



ADULTS LEARNING MATHS NEWSLETTER

No. 18
March 2003

From the Chair

While I am writing this text the new year has just begun. I wish that this year will be a good year for all of you with personal success and health and with more peace on earth. Concerning ALM I have some more wishes:

- I hope we meet in Strobl (Austria) at the ALM 10 conference. Please do not forget the deadline for papers: the 15th of April! For more details please read the information inside on page 10, or see the enclosed flyer, or on our website: www.alm-online.org
- I hope that ALM will grow: ALM needs more members, more activities, more exchange of information, more cooperation of ALM members. If you have any ideas that would help this, please mail them!
- I hope you will enjoy reading the special **ALM issue of the Literacy and Numeracy Studies: An International Journal in the Education and Training of Adults**. Some ALM members worked as editors, many ALM members wrote papers and now all the ALM members should read it. ALM decided to support the print and distribution of this issue. For more details please read the information inside this newsletter on page .
- I hope that the **electronic ALM journal** will start well. The editorial board has started to work. The first call for papers will be announced in the next newsletter and on the ALM website.
- I hope that more members of ALM will **work for ALM**: An organisation like ours needs a chair, officers, trustees, editors, conference organisers and many volunteers for other tasks. Would you like to do anything? If so, then what? Please read the minutes from the last AGM in London on pages 10-11. At the AGM in Strobl we will have elections for the new trustees team. Do you want to stand for election?

Do you have any comments or ideas? Please mail them! My email_address is <juergen.maasz@jku.at>

Juergen Maasz

In this issue

◆ Mathematics or Numeracy: Does it really matter?	1
◆ Emotions: a constant accompany in learning processes	5
◆ Report on ICOTS	8
◆ What Counts as Mathematics? (Review)	9
◆ ALM News	10
◆ About ALM	12

Mathematics or Numeracy: Does it really matter?

John O'Donoghue, University of Limerick, Ireland

Abstract

Sometimes during the course of other assignments one is forced to clarify more carefully understandings held to that point. Recently, I was left with a number of ideas and issues concerning mathematics and numeracy after such an assignment. In this presentation, I propose to explore some of these issues which can be flagged by use of pairs of words e.g. mathematics/numeracy, literacy/numeracy, adults/mathematics, adults/numeracy, numeracy/school mathematics.

This is an abridged version of the original paper which can be read in the conference proceedings.

Introduction

I should declare a personal bias - I come to this task and to ALM as a mathematics teacher educator, university mathematics teacher and mathematics education researcher. This contribution is also motivated by the objects of ALM which include the following:

The Charity's objects are the advancement of education by the establishment and development of an international research forum in the life-long learning of mathematics and numeracy by adults by:

- encouraging research into adults learning mathematics at all levels and disseminating the results of this research for the public benefit;
- promoting and sharing knowledge, awareness and understanding of adults learning mathematics at all levels, to encourage the development of the teaching of mathematics to adults at all levels, for the public benefit.

This reminds us that adults' *mathematics* education and *numeracy* are vital concerns.

In this session, I propose to explore a number of relationships that arise in adult mathematics education that are influenced by policies and practices and where it makes good sense to assess the associated risks and opportunities. I am not suggesting that the list is exhaustive but I do believe that it is comprehensive. I have adopted simple word pairs as a device to highlight relationships and as an organising principle.

Mathematics or numeracy*from p. 1*

These include:

- Literacy/numeracy
- Numeracy/Education
- Numeracy/school mathematics
- Numeracy/ indicators
- Adults/mathematics.

The thrust of the paper is clear – it answers the question in the title in the affirmative. It *really* does matter and it matters in a number of important ways! But first I would like to preface subsequent remarks with a short section on Economic/Education policy.

Economic/education policy

It is fair to say that economic policy and education policy no longer stand apart, if ever they did, in technologically advanced countries. Indeed it is clear now that education is purposefully articulated with economic policy, and in many ways is subservient to it, as countries pursue their economic development programmes.

The Higher Education (HE) sector has for a long time been an active partner in the national economic enterprise in many developed countries and is funded and resourced to meet the knowledge and manpower/skills needs of the economy e.g. Ireland. This is especially true of high-tech or knowledge-based economies where the impact on education is now being felt in all sectors from primary through to Higher Education. For example some conference participants will be quick to recognise evidence of this in the U.K. where there is now a National Numeracy Framework for primary and secondary schools. As an international association all of us are aware that lifelong learning/education is central to economic policy development internationally and this is clearly signalled in EU and OECD reports. Undoubtedly this impacts directly on adult literacy/numeracy education. Many of us also see a link between economic policy and equality issues.

It is true to say that all of us as we pursue our own agendas in adult mathematics education at local, regional or national levels increasingly feel the weight of economic policy in our day-to-day work and the effects are not always desirable or benign.

Literacy/numeracy

Like it or not, literacy and numeracy are bracketed together in the public consciousness and this is largely for historical reasons. Cockcroft (1982) identifies the source of the concept and the term *numeracy* as the Crowther Report (1959) and gives its own now famous definition. Crowther defined numeracy ‘as the mirror image of literacy’ (par. 398) and went on to elaborate his view. Literacy and numeracy were seen as personal attributes that were needed to support the life-long aspirations of an educated person and that included

communication between the so-called ‘two cultures’. They were seen as overlapping complementary attributes.

Numeracy issues and provision are traditionally subsumed under literacy in many countries e.g. Ireland, U.K., Australia. Consequently, literacy has influenced the debate on numeracy as regards funding and provision with the lion’s share of effort and resources going to literacy provision.

The concept of numeracy follows what may be described as an evolutionary trail that can be described roughly as follows:

1. Mirror image of literacy
2. Literacy (no explicit concern for numeracy except grassroots interest)
3. Literacy (concern for 3R’s and basic mathematical skills)
4. Functional numeracy (detached from literacy)
5. Literacy (numeracy is recognised as an aspect e.g. quantitative literacy)
6. Types of literacy (e.g. mathematical literacy, scientific literacy, etc)
7. Numeracy (independent life skill detached from literacy/ equally important).

If this evolutionary picture is a reasonable representation of the situation then there is reason to be grateful that numeracy was kept on the policy agenda allowing time for grassroots initiatives to increase general awareness and tutor expertise.

