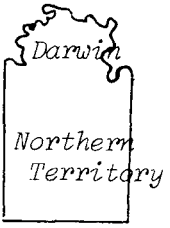
THE MATHEMATICS OF CARD PLAYING IN AN ABORIGINAL COMMUNITY



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TEACHING MATHEMATICS TO ABORIGINAL CHILDREN

The teaching of mathematics to Aboriginal children poses many difficulties for teachers. Aboriginal and non-Aboriginal teachers agree that many Aboriginal children are not making adequate progress in their development of mathematical understanding. The teaching of mathematics in Aboriginal communities is discussed in the Northern Territory Infants Curriculum (1974 : 119-123). After reviewing the outcomes of a desirable mathematics course the curriculum writers conclude that "many Aboriginal children do not manifest many of these outcomes at a level comparable with that obtained by European children".

John Gay and Michael Cole have written a very valuable book, *The New Mathematics and an Old Culture*, which examines the teaching of mathematics in a cross-cultural situation. They state that

> "... in order to teach mathematics effectively, we must know more about our students. In particular we must know more about the indigenous mathematics so that we can build effective bridges to the new mathematics we are trying to introduce." (Gay and Cole, 1967:1)

Little research has been carried out into Aboriginal mathematics. De Lemos, Dasen, de Lacey and others have studied concept development in Aboriginal children which has significant implications for the teaching of mathematics but it seems that no one has studied the ways in which Aboriginal children and adults actually use mathematics. This paper is a plea for teachers to carry out small research projects of this kind. In particular it is a plea to Aboriginal teachers to observe themselves and others in their community from a mathematical viewpoint. The idea of writing this paper arose from a comment made by Lionel Japanangka that part of the problem

Aboriginal children have with mathematics results from the way mathematics is used in playing cards.

THE ABORIGINAL CARD GAME AT HOOKER CREEK

In playing cards at Hooker Creek the picture cards from the deck are discarded so that the four suits (hearts (H), diamonds (D), spades (S), clubs (C)) of cards from 1 (ace) to 10 are used. These forty cards are dealt to eight players, giving each player five cards. Having received the five cards each player examines them to discover if any three combine to form a sum of 10, 20 or 30. For example 10H + 10C + 10D = 30, or 5S + 9C + 6S = 20, or 3S + 2D + 5C = 10. If a three card sum of 10, 20 or 30 cannot be formed by a player he has not got "a number" and is not entitled to take further part in the game. Players with three card sums of 10, 20 or 30 have qualified to proceed with the game : they have "a ten". There is no advantage in obtaining 30 over 20 or 10. Any of these totals is called "a ten" and it allows the player to proceed with the game.

Each player who has qualified to proceed then sums the remaining two cards to obtain his "number". This "number" is not necessarily the total of the two cards but is derived from the two card sum in the following way. If the two card sum is 10 or less, then that sum becomes the player's "number". For example a player with 2H and 3S has a "number" of 5. If the two card sum is more than 10 then the units figure becomes the player's "number". A player with 8C and 4D has a two card sum of 12 but his "number" is 2. The player with the largest "number" wins. To illustrate more fully, the cards received by eight players are shown on the table (P.22). In this illustration the winner is Player E.

IMPLICATIONS FOR TEACHING MATHEMATICS

Children of all ages, (perhaps as young as six or seven years of age), as well as adults play this game at Hooker Creek. Combinations of two and three numbers to a total of 30 are therefore very relevant learning experiences for these children. Reflection on the ways in which mathematics is used in the game, however, indicates that there are a number of probable difficulties associated with it that require special planning and attention by teachers.

First, there is a danger that concepts developed in playing cards will not be sufficiently established to generalise to other mathematical situations. The children must understand that not only

does	5 Hearts	+ 4 Diamonds	= 9
but also	5 men	+ 4 boys	= 9
and	5 dogs	+ 4 stones	= 9

Experience with a wide variety of concrete materials will be necessary to ensure that the children are able to combine different classes of objects to form a new kind of class so that they are able to perform the logical addition of classes (Williams and Shuard, 1970:33).

Second, in the game the three card sums of 10, 20 or 30 are simply referred to as "a ten". There is no practical difference between 10, 20 or 30. Much experience with concrete materials designed to differentiate between 10, 20 and 30 will be required so that children develop adequate concepts of these numbers. In particular, emphasis should be given to 10 as "1 ten", 20 as "2 tens" and 30 as "3 tens".

Third, the practice of disregarding the tens figure and only counting the units figure in the two card total also requires particular attention by the teacher of mathematics. In practical terms there is no difference between 2 and 12, but 7 is regarded as being greater than 16. The children must understand that the card game is played under certain rules but these rules are not the laws of mathematics. It must be understood that 5 Hearts and 6 Diamonds still equals 11 and that it is only for the sake of the game that it is called 1.

Fourth, teachers need to ensure that the children do not develop a set of "school" mathematical concepts and a set of "cards" mathematical concepts. Williams' (1972) research at Elcho Island suggests that Aboriginal children live in three worlds - home, peer group and school. Mathematics must be understood as being true and constant and therefore applicable to any mathematical context whether at school, in the peer group or at home.

CONCLUSION

This paper has, in a very minor way, tried to apply Gay and Cole's principle of using an understanding of indigenous mathematics to assist in planning for teaching "conventional" mathematics to Aboriginal children. This examination of Aboriginal card playing has suggested several areas which require special attention in teaching Aboriginal children. If small studies of this type were carried out in many Aboriginal communities and the results of these studies

were reported in publications to which teachers regularly have access, then gradually a body of information on Aboriginal mathematics would be compiled which would permit all teachers to more adequately plan for the teaching of mathematics to Aboriginal children. Teachers who are interested in this type of research would get many ideas from Gay and Cole. Topics contained in their book include Sets, Classification, Counting Systems, Equality and Inequality, Order Properties, Geometrical Terms, Location Terms, and Language and Logic.

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References

Gay, J. and Cole, M.: *The New Mathematics and an Old Culture*, Holt, Rinehart and Winston, New York, 1967.

Infants Curriculum. Darwin, Department of Education, 1974

Williams, D.: At home, at school, at play. *Special Schools Bulletin*, 1972, 9, (3), 2-7.

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Player	Cards Received	3 Card Sum	2 Card Sum	Player's 'Number'
A	1H 7D 5S 8S 7H	7D + 5S + 8S = 20	1H + 7H = 8	8
B	9H 6S 9C 5H 4C	6S + 9C + 5H = 20	9H + 4C = 13	3
C	6D 4D 5C 10C 9S	6D + 5C + 9S = 20	4D + 10C = 14	4
D	8H 2D 7C 2S 3S	3 cards ≠ 10 20 or 30	-	No 'number'
E	1D 3D 2H 8D 6C	1D + 3D + 6C = 10	2H + 8D = 10	10
F	1S 7S 8C 4H 3C	3 cards ≠ 10, 20 or 30	-	No 'number'
G	3H 4S 2C 5D 9D	3H + 2C + 5D = 10	4S + 9D = 13	3
H	10S 6H 10D 1C 10H	10S + 10D + 10H = 30	6H + 1C = 7	7