulary** may include, for example, mathematics words in English that have no equivalent in the local language or that translate in two or more ways.

**Collaborating** to complete the task requires students to use language to:
- make polite requests (please pass…)
- take and give turns (Tero, what do you think?)
- clarify (Can you please repeat.)
- questioning (What do we do with the gaps between pennies?)
Notes

1. **Scaffolding** is the temporary assistance by which a teacher/mentor helps a learner know how to do something, so that the learner will later be able to complete a similar task alone. It is future-oriented: what a child can do with support today, s/he can do alone tomorrow. Vygotsky (1978) suggests that ‘good learning’ is learning that is ahead of actual development. Implications for ELs suggest that rather than simplifying the task to reduce the language load, teachers should instead reflect on the nature of the scaffolding (of language and content) that is being provided for learners to carry out that task.

2. **Recasting** is a strategy used in oral interactions wherein the teacher/mentor corrects and/or paraphrases student speech. Corrective recasts repair form, making speech more literate. Paraphrased recasts address meaning in discourse

**References**


Eutia moa mai nanoa¹: navigating currents of literacy and numeracy in the Pacific

Teweiariki Teaero

We treasure the diversity of the Pacific and seek a future in which its cultures, traditions and religious beliefs are valued, honoured and developed (PIFS, 2005:2).

Introduction

When a group of Pacific Island academics, curriculum developers, policy makers, teachers and representatives of other interest groups gathered in a one-week workshop at Sia’atoutai in Tonga, from 24 – 31 May 2005 to engage in re-thinking the learning and teaching of literacy and numeracy in the Pacific, they looked critically inwards to identify strengths that could form the basis of new policy, curricula and pedagogy. In the process, they impregnated the brilliant Tongan (and, by extension, Pacific) sunshine with optimism, encouragement and excitement. Many of them experienced an exhilarating sense of empowerment and emboldment as they deliberated on matters that, potentially, stood to re-route the waa (Kiribati word for ‘canoe’) of Pacific learning to its rightful roots.

¹. The Kiribati title means ‘lift from within’.
As the participants interrogated and critiqued existing policy, curricula, pedagogy and assumptions pertaining to the learning and teaching of literacy and numeracy, some of them also felt needling undercurrents of apprehension because, after more than a century of being subjected to an education system that was premised on exogenous processes, worldviews and beliefs, the task of re-routing the waa of learning in literacy and numeracy to the Pacific sources was likely to be an epic voyage fraught with challenges beyond that ‘talkshop’. The sardonic verses of Ruperake Petaia (1980:10-11) in his ageless poem, *Kidnapped*, persistently and silently floated around the meeting hall as the participants heard ‘expert’ opinions and openly shared views and experiences. Perhaps Petaia’s verses are ringing louder and are more loaded with meaning today than when he first wrote them. Below is an extract from the poem.

**Kidnapped**

One day I was
kidnapped by a band
of Western philosophers
armed with glossy-pictured
textbooks and
registered reputations
‘Holder of B.A.
and M.A. degrees’

I was held
in a classroom
guarded by Churchill and Garibaldi
pinned-up on one wall
and Hitler and Mao dictating
from the other
Guevara pointed a revolution
at my brains
from his ‘Guerrilla Warfare’
The basics of learning

As rightly pointed out by several presenters at the workshop, such as Dr Bakalevu and Lice Taufa'aga, and others (Teaero, 1999; Pene, Taufe'ulungaki & Benson. 2002), one of the effects of Christianisation and colonisation in the Pacific region was the subjugation of indigenous Pacific philosophies, concepts and processes to exogenous ones. In the process, we grew (in the words of Petaia) ‘poorer and poorer’ and ‘whiter and whiter’ while the colonisers ‘grew richer and richer’. All Pacific societies have been, for a long time, thus significantly affected; most are still struggling to extricate themselves from these effects. The strong consensus that came out of Sia’atoutai was to expeditiously reverse the trend and re-emphasise Pacific values in education with a view to liberating ourselves from the tentacles of kidnapping in the form of colonisation and neo-colonisation.

Education and schooling are, as Konai Thaman (2002) has consistently argued, culturally specific and heavily laden with the values of the society that designed and delivered the curriculum. In the case of PICs, it was the Christian missionaries and colonial governments that imposed their values and processes on PICs and this has, as Petaia succinctly expressed in his verses, culminated in Pacific Islanders growing ‘whiter and whiter’. While schooling and Christianity have brought about many beneficial changes, these have also simultaneously brought numerous concomitant disappointments in education, as pointed out by several regional educators and educationists (Pene, et al. 2002). Sitting cross-legged at the heart of the matter is cultural incompatibility. Taufe'ulungaki (2002:15) sums it up aptly:

The failure of education in the Pacific can be attributed in large measure to the imposition of an alien system designed for western social and cultural contexts, which are underpinned by quite different values.