Numeracy/education

Numeracy impacts on individuals across their life span from child to adult and has implications for their education and lifelong learning in schools, in the work place and in other non-traditional settings. A wide range of goals for numeracy can be identified in national and international reports and literature. Steen (1997: xxii) refers to a useful summary of these goals associated with five different dimensions of numeracy as follows:

- *practical*, for the immediate use in the routine tasks of life;
- *civic*, to understand major public policy issues;
- *professional*, to provide skills necessary for employment;
- *recreational*, to appreciate games, sports, lotteries; and
- *cultural*, as part of the tapestry of civilization.

All of these implicate education at some level but other agencies are also implicated e.g. training agencies, trade unions.

Numeracy/school mathematics

The relationship between numeracy and school mathematics is problematic not least because numeracy does not seem to be an automatic outcome for many after years of compulsory schooling.



It is clear that there is a universal expectation that the school mathematics experience should deliver numerate citizens. That it consistently fails to do so for a significant percentage of the school-going population is matter of grave concern worldwide. This failure is due in part to a lack of clarity in the goals of mathematics education and a clear understanding of the meaning of numeracy. In practice the term may signify any one of a number of things including, basic computational arithmetic, essential mathematics, social mathematics, survival skills for everyday life, quantitative literacy, mathematical literacy and an aspect of mathematical power.

There are many unresolved issues surrounding school mathematics as a preparation for adult life. How is numeracy different from school mathematics? How does one promote numeracy within the school mathematics context? What is the role of context and life experience in school mathematics and numeracy? How does school mathematics relate to adult mathematics education? How does school mathematics 'transfer' to adult life?

Responses to these and related issues take different forms in different countries. For example numeracy and literacy are prioritised in the Irish Primary School curriculum. The U.K. is pursuing a national strategy for numeracy through the school system. For many practitioners and researchers in the field, it seems numeracy should not be equated with less mathematics but more in terms of sense making, application and decision making.

The term numeracy is not generally applied to the secondary school mathematics curriculum except in the context of under-achievement and early school-leavers. Indeed, the goal of secondary school mathematics in the U.S. is *mathematical literacy* (NCTM, 1989) which is interpreted as a good secondary mathematics education. This goal outstrips what would normally be interpreted as numeracy in most other Western countries.

The concept of numeracy has some currency in higher education specifically in the context of the so-called 'numerate disciplines'. Traditionally, there has been concern for the mathematics education of engineers, scientists and technologists. For example, Le Roux (1979), in the spirit of Crowther, interprets numeracy in a higher education context as developing the mathematical ability of non-mathematicians to interact effectively with mathematicians and communicate their needs. More recently this debate has widened to encompass issues such as service mathematics teaching, mathematical under-preparedness and entry standards (see LMS, 1995) learning support and more socially determined issues such as access, equality, disadvantage and the role of mathematics therein (see Benn, 1997).

Numeracy/indicators

What do we know about how numerate adults and others are? How do we measure numeracy in the population or elsewhere? In many countries the indirect indicators are, and have been, the mathematics results in State Examinations. The first reaction to falling standards in the 1980's in the U.S. and to a lesser degree in the U.K. was to advocate a 'return to basics' in mathematics, a misguided attempt to reform school mathematics that was widely resisted. Mathematical *literacy* is now the goal of school mathematics in the U.S. (NCTM, 1989: 2001).

In recent years there have been international studies in mathematics and science and literacy and these have been used as indicators although it is not always clear what these measure or indicate, or whether they apply to adults (see Kaiser et al, 1999). Some countries have been well served by national, regional or institutional studies e.g. U.K. Others such as Ireland must rely on participation in international studies for relevant data that is not always forthcoming in usable form. The point is illustrated for Ireland, a country that has participated in a number of such studies. Four of these are listed below:

- Second International Mathematics Study (SIMS, 1983-86)
- Third International Mathematics and Science Study (TIMSS, 1995)
- International Adult Literacy Study (IALS, 1995)
- Programme for International Student Assessment (PISA, 2000).

The main focus of SIMS was student achievement in mathematics and TIMSS measured achievement in mathematics and science. While these data shed light on performance in school mathematics, extrapolation to adults' numeracy levels must be tenuous.

The IALS was concerned with adult literacy and surveyed adults aged 16 – 65 in 19 countries.. Clearly this study is concerned with literacy and has very little to say about adult numeracy in the participating countries. Morgan et al (1997) present the results for Ireland.

PISA is different from the other studies in that it has a special focus on knowledge and skills needed for adult life. PISA acknowledges that students cannot learn all they need to know in school for successful participation as adults in society. Students must become life-long learners. In a significant departure from practice, mathematics test items are not designed to reflect school mathematics but rather the extent to which school has prepared students for, inter alia, the mathematical demands of adult life. Such studies are likely to influence our thinking on adult numeracy and adult mathematics education generally and the next PISA (2002) survey when mathematical literacy is a major focus is eagerly awaited. A summary of results of initial survey for Ireland can be found in Shiel et al (2001).



Adults/mathematics

I have argued elsewhere (Coben et al, 2000) that mathematics education should not be defined exclusively in terms of school mathematics. School mathematics cannot be treated in isolation from adult domains such as 'everyday mathematics' and 'workplace mathematics'. It is equally clear that we have much to learn about the interaction between school mathematics and adults learning mathematics in out-of-school settings.

The school mathematics experience impacts directly on adult mathematics education in Further Education (FE) and Higher Education (HE). When we look at adults in these sectors the concern is mainly for *mathematics* as opposed to *numeracy* education although one could argue that there is some overlap depending on how one interprets numeracy e.g. Adult Basic Education (ABE) in Further Education. Further Education is generally concerned with developing workplace skills/training for employment and also providing second-chance education for post-16 year olds. This second-chance education usually links in to Higher Education through a series of steps or equivalences. Indeed, many countries have high school equivalency diplomas that can be earned by adults part-time or at night. Unfortunately, very often the mathematics courses taught are identical to school certificate programmes and they are taught to adults in traditional ways that have already failed these same adults in school.

