



**BUKU KOLEKSI ARTIKEL
PENYELIDIKAN TINDAKAN
SEMINAR PENYELIDIKAN TINDAKAN
TAHUN 2010
INSTITUT PENDIDIKAN GURU
KAMPUS BATU LINTANG
(MATEMATIK PENDIDIKAN RENDAH)**

Tema

**Penyelidikan tindakan menjana
kecemerlangan pendidikan**

pada

7 hingga 8 Oktober 2010

di

**Institut Pendidikan Guru
Kampus Batu Lintang**

anjukan

**Institut Pendidikan Guru
Kampus Batu Lintang**

terbitan

**INSTITUT PENDIDIKAN GURU
KAMPUS BATU LINTANG**

Buku Koleksi Artikel Penyelidikan Tindakan
Seminar Penyelidikan Tindakan Tahun 2010,
IPG KBL (Matematik Pendidikan Rendah)

Institut Pendidikan Guru Kampus Batu Lintang,
Jalan College,
93200 Kuching,
Sarawak.

ISBN: 978-983-2827-03-0

Cetakan Pertama: 2010

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**JAWATANKUASA PENERBITAN
BUKU KOLEKSI ARTIKEL PENYELIDIKAN TINDAKAN
SEMINAR PENYELIDIKAN TINDAKAN TAHUN 2010
IPG KAMPUS BATU LINTANG
(MATEMATIK PENDIDIKAN RENDAH)**

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Chai Yapp Chien	Chin Jet Yi	Dohnny Hii Wui Ming
Kueh Li Chun	Kueh Swee Sen	Lee Jing Ying
Lee Shan Ling	Lo Si Gan	Loi Hui Lang
Ngu Ling Yieng	Ron Wee Chee Lon	Siao Chin Tze
Sii Ai Lin	Sim Lee Sin	Tan Ley Ping
Tan Sie Yung	Ting Wei Ung	Yeo Cai Wat

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**RASIONAL DAN OBJEKTIF
SEMINAR PENYELIDIKAN TINDAKAN TAHUN 2010
IPG KAMPUS BATU LINTANG**

1.0 PENGENALAN

Program Ijazah Sarjana Muda Perguruan (PISMP) (dengan kepujian) mengkehendaki penyelidikan tindakan dilaksanakan oleh para pelajar yang menyertai program latihan praperkhidmatan kurikulum mata pelajaran teras major pada Semester 7 dan 8 di semua IPG di Malaysia. Pada tahun 2010, tiga (3) kumpulan pelajar PISMP di IPG KBL yang sudah melaksanakan penyelidikan tindakan mereka dikehendaki berkongsi dapatan kajian mereka. Justeru, Jabatan Penyelidikan dan Inovasi Profesionalisme Keguruan dengan kerjasama rakan-rakan dari Jab. Pengajian Melayu, Jab. Bahasa (Unit Bahasa Cina) dan Jab. Matematik bergabung tenaga bersama para pelajar PISMP ambilan Januari 2007 menganjur seminar ini. Selain perkongsian dapatan kajian pelajar berkenaan, seminar ini juga berperanan sebagai landasan yang memberi pendedahan aspek pengendalian dan pengurusan seminar dalam kalangan pelajar PISMP bukan sahaja dari segi teori tetapi melalui amali.

2.0 RASIONAL

Penyelidikan tindakan merupakan salah satu cara mewujudkan amalan refleksi secara sistematik yang berasaskan data terhadap pengajaran dan pembelajaran dalam bilik darjah. Amalan refleksi ini membolehkan pelajar selaku bakal pendidik membuat inovasi pengajaran dan pembelajaran di bilik darjah. Amalan yang berterusan ini mampu mencapai salah satu daripada hala tuju IPG iaitu cemerlang dalam pengajaran dan pembelajaran. Apabila proses membuat refleksi secara kitaran dan lingkaran dikongsi bersama dalam majlis ilmu seperti seminar, para pelajar selaku bakal pendidik dapat membuat penambahbaikan amalan di bilik darjah.

Peningkatan profesionalisme keguruan perlu dilihat sebagai sesuatu yang mempunyai kesinambungan dan perlu bermula daripada bakal guru iaitu para pelajar kita. Justeru, seminar ini diadakan sebagai satu landasan yang memberi peluang serta

pengalaman kepada pelajar dalam mengurus dan mengendalikan seminar. Selain memenuhi kehendak pro forma, seminar ini perlu dilihat sebagai nilai tambah kepada aktiviti kurikulum pelajar di IPG KBL. Pengalaman ini diharap dapat meningkatkan keyakinan diri serta memberi dorongan dan inisiatif kepada pelajar untuk berjinak-jinak dengan budaya penyelidikan. Pengalaman ini juga boleh dijadikan panduan kepada pelajar dalam mengurus dan mengendalikan seminar penyelidikan apabila ditempatkan di sekolah kelak.