Taufe'ulungaki (2002:20) also asserts that:

... the western-derived developmental and educational paradigms which have been adopted by most Pacific countries have failed to achieve their expected outcomes. There is an urgent need, therefore, to explore alternatives based on other value systems. For it is from values and belief systems that social and cultural groups construct their world, create meaning, develop rules that
The Sia’atoutai workshop was, in many respects, an operationalisation of the ideas espoused by Taufeʻulungaki, Thaman and other Pacific educators (Pene et al., 2002; Taufeʻulungaki, 2005) in that, while focussing on literacy and numeracy, it represented a significant and complementary part of the broader pan-Pacific initiative by Pacific educators to re-think education in the region for Pacific Islanders with a view to embedding it in Pacific values. It is also consistent with the desires of Pacific Island leaders (PIFS, 2005).

The key ideas that came out of Sia’atoutai are highlighted in this chapter, the purposes of which are threefold. First, the major issues and challenges pertaining to literacy and numeracy that were identified by the participants are highlighted. Second, the implications of these issues and challenges are discussed in the light of emerging ideas and realities. Lastly, some initial pointers are provided to assist policy makers and practitioners in mapping and navigating ways towards desired destinations. Many of these suggestions are framed around proposals espoused by the participants at the Sia’atoutai workshop. Emphasis is placed on policy development, research, curriculum development and teacher education.

The key ideas

Several important ideas regarding the re-thinking of the teaching of literacy and numeracy in the Pacific emerged during the Sia’atoutai workshop. They can be categorised into six main areas, as follows:

1. The teaching and learning of literacy and numeracy in the region have been dominated largely by notions and practices that are alien to this part of the world.
2. The different cultures in the Pacific have unique ways of seeing and understanding their worlds and ways of solving problems for living, including ideas and practices in the areas of languages and ethnomathematics.
3. While not enough has been done to incorporate these aspects of Pacific indigenous cultures into the contemporary curriculum, pedagogy, assessment
and policy, there is evidence to show that it can be done and can significantly improve the teaching and learning of literacy and numeracy.

4. While there is a growing corpus of literature by Pacific Islanders on indigenous Pacific cultures, education and epistemologies in general and literacy and numeracy in particular, there is still much urgent need for more immediate and ongoing research into these areas.

5. It is best to pursue an integrated curriculum where literacy and numeracy, as well as other subject areas, co-exist.

6. Pacific cultures are dynamic and the sense of identity is always shifting. This needs to be appreciated and taken into account in any educational undertaking, including the teaching and learning of literacy and numeracy.

The participants considered these key ideas and their impacts on and implications for educational policy, curriculum, pedagogy and teacher education. These are reported in detail in earlier chapters of this book. In this chapter the major challenges and difficulties that need to be overcome, if the contextualisation of the learning and teaching of literacy and numeracy in Pacific schools is to be successful, are highlighted.

**Challenges**

There was overwhelming support from Sia’atoutai for both the importance of Pacific cultures and for these to inform and underpin the teaching of literacy and numeracy in the region. This intention and attempt to emphasise Pacific values and cultures in literacy and numeracy programmes in schools are perfectly legitimate but the implementation is bound to be fraught with a number of challenges, some of them substantial in nature. The major challenges that were identified at Sia’atoutai include:

1. a deep ingraining of western values in education systems in the region;
2. a still relatively limited understanding of our indigenous epistemologies and how these could fit into classroom practice;
3. the multiplicity of languages;
4. a lack of appropriate curriculum materials;
5. inappropriate training of teachers and a lack of systematic opportunities for staff development;
6. the absence of genuine political commitment, and
7. the onslaught of globalisation.

Formal education in the region has been relatively privileged. Ministries of Education in PICs have been consistently receiving the shark’s share of recurrent and development budgets, the average being approximately 20%. However, as Thaman (2002:22) has argued,

… despite heavy investments by Pacific Island governments and external donors, improved access at all levels of education, better contextualisation of the curricula, improvement in the training of teachers, educational reforms in the region, like that in other parts of the world, have had a disappointing record. The quality of education, as measured by various international agencies, remains low and the effectiveness of the education system is poor.