The normal cohort of undergraduate students in Higher Education institutions such as universities have traditionally been taught without any real emphasis on their adult status. Mature students (those aged 23 or 25 or more) had to fit in or leave since there was no attempt to adjust mathematics teaching to their special needs or circumstances. Thankfully this state of affairs is changing with universities in many countries making special provision for mature students by introducing foundation year, access programmes or other transition arrangements in tandem with learning support such as Mathematics Learning Centres and on-line support. But clearly these activities are viewed in Higher Education as *mathematics* teaching except perhaps when progression is targeted for disciplines in the Humanities when the term numeracy is applied. It should be said that universities did not rush to embrace such activities but yielded under pressure of social and economic policies and financial impact of fewer students due to demography.

Discussion and conclusions

Adult mathematics education involves mathematics teaching and numeracy, and practitioners need to be clear what their goals are. Increasingly school mathematics goals include numeracy but numeracy education does not always include substantial mathematics. The tension between mathematics and numeracy in adult mathematics education needs to be acknowledged and the relationship should be clarified. For

example, how does a numeracy curriculum for adults differ from a basic mathematics curriculum for adults? Mathematics and numeracy are not congruent. Nor is numeracy an accidental or automatic by-product of mathematics education at any level. When the goal is numeracy some mathematics will be involved but mathematical skills alone do not constitute numeracy.

Mathematics and numeracy are overlapping concerns in various sectors of national education systems including primary, secondary, Further Education and Higher Education and outside the formal education systems. Adult mathematics education generally is not well articulated throughout the various sectors nor is numeracy education. However, some definitions of numeracy e.g. Johnston (1994) offer an avenue for an integrated approach to numeracy education that may be viable at each level and also makes sense in an adult environment.

It does matter that mathematics education is not distorted by undue pressure from economic policy that has the effect of atomising curricula into various skills that are measured incessantly. It matters that adults are trusted to study mathematics when that is what is needed and develop their numeracy when that is necessary. It affects tutors in their practice if they are not trained to deliver the appropriate service and it matters to society if there is not sufficiency of individuals with appropriate skills in the workforce. Sometimes these requisites are described as literacy or literacy and numeracy or as multiple literacies e.g. reading literacy, scientific literacy, mathematical literacy. So long as we know what we are talking about then adults' mathematics education is more likely to prosper.

References

- Benn, R. (1997) *Adults count too: Mathematics for empowerment*. Leicester: NIACE.
- Central Advisory Council for Education (England) (1959) *A report of the Central Advisory Council for Education (England), Crowther Report*. London: HMSO
- Cockcroft Committee (1982) *Mathematics Counts: A Report into the Teaching of Mathematics in Schools*. London: HMSO.
- Dossey, J. A. (1997) Defining and measuring quantitative literacy. In L.A Steen (ed.) (1997) *Why numbers count: quantitative literacy for tomorrow's America*. New York: College Entrance Examination Board, 173-186.
- FitzSimons, G. E., Coben, D., and J O'Donoghue (eds.) (2000) *Perspectives on Adults Learning Mathematics: Research and Practice*. Dordrecht: Kluwer Academic.
- Gal, Iddo (ed.) (2000) *Adult Numeracy Development: theory, Research, Practice*. New Jersey: Hampton Press.
- London Mathematical Society and Institute of Mathematics and its Applications (1995) *Tackling the mathematics problem*. Southend-on-Sea: IMA.

continued on page 8



Emotions: a constant accompany in learning processes

Wolfgang Schlöglmann, University of Linz, Austria

It has long been accepted that learning processes are accompanied by affects. In particular, interest, motivation and attention are essential for effective learning. Affects are usually viewed as the driving force behind all cognitive processes, as the energy supplier that gives all cognitive processes the power to run (Ciompi, 1999; Piaget, 1995).

All teachers presenting mathematics courses for adults appreciate the importance of interest, motivation and attention as a prerequisite for successful learning. In addition, however, teachers have to deal with students' emotional reactions that hinder the learning of mathematics. Particularly in the USA, a long discussion has been taking place about "math-anxiety" (e.g. the book with this title, by Tobias, 1993). The title of a book by L. Burton (1981) is, "Do You Panic About Maths? Coping with Maths Anxiety"; and J. Evans (2000) considers anxiety in connection with mathematics learning at length. Emotional reactions reported in the literature range from flat refusal to learn, to experience of trauma such as "learning blockades" (Lindenskov, 1996; Schlöglmann, 1999; Wedege, 1998).

In the last few decades, research into the influence of affect in processes of mathematics learning has been increasing. New concepts, sometimes partly borrowed from other subjects, have been introduced, which have in turn stimulated research.

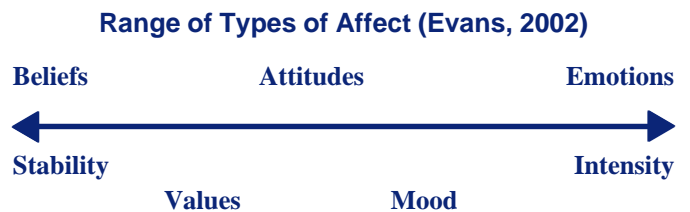
One ought to keep in mind that concepts and research methods are always interrelated (Evans, 1994; Malmivuori, 2001). For example, as a research instrument, questionnaires reveal more stable, less intense affective reactions; classroom observations, on the other hand, reveal rapidly changing, more intense emotional reactions.

Four categories of affect are now widely accepted: emotions; attitudes; beliefs; and, values/ethics and morals. In this paper, I use the concise description given by Goldin (2001). For a deeper discussion, I refer the reader to Jeff Evans (Evans, 2000) and Marja-Liisa Malmivuori (2001). The concise description reads:

- (1) Emotions (rapidly changing states of feeling, mild to very intense, that are usually local or embedded in a context);
- (2) Attitudes (moderately stable predispositions toward ways of feeling in classes of situations, involving a balance of affect and cognition);
- (3) Beliefs (internal representations to which the believer attributes truth, validity, or applicability, usually stable and highly cognitive, may be highly structured);

- (4) Values, ethics, and morals (deeply held preferences), sometimes characterized as "personal truth", stable, highly affective as well as cognitive, may also be highly structured). (Goldin, 2001; 3)

Note that the terms "stability" and "intensity" are used here. Evans represents the situation concisely in graphical form:



Taking a closer look here, one can convince oneself that although the four categories mentioned above suffice to grasp many of the "normal" situations found in mathematics courses, they cannot explain phenomena such as "learning blockades" or strong manifestations of "learning refusal".

In the last 20 years, emotions have increasingly become the focus of neuroscientific research. New research methods utilizing, and stemming from, positron emission tomography (PET) have led to insights into cognitive and emotional processes and their interrelations. These new results can help one understand the traditional concepts better. I shall now discuss this further.

First, however, some general background remarks relating to neuroscience are in order. (Note that in neuroscientific research, affect is usually called "emotion".) (Schlöglmann, 2002)

- 1) The brain is the organ in which not only all knowledge of the world outside is represented, but also knowledge of all processes inside the body.
- 2) All systems within the brain are products of evolution, whose aim was to produce individuals capable of surviving. Emotion and cognition are also part of the brain system and therefore a result of evolution (Damasio, 1999; LeDoux, 1998; Roth, 2001).
- 3) The brain system exhibited by a particular individual is a product of evolution together with the individual's ontogenetic development (Ciompi, 1999).
- 4) On the neuronal level, all processes are unconscious. The course taken by any process is a consequence of the structure of the brain together with stimuli. Some of these processes, however, lead to conscious results. We are aware only of these conscious stages of the processes.

Emotion and cognition are both subsystems of the brain system. Although they are located in different parts of the brain (Damasio 1999; LeDoux 1998; Roth 2001), physical connections exist between them, which allows interaction. A very important consequence of the two different systems is that one must distinguish between "feeling" and "knowing that we have a "feeling" (Damasio, 1999; 26), or "emotional

Emotions*from page 5*

reactions” and “conscious emotional experience” (LeDoux, 1998; 296).

The emotion system is also physically connected to the arousal systems; therefore emotional reactions are often accompanied by “body reactions” (LeDoux, 1998). In the present paper, the interaction between affect and cognition are of particular interest.

The emotion system influences memory processes. On the one hand, the emotion system is involved in the storage process: it works like an appraisal filter. On the other hand, results of the retrieval process are related through emotions (Roth, 2001).

To understand the significance of the neuroscientific results, let us consider the research methods used in mathematics education. The favoured methods used in investigating beliefs and attitudes are questionnaires and interviews. Both rely on the memory of the interviewees.

The neuroscientific results apropos memory indicate that one must distinguish between two memory systems regarding emotions: the implicit emotional memory and the explicit memory of emotions (LeDoux, 1998). The implicit emotional memory operates unconsciously, is strongly connected to arousal systems and may often lead to bodily reactions.

The explicit memory of emotional situations contains all the conscious knowledge of emotional situations, emotional reactions to objects, persons and ideas, et cetera. The most important consequence of this is the fact that this memory system is part of the cognitive memory and there is no distinction between remembrance of an emotion and remembrance of cognitive content (LeDoux, 1998).

Some important consequences arise from the fact that memory of emotions is a cognitive memory:

- 1) We have knowledge about our feelings and their origin. This knowledge is stored in memory systems as cognitive knowledge. It is therefore possible to investigate knowledge of affect via cognition. Research methods used in cognition research (questionnaires and interviews) can help us explore affect.
- 2) Memory of emotions is open to “rational” manipulation. This means we are able to think about our emotional remembrances. Note, however, that all verbal statements are controlled by cognition.
- 3) A very important control authority governing all verbal statements is the “feeling of one’s own worth”. We therefore try to assign a meaning to our emotional remembrances that doesn’t destroy the feeling of our own worth. In this sense, persons in interviews have a tendency to trivialize their own weaknesses. If the person is unable to cope with a particular type of problem, for

instance, then such trivialization can occur through the expression of the opinion that this particular mathematical principle is unimportant.

- 4) Research on emotion and memory suggests that humans “construct” their memories in a way that allows them to live with their memory. One aspect of this process is that we forget unpleasant facts more easily than pleasant ones. Moreover, our memory has suppression mechanisms to handle unpleasant remembrances (Roth, 2001).
- 5) Group processes have an important influence on verbal statements about emotionally coloured content. Humans are able to “learn” emotions in group processes (Ciompi, 1999; Damasio, 1999). These processes can lead to common shared emotions apropos special content. In particular, shared value systems can influence the content of memory. In this sense, we have to see the habitus concept (Gates, 2001) or the socially constructed “feeling rules” (Ulich & Kapfhammer, 1991). (“Feeling rules” arise when the group prescribes what a member of the group has to feel in a particular situation.)

While research into “beliefs and attitudes” in most cases uses explicit memory as the source of information, research into the affective category “emotions” (Goldin, 2001) favours classroom observations (often videotaped). One is then able to observe an activated emotional memory system. The activation can be observed by the researcher. The best-known signs of system activation are bodily reactions. The act of interpreting bodily reactions is rooted in human evolution, and is therefore a valuable research method in evaluating emotional situations. These emotional reactions are subject only to weak control by cognition (LeDoux, 1998) and are therefore especially valuable hints as to the emotional state of an individual. Indicators for this emotional state are facial expressions, shaking of the hand, quavering of the voice, and so on. These bodily signs allow also the recognition of any changes in the emotional state.

It is important to note that information about emotional situations is not only stored in the part of memory that contains knowledge of feelings, but also in the implicit emotional memory; and this memory influences further reactions to a particular situation.

Adults participating in courses for adult learners are often experiencing personal hardship. Many of them lost their job and require a further qualification in order to find a new job. As an experienced person with many valuable skills and qualifications, they may acutely feel their loss of prestige and status. Monetary losses can lead to financial difficulties and personal insecurity. Their status as a learner is forced upon them, and not chosen. They must learn like a young apprentice, and success in the course is not guaranteed (Schlöglmann, 2000). All these often lead to depressive moods that can hinder the learning process. On the neuronal level, the effect of moods is augmented by the effect of a special neurotransmitter that is important for the transmission



of signals between neurons. The neurotransmitter influences interest and attention span, and therefore influences the learning process (Ciompi, 1999). We all know that sad moods make us unconcentrated, we think of other things, and are inhibited from learning. In such cases, failures together with anxiety often lead to aggression.

Research into the learning process in mathematics education for adults also reports “learning blockades” (Lindenskov, 1996; Schlöglmann, 1999; Wedege, 1998). Dramatic emotional reactions, which prevent learning on the cognitive level, point to “traumatic experiences”. LeDoux describes reactions to such experiences in the following way: “In traumatic situations, implicit and explicit systems function in parallel. Later, if you are exposed to stimuli that were present during the trauma, both systems will most likely be reactivated” (LeDoux, 1998; 202).