There is, apparently, a serious gap between these substantial investments, the expected outcomes and the eventual reality. The challenges facing PICs in using indigenous cultures and values in the teaching of literacy and numeracy are discussed below.

Deeply ingrained exogenous values and practices

In pre-contact times, Pacific societies did not have literacy as we know it from the schooling process. Neither did they conceive of mathematical ideas as conventionally conceptualised in the western sense. The Pacific Islanders’ various ways of dealing with language and materials serve important purposes that are directly related to daily living. Bakalevu (see Chapter 8) provides numerous examples of ethnomathematics from several Pacific countries that are quite complex. Taufaga (see Chapter 2) also provides many examples of rich linguistic traditions from the region. Pacific societies had and still have their unique ways of mathematising and their numerous languages (Lynch, 1993) are complex and rich. They have been developed over millennia and are used almost exclusively in the home to cater for and fulfil their users’ specific needs.
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In school, however, students have had to grapple with exogenous concepts in literacy and numeracy. This is akin to Pacific children being placed in a situation where they find themselves dancing simultaneously to two different songs.

Christian missionaries introduced basic literacy and numeracy primarily for the purposes of converting Pacific Islanders to Christianity and for simple counting purposes. They were very noble purposes but, as formal education developed over time, it became a tool for colonisers to assert and impose their alien values. Taufaga (Chapter 2) argues that:

… for too long Pacific learners have been coerced into learning practices incongruent with their ways of learning and knowing, one of the reasons being the sanctity of conventional schooling (Holdaway, 1979).

These values and practices have become so ingrained in the education systems—particularly the curriculum and pedagogy—as well as political, historical, religious and socio-cultural aspects of life in the region that it is bound to take a lot of time and effort to re-assert and re-centre Pacific values and practices. The deconstruction of modes of learning and teaching that have been successfully ingrained in the school curriculum, educational policy, pedagogy, assessment and mindset of generations of Pacific Islanders is bound to require a lot in terms of time and a reorientation and reconstruction of thinking and practice.

Relatively limited understanding of Pacific epistemologies

There was a feeling at Sia‘atoutai that the level of knowledge and understanding among Pacific Islanders of their indigenous epistemologies in general and literacy and numeracy in particular, and how these could be successfully incorporated into curriculum and pedagogy, is increasing but needs still more rigorous interrogation and exploration. The complexity of Pacific societies and their epistemologies (despite the erroneous assumptions by outsiders about their largely homogenous nature) as well as the fact that they have remained largely uncovered in research, renders them an expansive field for research. As pointed out by Lynch (1993), the Pacific is home to a phenomenal 25% of the world’s languages. There are also numerous elaborate and elegant mathematical ideas used in traditional Pacific
societies that are both effective and closely related to people’s ways of life (see Chapter 8). Unfortunately, the usage of these has been waning with the times and has been marginalised in the wake of western formal education, westernisation and globalisation.

To compound these problems, almost all of the earlier research into the lives of Pacific Islanders has been undertaken by outsiders. For various reasons, many of these well-meaning researchers have interpreted events, ideas and objects in the region in ways that are distorted at best and erroneous at worst. These misconceptions and misinterpretations by non-Pacific Islanders become understandable, given the insistence of some outside researchers to construct meaning using their exogenous analytical frameworks and framing observations of local Pacific phenomena against their own experiences. However, some foreigners have been credited with making invaluable contributions to the enrichment of the lives of people in the region, especially Christian missionaries who, among other contributions, gave the written form to our languages, thereby introducing western literacy and numeracy through formal education.

There has been an increase in the literature about various Pacific epistemologies over the last decade, written by indigenous Pacific Island educators and researchers (see Thaman, 2003; Nabobo-Baba, 2006; Mel, 1995; Huffer and Qalo, 2004). This renaissance of interest was spurred on partly by the dissatisfaction and disillusionment with education systems that persistently fell short of expectation (Pene, et al. 2002) and partly as a direct reaction to the onslaught of globalisation. Much of this research focuses on documenting the processes of indigenous education as well as the values that underpin these. Recently, many of these indigenous ideas have been explored even further with a view to using them in the framing of curricula in Pacific schools.

**The multiplicity of languages**

While the need to assert indigenous languages was accepted at Sia’atoutai, any attempt to be culturally democratic in terms of giving due attention to all the languages spoken in the region is bound to be a daunting challenge. The number of languages is formidable, as pointed out earlier. Countries such as Papua New
Guinea, Solomon Islands and Vanuatu have hundreds of different languages. The number of people who use the different languages in the region ranges from 200 in some parts of Solomon Islands to about 300,000 in Fiji (Mugler and Lynch, 1996). Designing and implementing a nation-wide curriculum that caters for all these languages would stretch the imagination of the best curriculum writers and teachers implementing it. It would also place extra strain on the already meagre resources, probably stretching them beyond reasonable effectiveness.

Taufe’ulungaki (2005) provides a useful overview of literature on Pacific vernacular languages, language education and their relevance to culture. The literature lends support to the importance of vernacular languages in learning and the need for the development and support of appropriate country-specific language policies. These proposals are timely and sound, given the multiplicity of languages in the region and some individual countries.

**Shortage of appropriate curriculum materials**

The problem of the shortage of suitable curriculum materials for primary and secondary schools for literacy and numeracy was accepted at Sia’aoutai. Many attempts have been made to produce materials that are based on Pacific literature. Significant inroads have been made over the past decade in producing teaching and learning aids from local materials (see the photographs in James, 2004). The Waka Story Book Series, published by USP's Institute of Education includes many stories written in Pacific languages, by Pacific writers. The stories are based on oral traditions and current lived experiences in the region. This has been a most useful start but, according to one participant at Sia’atoutai:

… we need to do more than just produce story books if we are to truly ground our educational policies, pedagogies, curriculum and assessment in literacy and numeracy on the essential elements of our very rich indigenous cultures. This is not going to be easy in my country where we have many different ways of doing things.

There is a need for more than books and materials that are produced locally if the underlying core Pacific values are to be successfully utilised in the teaching
of literacy and numeracy. There is a need to consider, closely and critically, the multiple languages, ways of mathematising and epistemologies in the region in order to construct frameworks for curriculum materials that are consistent with indigenous ways of mathematising and notions of literacy.

**Inappropriate teacher training and lack of staff development**

As with any innovation and change in education, the success of the movement towards contextualising the curriculum in literacy and numeracy and grounding it in Pacific cultures, values and systems will ultimately depend on the quality, passion and commitment of teachers. It is common knowledge that many teachers typically become entrapped in their teaching by the way they were taught and merely adopt their teachers’ ways. They usually become set and entrenched in their ways, making it difficult to alter their mind set and practices. Liberation from such enslaving mindsets, therefore, becomes an important prerequisite for successful engagement (Teaero, 1999).

An additional compounding factor is the examination-driven nature of schools in the region. This, as pointed out by a participant, compels teachers to adopt ways of teaching that have been proven over time to provide the desired results in examination, that is, high pass rates. The immense pressure to produce high pass rates leaves no room for experimentation or engaging in novel ways that may prove detrimental to this purpose.

Feedback from the participants on teacher education programmes showed that systematic teacher education and subsequent professional development in literacy and numeracy that are premised strongly on indigenous cultures is still largely absent in many PICs, including those with teacher training colleges. This need not be the case. In 2000, the UNESCO Chair in Teacher Education and Culture (based at USP) and the USP’s Institute of Education published several modules on *Pacific Cultures in Teacher Education Curriculum* designed to ‘assist teacher educators in the USP region better contextualise their teaching’ (Thaman and Benson 2000). One of these was specific to vernacular languages (Taufe’ulungaki, 2000) and another to indigenous mathematising in Fiji (Bakalevu, 2001). All these modules
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proffered many useful strategies on how Pacific perspectives might be practicably incorporated into teacher education programmes.

The absence of genuine political commitment

There is no dearth of rhetoric supporting the grounding of education in general and literacy and numeracy in particular in Pacific cultures and values. At the regional level, Pacific leaders (PIFS, 2005: 2) indicated that they

... treasure the diversity of the Pacific and seek a future in which its cultures, traditions and religious beliefs are valued, honoured and developed.

However, it is disappointingly obvious that the Pacific Plan perceives Pacific cultures primarily from the perspective of their usefulness only in the promotion of sustainable tourism. While tourism is a useful income-generating undertaking, culture ought to be considered from its central position in the bigger scheme of life in the region as a fundamental building block and feature of life in many spheres.

SPBEA, jointly governed by many PICs, is also heavily involved in carrying out projects in the region covering literacy and numeracy, especially in trying to assist member countries gain greater competence in assessment and establishing appropriate benchmarks (SPBEA, 2006a). SPBEA attaches a lot of importance to literacy and numeracy, as evident from their statement below:

Literacy, numeracy and life-skills should not be taken for granted but should be part of learning in both the formal and non-formal setting. One cannot dispute the fact that being able to read, write and calculate well, to think critically, to have positive values as citizens are keys to acquiring a better chance for a better life (SPBEA, 2006b: 64).