The specificity of such emotional reactions is that there is no chance of helping on the cognitive level. Such problems cannot be handled in classroom situations. Emotions flood cognition; the cognitive system is blocked and unable to be influenced by “rational” arguments. In most cases, however, adults are able to handle unpleasant emotional situations by using their knowledge of emotions - a qualification that Goldin (2001) calls meta-affect.

References

- Buxton, L. (1981). *Do You Panic About Maths: Coping with Maths Anxiety*. London: Heinemann.
- Ciompi, L. (1999). *Die emotionalen Grundlagen des Denkens*. Göttingen: Vandenhoeck & Ruprecht.
- Damasio, A. R. (1999). *The Feeling of What Happens*. New York/London, Harcourt Brace & Company.
- Evans, J. (1994). ‘Quantitative and Qualitative Research Methodologies; Rivalry or Cooperation?’ In: Da Ponte, J.P. & Matos, J.F. (Eds.) *Proceedings of the 18th Conference of the International Group for the PME* (Vol.2), 320-327.
- Evans, J. (2000). *Adults' Mathematical Thinking and Emotions*. London, Routledge Falmer.
- Evans, J. (2002). ‘Developing the Ideas of Affect and Emotions among Adult Learners’. In: L. Ostergaard/ T. Wedege (Eds.): *Numeracy for Empowerment and Democracy? Proceedings of the 8th International Conference of Adults Learning Mathematics (ALM8)*. Roskilde University Printing, 88 -96.
- Gates, P. (2001). ‘Mathematics Teacher Belief Systems. Exploring the Social Foundation’. In: van den Heuvel-Panhuizen, M.(Ed.) *Proceedings of the 25th Conference of the International Group for the PME* (Vol.3), 17-24.
- Goldin, G. A. (2000). ‘Affective Pathways and Representations in Mathematical Problem Solving’. In *Mathematical Thinking and Learning*, 17(2), 209-219.
- Goldin, G.A. (2001). *Affect, Meta - Affect, and Mathematical Belief Structures*. Preprint, Rutgers University.
- LeDoux, J. (1998). *The Emotional Brain*. Phoenix, Orion Books Ltd.
- Lindenskov, L. (1996). ‘Kursistundersøgelse på AMU - centre om alment - faglig kompetence i matematik’. In: Wedege, T. (Ed.) *Projekt: Faglig Profil i Matematik*. København, Arbejdsmarkedstyrelsen, 73-84.
- Malmivuori, M.–L. (2001). *The Dynamics of Affect, Cognition, and Social Environment in the Regulation of Personal Learning Processes: The Case of Mathematics*. Helsinki University Press.
- Piaget, J. (1995). *Intelligenz und Affektivität in der Entwicklung des Kindes*. Suhrkamp.
- Roth, G. (2001). *Fühlen, Denken, Handeln*. Frankfurt/Main, Suhrkamp.
- Schlöglmann, W.(1999). ‘On the Relationship between Cognitive and Affective Components of Learning Mathematics’. In: Groenestijn, M./Coben, D. (Eds.) *Mathematics as part of Lifelong Learning*, London: Goldsmiths University of London, 198-203.
- Schlöglmann, W.(2000). ‘Affect and mathematics learning – some remarks’. In:Johnson, S./Coben, D. (Eds.) *Proceedings of the sixth international conference of Adults Learning Mathematics – A Research Conference*, Nottingham: University of Nottingham, 51-59.
- Schlöglmann, W.(2002). ‘Affect and mathematics learning’. In: A. D. Cockburn & E. Nardi (Eds.): *Proceedings of the 26th Conference of the International Group for the Psychology of Mathematics Education*, University of East Anglia, Norwich 2002/4, 185 – 192.
- Ulich, D./Kapfhammer, H-P. (1991). ‘Sozialisation der Emotionen’. In Hurrelmann, K.& Ulich, D. *Neues Handbuch der Sozialforschung*, Weinheim - Basel, Beltz Verlag, 551-571.
- Wedege, T. (1998). ‘Adults Knowing and Learning Mathematics’. In: S. Tøsse et al. (Eds.) *Corporate and Nonconform Learning. Adult Education Research in Nordic Countries*, Trondheim, Tapir, 177-197.

Available now: The first ALM issue of *Literacy and Numeracy Studies*

In June 2001 during the ALM conference in Copenhagen the editors of *Literacy & Numeracy Studies: An International Journal in the Education and Training of Adults* offered to publish a special issue of the Journal focusing on adults learning mathematics. ALM was honoured to accept this offer and has delegated Dr. Gail FitzSimons (Australia) and Prof. Dr. Juergen Maasz (Austria, Chair of ALM) to edit this issue. The editors of the Journal have delegated local adult numeracy researchers Dr. Betty Johnston and Dr. Keiko Yasukawa (Australia) to complete the editing team of this special issue.

How do you get a FREE copy? For privacy reasons the trustees decided not to send the addresses of the ALM members to the journal. Please send an order mail with your post address to me: juergen.maasz@jku.at. I will send you your copy by mail.



Report on International Conference on Teaching Statistics (ICOTS 6): “Developing the Statistically Literate Society”, 7-12 July 2002, Cape Town, South Africa

Jeff Evans, Middlesex University, England

ICOTS-6 attracted about 550 or 600 participants. Like ALM, ICOTS attracts many practitioners. This year participants included a very international mix of:

- teachers of statistics at all levels, many of whom are relatively new to research;
- researchers from statistics /stochastics didactics, a small but rather distinct subset of mathematics education;
- those with a concern for the public understanding of statistics, especially those from national statistics offices, e.g. National Statistics in the UK, StatsCan in Canada, Australian Bureau of Statistics, etc.;
- those concerned with developing and marketing statistical software.

Abstracts for most speakers are available on the website: http://www.swin.edu.au/math/iase/Post_ICOTS6.html

For me, highlights included:

- Iddo Gal's (Israel) plenary lecture on Statistical Literacy, and Helen MacGillivray's (Australia) plenary panel on the same topic; readers will remember that Iddo was an ALM-5 plenary speaker at Utrecht;
- Jane Watson's (Aus.) plenary lecture on “Doing Research in Stats. Education”; though addressed to the statistics education community, Jane's talk had many good ideas for ALM participants: “As a single teacher with a good idea on how to teach ‘confidence intervals’ [a statistical technique], I do not expect anyone to pay much attention to me. If I can, however, place my ideas in the context of others' ideas or research on teaching confidence intervals, conduct a study [...] that is valid for considering the issue I want to promote in teaching about confidence intervals, and have my results refereed by peers in the field, then I can expect people to pay attention to me” (Abstract);
- many talks on service teaching of statistics, e.g. for managers, e.g. Corinne Hahn (France);
- talks emphasising the importance of relations of national statistical offices with the media, in order to maintain public support for their work, e.g. Martin Podehl (Canada);
- discussions of statistics for the citizen, or a community statistical service (Eric Sowe, Aus);

- discussion of teaching using “statistical assistant” software, such as EXCEL (Rodney Carr, Aus); and
- Siva Ganesh's (Aus) paper warning of the threat that “data mining” (artificial intelligence) software, using large “available” databases, such as those produced for supermarkets from the detailed correlation of shopping basket contents with demographic data held on “customer loyalty” cards.

I would especially recommend the latter paper to all those who hope to be teaching mathematics, statistics or numeracy in five / ten years' time.

I hope this will whet your appetite to have a look at the website. Many of these papers provide stimulating ideas about “gingering up” our teaching. In addition, at this stage of development of ALM, we need more colleagues to be active in producing research, as well as maintaining their grasp of their subject, and their teaching skills. Researching your own teaching and practice can be a valuable and rewarding way of building on these latter aspects. ▲

Mathematics or numeracy

from page 4

Johnston, B. (1994). Critical numeracy. *Fine Print*, 16(4), 32-36.

Johnston, B. and D. Tout (1995) *Adult numeracy teaching: making meaning in mathematics*. Melbourne: National Staff Development Committee.

Kaiser, G., Luna, E. and I. Huntley (eds.) (1999) *International comparisons in Mathematics Education*. London: Falmer Press.

LeRoux, A.A. (1979) *International Journal of Mathematical Education in Science and Technology*, 10, 343-354.

Manly, M. and D. Tout (2001). Numeracy in the Adult Literacy and Lifeskills project. In G.E. FitzSimons, J O'Donoghue and D. Coben (eds) (2001). *Adults and Lifelong Education in Mathematics*. Melbourne: ALM and Language Australia, 71-83.

NCCA (1999) *Primary School Curriculum: Introduction*. Dublin: Stationery Office.

NCTM (1989) *Curriculum and evaluation standards for school mathematics*. Reston, VA: NCTM.

Steen, L.A. (ed.) (1997) *Why numbers count: quantitative literacy for tomorrow's America*. New York: College Entrance Examination Board.

Morgan, M., Hickey, B. and Kellaghan, T. (1997) *International Adult Literacy Survey Results for Ireland*. Dublin: Stationery Office

Shiel G., Cosgrove, J., Sofroniou, N., Kelly, A. (2001) *Ready for Life? The literacy achievements of Irish 15-year olds with comparative international data—summary report*. Dublin: Educational Research Centre.

Tout, D (2001) What is numeracy? What is mathematics? In G.E. FitzSimons, J O'Donoghue and D. Coben (eds) (2001). *Adults and Lifelong Education in Mathematics*. Melbourne: ALM and Language Australia, 31-36. ▲



What Counts as Mathematics? Technologies of Power in Adult and Vocational Education by *Gail E. FitzSimons*

Kluwer Academic Publishers, Dordrecht, 2002, 280 pp.
Hardbound, ISBN 1-4020-0668-3, EUR 90 /USD 83
Paperback, ISBN 1-4020-0669-1, EUR 40 /USD 37

When first I heard the title of this book, the question “What counts as Mathematics?” reminded me of the Norwegian Stieg Mellin-Olsen who stated, in his *The Politics of Mathematics Education* (1987), that it is a political question whether folkmathematics is recognized as mathematics or not. Later, my reading of the new book on adult and vocational education has confirmed this thought: the book is in fact about mathematics and power. Gail FitzSimons states that the distribution of knowledge in society defines the distribution of power but she doesn’t stop there: “Mathematical knowledge is said to be empowering, but questions arise, such as: What mathematics? How much mathematics? For whom? Who decides? Who should decide?”

FitzSimons sets historical, sociological, and practical elements of mathematics within vocational education against the emerging impact of technology. The monograph presents an institutional study, attempting to account for the current situation of mathematics within the Australian vocational education and training (VET) sector. However, the study is applicable to other institutions of education internationally because the author involves international experiences, findings and theories all through her work. For example, she employs the construct of ‘institution’ to set a theoretical foundation with regard to, respectively, the discipline of mathematics, the field of mathematics education, and the field of vocational education and training. The concept of *institution* attends to patterns of social conduct and value; norms and rules, embodied within everyday activities provide them with coherence and meaning.

Another key concept is *technology* that emerges as a unifying construct for the complex relationships between mathematics and industry, and between mathematics and vocational education. Differences between the institution and the workplace are raised as sources of tension as well as offering new possibilities for vocational mathematics education, while recognising that notions of competence and indeed knowledge itself are non-neutral.

The book has seven chapters structured in four parts. After a prelude with FitzSimons’ personal view, from what she calls “a marginal position”, of the theoretical choices and aims of the work, the first two chapters set the scene from a mathematical perspective. They present reviews of literature focusing on the institutions and images of mathematics and mathematics education, on the one hand, and the relationship

between technology and mathematics in and for the workplace, on the other. An “Interlude” provides theoretical perspectives on technologies of power and new forms of knowledge production, drawing upon a range of intellectual work. However, the author has chosen Basil Bernstein’s concepts of symbolic control, pedagogy, and identity as they appear to provide the most coherent framing for this subject area. The next three chapters consider technologies of power – moving from the *micro-level* issues associated with teaching and learning, through the *meso-level* of curriculum and the conditions of teachers’ work, to the *macro-level* of knowledge production and distribution, where the de-institutionalisation of education looms as a serious challenge.

The book concludes with discussion of unresolved policy, research, and practical issues. FitzSimons explores possibilities for developments on a structural level and, drawing on the literature of pedagogies intended to combat racism, on an individual level for teachers and students to address issues of identity formation.