Many sentiments about the right of children to be literate and numerate can be found in statements at international and national levels. For example, UNESCO
(2006) recognises literacy and numeracy as a right and fundamental requirement for learning. However, a disconcerting factor is the absence of genuine political commitment by most governments in the region when it comes to financing efforts that would promote the grounding of the teaching and learning of literacy and numeracy in Pacific cultures. There is at best little and at worst no reflection of this rhetorical support in either the recurrent or the development projects in most PICs. Most of the funding continues to be channelled towards the ‘usual’ subjects being taught and the pedagogies being used: methods whose theoretical underpinnings and orientations are derived largely from exogenous sources.

While much of the budget allocated to education is invested in examinable subjects, including literacy and numeracy, it is evident from the Sia’atoutai discussions that no allocation is made towards financing efforts by locals to do more research into how we could make better use of indigenous ways of thinking in mathematics and literacy and how we could use these in the curriculum and teaching.

Until and unless the rhetoric is manifestly transformed into concrete action and genuine political commitment, no significant progress will be made in the movement towards the grounding of the teaching and learning of literacy and numeracy in Pacific cultures.

**The onslaught of globalisation**

The last significant challenge that was identified by the participants at Sia’atoutai was the onslaught of globalisation and its effects on all facets of life in the Pacific but, more importantly, on education systems and cultures. These sentiments echo the views espoused earlier by Nabobo-Baba (2002: 39):

As we begin the new millenium, most educators operate with increasing awareness that education, like every other sector in a country’s economy, has to deal with global forces. The Pacific States, given their relatively fragile and limited economic bases, find themselves in situations where they are overly dependent and controlled by donors and donor-driven agendas in education. This externally driven scenario also has to contend with certain issues, some new, some emergent. Some of these issues … are a rising emphasis
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on technology and information, the increasingly popular discourse on the importance of preparing children for a competitive international information economy, and an increasingly diverse, border-crossing population of learners.

There are numerous examples in this book of how these latest global developments have had a direct impact on communication in the Pacific region. Lee, Low and Taufaga convincingly argue that these, too, have to be taken on board as they are legitimate forms of communication and are useful for understanding the world that we live in today. In addition, there has been a significant paradigm shift from the conventional notions of literacy and numeracy to those that are more accommodative of the local cultural contexts. The understanding of literacy has also shifted from a mere cognitive process to becoming a basis for personal and social change (UNESCO, 2006; Taufe‘ulungaki, 2003).

Globalisation, in its very essence, does not deliberately seek to promote indigenous cultures but articulates and promotes an agenda that leans heavily towards creating a single global community based on a new world order that is fuelled largely by economic and communications forces. Global homogenisation, naturally, marginalises at best and ignores at worst attempts to re-centre indigenous cultures in education systems. Globalisation and the promotion of indigenous values pose a polemical dilemma for they outwardly appear to be mutually exclusive although, as we shall see later, this need not be the case. Globalisation has spurred on a reaction among PICs to emphasise their uniqueness in efforts that are reminiscent of those in the immediate post-independence era, during which PICs sought to resurrect and re-emphasise important aspects of their disappearing cultures. This alone is a compelling justification for the expeditious assertion of the shifting and re-defining cultural identities of the Pacific region as manifested through literacy and numeracy.

Future routes: voyaging beyond the current horizon

Education systems in PICs have been based predominantly on deficit models and assumptions (see for example Taufe‘ulungaki, 2003). These, naturally, pose some
challenges. It is now believed that Pacific traditions, worldviews and values can and ought to be used as inputs into the curriculum, pedagogy, assessment and policymaking. Despite the plethora of formidable challenges that impede these attempts, there are possible ways forward, all of which must start with the realisation and appreciation of the intrinsic strengths that are within our cultures. These vast riches of our languages and ethnomathematical traditions that have hitherto remained largely hidden, ignored and untapped were acknowledged and brought to the fore at Sia’atoutai. These strengths must be optimally utilised to ground the teaching and learning of literacy and numeracy in Pacific values and cultures, hence the title of this chapter, eutia moa mai nanoa (lift it first from within). New efforts in reconceptualising and reshaping practice in literacy and numeracy must, by necessity, begin with the incorporation of the indigenous and cumulatively add on the exogenous in subsequent stages. The two need not be mutually exclusive but can and must be complementary and exist in a synergic manner.