Gail FitzSimons has a highly professional and personal engagement in the borderland between the fields of research and practice in mathematics, adult education and vocational education. She draws on an extensive literature base (about 500 titles), as well as two decades of practical teaching experience, to critique the impact of neoliberal policies upon mathematics education. Time after time, she points to the lack of research in this area. With her interdisciplinary study, FitzSimons has given us both multiple perspectives on the very complex issue of adults’ vocational mathematics and a series of new research questions. At the same time, her overwhelming insight into multiple disciplines (pedagogy, sociology, history, philosophy, etc.) makes real for me the question about the identity of our research field in “Adults Learning Mathematics.” I am sure that we will see many references from all parts of mathematics education to FitzSimons’ comprehensive work, which has made visible this new area of research.

Tine Wedege, Roskilde University, Denmark

Visit the ALM website
The address is: <http://www.alm-online.org>

ALM NEWS



Learning Mathematics to live and work in our world ALM 10 conference in Austria (Strobl) Provisional Program:

Sunday 29th June 2003

09:00 - 18:00	Registration
18:00 - 19:00	Dinner
19:00 - 19:10	Welcome from the Conference Chair
19:10 - 20:40	Plenary Lecture (including discussion): Prof. Dr. H. Engl, Uni Linz: "Industrial Mathematics Mathematics and Industry - A Relation for Mutual Benefit"

Monday 30th June

08:00 - 09:00	Breakfast
08:30 - 09:00	Late and Day Registration continued
09:00 - 09:30	Welcome Addresses
09:30 - 10:45	Plenary Lecture: Dr. M. van Groenestijn, Uni Utrecht: "Numeracy in Everyday Life"
10:45 - 11:15	Refreshments
11:15 - 12:30	Paper presentations / workshops / session
12:30 - 14:00	Lunch
14:00 - 14:45	Paper presentations / workshops / sessions
14:45 - 15:15	Refreshments
15:15 - 16:45	Topic Group / Discussion Group (1)
16:45 - 17:00	Break
17:00 - 18:30	Panel discussion: Adults Learning in Austria: History, Facts, Trends Dr. Fritz Bauer, AK OÖ, and Dr. A. Schneeberger, WIFI (IBW)
18:30 - 19:30	Dinner
19:30 - 21:00:	Preparing the AGM: ALM trustees meeting open for members

Thursday 1st July

08:00 - 09:00	Breakfast
09:00 - 10:15	Plenary Lecture: Dr. T. Wedege, Uni Roskilde: "Sociomathematics - Researching adults' mathematics in work"
10:15 - 10:45	Refreshments
10:45 - 11:30	Paper presentations / workshops / sessions
11:30 - 11:45	Break
11:45 - 12:30	Paper presentations / workshops / sessions

12:30 - 14:00	Lunch
14:00 - 15:30	Topic Group / Discussion Group (2)
15:30 - 16:00	Refreshments
16:00 - 18:30	AGM
19:00	Conference Dinner with traditional Austrian folk music ("Stubenmusi")

Wednesday 2nd July

08:00 - 09:00	Breakfast
09:00 - 10:15	Plenary Lecture (including discussion):: Prof. Dr. R. Strässer (Sweden): "Mathematics at Work: Adults and Artefacts"
10:15 - 10:45	Refreshments
10:45 - 12:30	Plenary - International Perspective on Adult Numeracy
12:30 - 14:00	Lunch

Adults Learning Mathematics - a research forum: Annual General Meeting Thursday 18 July 2002 5.00pm Uxbridge College, Uxbridge, Middlesex, UK.

The meeting was attended by 32 members and 7 visitors.

1 Minutes of AGM 2001

The minutes of the AGM held on Thursday 28 June 2001 were accepted as a true record with one amendment. The name of 'Sylvia Johnson - Membership Secretary' was added to the list of elected Officers (Item 5).

2 Trustees' Report

The report by the Chair, Juergen Maasz, on behalf of the Trustees had been previously circulated.

The following items were raised in the discussion.

The plans for future ALM conferences were to hold ALM10 (2003) in Austria, ALM11 (2004) in Northern Europe, and ALM12 (2005) possibly in Australia. The Trustees had agreed to issue guidelines to members to encourage bids for future conferences with the following deadlines: for ALM11 31 December 2002 and for ALM12 April 2003.

A special issue of Studies in Literacy and Numeracy (an Australian publication) on ALM issues is being produced. Agreed the Trustees should investigate the cost of purchasing a copy of this special issue for each member, to the mutual benefit of ALM and the journal; if not an unreasonable cost to buy and distribute to each member.



Jeff Evans and John O'Donoghue introduced a discussion on a number of suggestions to find an ALM publisher. Various issues were raised concerning the cost, length of contract, marketing and publicity experience, academic reputation, relationship to publishing proceedings annually and links to ALM. There were no volunteers to form a sub-committee, so the initial stages will remain with the ALM9 organising committee who have still to agree on publishing arrangements for the proceedings.

Alison Tomlin reported that a proposal to work on a book with NIACE (National Institute for Adult Continuing Education) was still pending. No further progress to report.

3 Treasurer's Report

Sue Elliott, the Treasurer distributed a written report with a summary of the ALM accounts and balances for the period 2 June 2001 to 1 June 2002. Additional notes to the account showed that our current balance is about 11,600. A separate account of the ALM8 conference was distributed for the information of members. It was noted that the ALM8 conference had been very generously supported by the Centre for Research in Learning Mathematics (Roskilde & Aalborg Universities, Danish University of Education).

The following points arose in discussion.

It was noted that income from the sale of proceedings had reduced from 77.19 in 2000/2001 to 17.22 in 2001/2002.

The cost of the website was clarified.

A visitor informed the meeting that it may be a good idea to investigate the advantages of using the Charities Aid Foundation (CAF) bank.

The accounts were accepted (Moved by Jeff Evans and Seconded by Dhamma Colwell).

4 Membership

In the absence of the membership secretary Sue Elliott reported that the number of paid up members was approximately 110.

5 Elections

The Company Secretary gave the following election report.

Under the constitution (Articles of Association) the Officers and Trustees must all stand for election each year. There is provision to elect four officers (Chair, Company Secretary, Treasurer and Membership Secretary) and four additional Trustees (Article 30). There is also provision for the Trustees to appoint four additional Trustees.

Since there were 10 Officers and Trustees willing to continue in office and two new Trustees nominated it was proposed that the meeting agree to the following nominations.

Chair	Juegen Maasz*
Company Secretary	David Kaye*
Treasurer	Sue Elliott*

Membership Secretary	Valerie Seabright
Elected Trustee	Tine Wedege*
“	Alison Tomlin*
“	Lisbeth Lindberg
“	Mieke van Groenestijn*
Appointed Trustees	Diana Coben*
“	Kathy Safford*
“	Jeff Evans*
*	John O'Donoghue*

The meeting agreed to this procedure.

Those marked * were continuing in Office and were formally proposed and seconded by Caz Randall and Valerie Seabright. Valerie Seabright was nominated by Jeff Evans and seconded by John O'Donoghue. Lisbeth Lindberg was nominated by Valerie Seabright and Seconded by Marta Civil. All Officers and elected Trustees were elected without opposition. The other Trustees would be appointed immediately the new Trustees next meet.

6 Website

Mieke van Groenestijn reported on the use of the ALM website. Since the beginning of 2002 there had been 34 162 hits (visits to pages) and 4 828 unique visits (individuals). Since these were a half year figure it looked like use of the website was double that recorded for last year.

Juergen Massz advised members that the ALM members list was to be re-started, putting members email addresses onto a closed list. There would be an option withdraw (unsubscribe) and members who had shown on their application form a particular request not to have their email address used, would not be included. Another email list - for vocational education, had not been used and was to be closed down.

7 Newsletter

The newsletters had been produced during the last year by Mieke van Groenestijn, Tine Wedege and Dave Tout. Mieke made a general appeal for articles to be submitted.

8 ALM 10

Juergen informed the meeting that the next conference will be in Strobl, Austria from Sunday 29 June 2003 to Wednesday 2 July 2003.

9 Future Developments

John O'Donoghue urged the Trustees and members to give more emphasis to recruiting more members. It was suggested each member should try to recruit one other - and thus double our membership.

10 Other Business

Richards Angiama proposed that we should ensure that the Danish authorities who supported ALM8 are thanked appropriately. The meeting agreed.

The meeting ended at 6.30pm.





About ALM

Company No. 3901346
Charity No. 1079462

Adults Learning Maths - A Research Forum (ALM) is an international research forum bringing together researchers and practitioners in adult mathematics/numeracy teaching and learning in order to promote the learning of mathematics by adults.

What is ALM?

ALM was formally established at the Inaugural Conference, ALM-1, in July 1994 as an international research forum with the aim to promote the learning of mathematics by adults through an international forum which brings together those engaged and interested in research and developments in the field of adult mathematics/numeracy teaching and learning.

ALM is a forum for experienced and first-time researchers to come together and share their ideas and their reflections on the process as well as the outcomes of research into hitherto neglected area of adults learning mathematics. ALM puts people in touch with each other, providing a framework for collaboration and helping to stimulate and develop research plans. We are especially keen to encourage practitioners to undertake research.

Since 1994, ALM has gone from strength to strength and now has 140 members in 19 countries. In 2000, it was registered as a company and as a charity in England and Wales.

What does ALM offer?

ALM membership brings with it opportunities to:

- contribute to an international forum of researchers and practitioners in the field
- share concerns, insights and research at ALM annual conferences, and to attend at a reduced rate
- receive ALM newsletter (free)
- receive ALM conference proceedings (free of charge to conference delegates). These proceedings constitute the most significant and authoritative collection of papers on adults learning mathematics available today
- network, electronically and otherwise, with practitioners and researchers in the emerging field of adults learning mathematics.

ALM Officers

Chair: Prof. Dr. Juergen Maasz,
University of Linz, Austria

Secretary: David Kaye, London

Treasurer: Sue Elliott, Sheffield Hallam University

Membership Secretary: Valerie Seabright,
Uxbridge College, UK.

Join ALM today!

ALM is actively seeking to expand its membership worldwide. Membership is open to all individuals and institutions who subscribe to its aims. For details contact Valerie Seabright, Park Road, Uxbridge, UB8 1NQ, UK. Ph: 01895853415, email: vseabright@uxbridgecollege.ac.uk, or your regional ALM membership agent:

ARGENTINA Dr Juan Carlos Llorente, Fundacion PAIDEIA, Instituto de Investigacion Educativa, Mitre 862 (8332), Gral Roca, RN, Argentina. Email: JCLlorente@paideia.edu.ar

AUSTRALIA Dr Janet Taylor, Office of Preparatory and Academic Support, Uni. of Southern Queensland, Toowoomba, Queensland, 4350 Australia. Email: taylorja@usq.edu.au

BRAZIL Eliana Maria Guedes, Dept. of Architecture, Mathematics and Computing, UNITAU, University of Taubaté, Sao Paulo, Brazil. Email: emg@aquarius.com.br

DENMARK Dr. Tine Wedege, IMFUFA, Roskilde University, Box 260, 4000 Roskilde, Denmark. Email: tiw@ruc.dk

NEW ZEALAND Barbara Miller-Reilly, Student Learning Centre, The University of Auckland, Private Bag 92019, Auckland, N.Z. Email: Barbara@math.Auckland.ac.nz

REPUBLIC OF IRELAND Prof. John O'Donoghue, Dept of Maths and Statistics, University of Limerick, Limerick, Ireland. Email: John.ODonoghue@ul.ie

THE NETHERLANDS Dr. Mieke van Groenestijn, Utrecht University of Professional Education, PO Box 14007, 3508 SB, Utrecht, The Netherlands. Email: Mieke.v.Groenestijn@feo.hvu.nl

UNITED KINGDOM Sue Elliott, Centre for Mathematics Education, Sheffield Hallam University, 25 Broomsgrove Road, Sheffield S10 2NA, UK. Email: S.Elliott@shu.ac.uk

USA Dr Katherine Safford, Saint Peter's College, Kennedy Boulevard, Jersey City, NJ 07306, USA. Email: RamusLTD@spc.edu

Membership fees

Individual:	£15	Institution:	£30
Student/unwaged:	£3		

Editorial Committee

Mieke van Groenestijn Utrecht University of Professional Education, Netherlands

Dave Tout Language Australia

Tine Wedege Roskilde University, Denmark

And thanks to Alison Tomlin for help with editing articles.

For more information email: newsletter@alm-online.org

The views expressed in articles are those of the authors and do not necessarily represent the views of ALM or of the editorial committee.

Printed on recycled paper.