Any meaningful movement forward must incorporate the local and global, or the indigenous and exogenous, in a mutually enriching manner in a voyage that commences from and is guided by inputs from local cultures. It is always pedagogically prudent to commence students’ new learning experiences from what they are familiar with and then progressively add new knowledge (Hilgard & Bower, 1975). The arguments put forward earlier by Nabobo-Baba (2002:36) that ‘the two forces (the internal and external) must be both scrutinized, and their strengths harnessed to benefit Pacific people’ are still valid.

I have canvassed a similar argument in a painting, reprinted in this book, entitled Bwaninin te reirei (the completion of education) (Teaero, 2004: 80). The major motifs are the coconut shell representing the local region and all its concomitant features and the globe representing the global. The two are fused together and the wick of education runs through the area where they overlap, exploding on top with the brightness and fragrance of flowers. This denotes a desirable theoretical position that espouses a contemporary education system that starts from the local and then combines with the global in coherent ways.
Taufaga (Chapter 2) expresses the same idea thus:

They [Pacific Islanders] want their children to experience the best of two worlds; the high-tech cultures of the western world and the culture and tradition of their Pacific world that distinguish them from the rest of the world.

Grounding in Pacific roots

The attempts to ground contemporary educational thoughts and practices in literacy and numeracy in Pacific cultures must begin with the collection, documentation, analysis and development of Pacific Islanders’ notions of both literacy and numeracy. This insiders’ view is essential if the core defining characteristics of Pacific cultures pertaining to literacy and numeracy are to be adequately reflected. In their respective papers, Bakalevu (Chapter 8) and Taufaga (Chapter 2) highlight the fact that Pacific Islanders have unique ideas regarding literacy and numeracy in their own traditional worlds that could be profitably taken on board to enrich contemporary endeavours. Bakalevu cites Kiribati counting that distinguishes between different objects, ni-Vanuatu beach drawings that are extremely complex, and Fijian weaving patterns that clearly demonstrate the use of important mathematical concepts. These could form the basis of important mathematical concepts. All these should be gathered, critically analysed, systematically organised to form the initial foundation for the re-conceptualisation of literacy and numeracy, and then judiciously utilised to develop educational packages. The urgency of the need to gather such information is underlined by the fact that the bastions of such knowledge, our elders, are fast disappearing.

A regional conference on arts education held in 2002 in Nadi, Fiji, was attended by experts in the culture and arts of the Pacific. They concluded that Pacific arts (visual art, dance, drama, crafts and oral traditions) continue to hold immense significance and relevance in the lives of people in the region, and that the arts stand to offer culturally grounded ways of learning and developing relevant competencies in literacy, numeracy and other life skills (UNESCO, 2003). More importantly, the participants provide many useful ideas and strategies that could
be profitably used in the teaching of literacy and numeracy. One of these is the acceptance at the outset that there is a multiplicity of ‘languages’ and ‘literacies’ that are all equally effective and useful in terms of understanding Pacific worlds and in developing appropriate curricula, pedagogies, policies and assessment procedures. These include, inter alia, visual arts, crafts, poetry and dance.

There is, therefore, a platform upon which to ground contemporary curricula and pedagogy in literacy and numeracy. However, one must not lose sight of the important fact that today’s classroom must be an inclusive one that embraces the local and the global. This is because of a fundamental idea: that Pacific children must be prepared to live as knowledgeable citizens who are capable of living in and participating fully in their country of origin, the region and as global citizens.

**Placing Pacific values in educational policy**

The term ‘policy’ is defined here as

… a political process where needs, goals, and intentions are translated into a set of objectives, laws, policies, and programs, which in turn affect resource allocations, actions, and outputs, which are the basis for evaluation, reforms and new policies (Cooper, Fusarelli & Randall, 2004:3).

Like education itself, policy development in education is a value-laden process and undertaking that inevitably reflects the biases and priorities of the people who develop such policies. Given the absence of clear-cut policies in many PICs, particularly, those with numerous vernacular languages, and the apparent support for early learning in the vernacular and indigenous numeracies, there is an urgent need to convince leaders in the top political echelons to expeditiously and prudently shift from a position of mere rhetoric to concrete action. This shift to action implies:

- a development and articulation of clear policies on literacy and numeracy that are based on sound political, socio-cultural, economic and educational foundations (Taufe'ulungaki, 2005), and sound administrative considerations, and
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- realistic budgetary allocation to facilitate research and other necessary undertakings that will promote literacy and numeracy that are grounded in specific cultures.

Literacy and numeracy skills are deemed useful for various aspects of individuals’ and nations’ lives. Language, as Taufē’ulungaki (2005) argues, can be used for national unity, modernisation and individual and national identification. Individuals can also use competencies in these areas for problem-solving in the course of daily living and for facilitating upward mobility. It is therefore suggested that policy development in the area of literacy and numeracy at national level be guided by the following principles:

- local users’ notions of literacy and numeracy;
- inclusiveness of an eclectic combination of the local and the global;
- current needs, aspirations and priorities;
- sound educational thoughts and practices, and
- participation of key stakeholders such as teachers, teacher educators, curriculum developers, policy makers and community experts.

Curriculum development

Bakalevu (see Chapter 8) encapsulates the key ideas in a coconut shell when she equates the Pacific curriculum developer to a cultural bridge. Her guidelines for curriculum development that enhances the incorporation of relevant Pacific ethnomathematical ideas are based on five key principles. She argues that curriculum developers must engage in the following tasks: establish a philosophy of education, challenge existing curricula, develop curricula for their own people first, use elders and quality people as resources, and, finally, facilitate the professional development of teachers.

With the multiplicity of languages and ethnomathematical ideas, it is considered a prudent practice to develop curricula that are adequately flexible to enable teachers to incorporate the local while simultaneously maintaining and giving due consideration to the national and global in an eclectic and pragmatic balance that begins with the local.
Curriculum developers must also look beyond the traditional sources and explore the rich oral and artistic traditions that exist in the Pacific. The use of the unique visual arts (Teaero, 2002) and the lyrics of songs (UNESCO, 2003; Teaero and Tebano, work in progress) are in themselves texts that represent Pacific Islanders’ perceptions and understanding of their worlds, even from their pre-literate days. They are also consistent with the ILO’s and UNESCO’s declarations on indigenous people’s rights to self-definition and self-identification.

**Teacher education**

The importance of the roles of teachers in any new way of teaching and learning of literacy and numeracy in the Pacific or elsewhere cannot be over-emphasised. The concept of ‘teachers for all times’ who are ‘historically, linguistically, and culturally grounded and articulate in terms of time, place and people’ (see Herrmann. Chapter 3) was repeatedly canvassed in Sia’atoutai. This compels teachers to develop a deep and substantive knowledge of mathematics and the culture and language of their country if they are to be effective and for teacher educators ‘to foster new consciousness in trainee teachers’ (see Bakalevu, Chapter 8).

It is important to emancipate all islanders, but particularly teachers, from the bondage of conventional thinking that is premised on colonially imposed values. As I explained elsewhere:

> Emancipation here refers to freedom from previous injustices inherent in earlier education programs that featured the subjugation of studies of indigenous educational ideas to western ones. Such emancipation would culminate in freedom from ignorance of our own indigenous educational ideas and reclamation of an important part of our cultural heritage … (i)t liberates our students and us from the mental confines of exogenous philosophies of education – a kind of colonisation of the mind. (Teaero, 1999:39).

Teachers need assistance to develop a culture of learning in which they acquire the necessary skills to keep on accumulating knowledge from reflective practice
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and other modes. There is also a need to sensitise them to the existence of other sources of knowledge that are available in the community, such as elders, songs and dances of the local community and interactions with other stakeholders. An embracing of all these and other sources of knowledge would assist teachers to harness the strengths of the community they serve.

Ownership

The ownership of knowledge and modes of transmitting it that are specific to Pacific ways of mathematising and notions and processes of literacy has always been that of whole societies or individual groups within those societies in the Pacific. Pacific Islanders have always regarded knowledge as an important part of their heritage and survival and guard it most clandestinely and zealously (Thaman, 2003). There are forms of open knowledge that are intended for public use and other forms are privileged or limited to specific clans or individuals. The language associated with specific skills such as building meeting houses, building canoes, and speaking in public during formal occasions, for example, fall within the guardianship of people who are traditionally responsible for these. Similarly, the ‘mathematics’ associated with the construction of houses, canoes, navigation and the like is ‘owned’ by specific groups. This sense of ownership must be respected at the outset, negotiated in the light of current needs and perpetuated in its appropriate form. There is, therefore, a need to facilitate and ensure the participation of these traditional owners in any research or development in areas pertaining to their areas of expertise. Participation is most effective if it is based on the twin concepts of stake and expertise. Stake refers to what owners stand to gain (or lose) from any development. The greater the stake, the greater the people’s motivation is to participate. Expertise maximises people’s inputs when participating in decision-making and strategising, especially with regard to qualitative aspects. These, in turn, would be expected to promote a strong sense of ownership and support.

Research

Literature emanating from recent research by Pacific Islanders in the field of education (Pene, et al. 2002; Thaman, 2003; Nabobo-Baba, 2006) is growing. Considered in its totality, the research by Pacific Island educators into indigenous
epistemologies and literacy and numeracy that has so far been undertaken is a very encouraging beginning. These efforts must be sustained if a more holistic level of understanding is to be achieved and if emerging needs are to be adequately satisfied. There will always be a need for additional research, given the dynamic nature of PICs and the need to develop a high level of knowledge and understanding of aspects of our Pacific cultures that could inform the curriculum, policy, pedagogy and assessment in literacy and numeracy.

Research into any aspect of Pacific knowledge should entail an interaction with owners of the knowledge being sought. Safekeeping and gate-keeping of traditional knowledge is often vested in elders and, as Bakalevu (Chapter 8) argues, there is a need to make greater use of community resources such as elders because we ‘need the wisdom and skills of elders and experts for an understanding of traditional practices, knowledge and values’.

An important consideration in the conduct of research is the need to acknowledge, be sensitive to and observe traditional protocols pertaining to accessing, using and disseminating knowledge (Thaman, 2003). This calls for a co-ordinated undertaking between policy makers, researchers, curriculum developers, teachers and owners of knowledge to jointly formulate guidelines that adequately safeguard the interests, self-esteem and needs of the owners of knowledge on the one hand and the broader interests of users on the other hand. Part of this propriety is the need to acknowledge the differences that may exist in any one culture or country and to give these appropriate coverage.

**Sustainability**

The preceding discussion emphasises the contextualisation of the teaching and learning of literacy and numeracy on Pacific cultures. The other over-arching consideration is the sustainability of these innovations in contextualisation. Innovations in education or any other field will fail to produce the desired benefits if they cannot be sustained. The key requirements of sustainability, in my view, are ownership, feasibility, suitability for current and emerging needs, relevance to the local culture and the whole context, and adaptability to changing circumstances. The grounding of these innovations in sound philosophical, cultural and educational
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foundations is essential for their sustainability. If innovations are designed and implemented in close collaboration with committed and knowledgeable locals, their chances of sustainability will be significantly enhanced. Any undertaking and innovation that is capable of withstanding the rigorous test of time and sustainability is one that contributes meaningfully and in tangible ways to the promotion and maintenance of quality living and pride in one’s cultural heritage in the rapidly changing and globalised world.

Conclusion

While Pacific societies have been subjected to a long period of domination by alien cultures, there is now an emerging sense of liberation arising out of efforts to discover and use appropriate elements of their cultures in the education systems in the region. The Sia’atoutai workshop proved that the region is indeed rich in ethnomathematical and language heritages that could be profitable, used alongside exogenous thoughts, practices and processes to develop and deliver an educational package that is simultaneously grounded in local ideas and relevant for the global world. Instead of allowing the exogenous to continue bulldozing the indigenous, a route ought to be carved in which the best of both worlds is extracted and an eclectic combination optimally utilised to re-define our goals, strategise, and map out a more promising future that beckons sustainable, improved living and to reaffirm our evolving identities as Pacific Islanders in an increasingly globalising world.

There cannot be one single solution to the problems of literacy and numeracy for the entire region, principally because the region is far from being homogenous. Similarly, solutions need to be continuously revised to ensure their congruence with emerging needs and circumstances and, therefore, their very relevance. Sia’atoutai provided a useful starter for educators from the region to identify and focus on broader issues pertaining to the teaching and learning of literacy and numeracy at regional level and for sharing country experiences. It is now time to shift from rhetoric to action and to focus on country-specific issues. This entails obtaining relevant local knowledge, devising effective and inclusive ways of fusing
it with the global in ways that best address the needs of each island state and the communities within, and developing sustainable ways of implementing these. This will be a fitting tribute to the diversity that we cherish and commonalities that bind Pacific Islanders together. Properly utilised and managed, such undertakings stand to transform island communities into self-renewing ones that thrive and grow as a result of successfully fusing the local and the global. Innovations in education that are implemented for providing solutions to problems produce benefits only if they are appropriately contextualised and sustained.

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