3.0 OBJEKTIF

Secara amnya, seminar penyelidikan ini berhasrat menyediakan landasan untuk:

- (i) melatih pelajar mengurus dan melaksanakan seminar penyelidikan;
- (ii) melatih pelajar berkongsi dan menyebarkan dapatan kajian mereka;
- (iii) memberi pengalaman kepada pelajar membentang dan mendapat maklum balas untuk penambahbaikan kajian dalam seminar; dan
- (iv) memenuhi kehendak pro forma kursus teras major PISMP Semester 8.

JADUAL SEMINAR PENYELIDIKAN TINDAKAN TAHUN 2010

Tema: "Penyelidikan Tindakan Menjana Kecemerlangan Pendidikan"

Tarikh: 7 Oktober 2010 (Khamis)

Masa	Aktiviti
0730-0800	Pendaftaran
0800-0830	Majlis Perasmian Pembukaan
0830-0900	Ucap Utama
0900-0930	Sesi 1 (Selari)
0930-1000	Sesi 2 (Selari)
1000-1030	Kudapan Pagi
1030-1100	Sesi 3 (Selari)
1100-1130	Sesi 4 (Selari)
1130-1200	Sesi 5 (Selari)
1200-1230	Sesi 6 (Selari)
1230-1400	Rehat
1400-1430	Sesi 7 (Selari)
1430-1500	Sesi 8 (Selari)
1500-1530	Sesi 9 (Selari)
1530-1600	Sesi 10 (Selari)
1600-1630	Sesi 11 (Selari)
Bermula 1630	Majlis Bersurai

Tarikh: 8 Oktober 2010 (Juma'at)

Masa	Aktiviti
0730-0800	Sesi 12 (Selari)
0800-0830	Sesi 13 (Selari)
0830-0900	Sesi 14 (Selari)
0900-0930	Sesi 15 (Selari)
0930-1000	Kudapan Pagi
1000-1030	Sesi 16 (Selari)
1030-1100	Sesi 17 (Selari)
1100-1130	Sesi 18 (Selari)
1130-1430	Rehat
1430-1500	Sesi 19 (Selari)
1500-1530	Sesi 20 (Selari)
1530-1600	Penilaian Keseluruhan Seminar
1600-1630	Majlis Perasmian Penutupan
Selepas 1630	Majlis Bersurai

SENARAI PEMBENTANG DAN TAJUK ARTIKEL PENYELIDIKAN TINDAKAN

Sesi selari 1: Jam 900 – 930			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
PCina	Chung Siau Khun	多媒体教学进行华文课课堂有助于改善三年级学生的学习兴趣 Penggunaan TMK menambahkan minat belajar murid Tahun Tiga dalam Pengajaran Bahasa Cina	DK A
P.Mt	Chai Yapp Chien	Using Cooperative Learning to Improve Primary Four Pupils' Learning, Interest and Participation in Mathematics	DK B
P.Melayu	Abdul Kareem Firdaus bin Abdul Razak	Pembelajaran Masteri untuk Mengatasi Masalah Menulis Huruf Besar dan Huruf Kecil dalam Penulisan Perkataan dan Ayat Murid Tahun 4	BK A02 & A03
Sesi selari 2: Jam 930 – 1000			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
PCina	Hii Mei Ling	运用字理识字法提升小学五年级识字能力的效果 Kesan Penggunaan Hukum Pengurusan Keaksaraan bagi Meningkatkan Pengetahuan Aksara Cina di Kalangan Murid Tahun 5	DK A
P.Mt	Tan Sie Yung	The Effect of Cooperative Learning on Students' Interest and Learning in a Primary Three Mathematics Classroom	DK B
P.Melayu	Adrian Stewart Ngau	Kesan Rumus Pelaku + Perbuatan + Keterangan dalam Menguasai Kemahiran Membina Ayat Karangan Bahagian A Bahasa Melayu dalam Kalangan Murid Tahun 4	BK A02 & A03
1000 – 1030 Kudapan pagi			
Sesi selari 3: Jam 1030 – 1100			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
PCina	Lau Diu Sin	运用多媒体来进行识字教学是否能够提高四年级学生的学习兴趣而提升他们的识字能力 Keberkesanan Penggunaan PowerPoint dalam Memupuk Minat Murid Tahun Empat dalam Mengenal Aksara Cina	DK A
P.Mt	Dohnny Hii Wui Ming	Using Cooperative Learning to Improve Primary Four Pupils' Learning, Interest and Participation in Mathematics	DK B
P.Melayu	Ahmad Durani bin Suip	Memperbaiki Kekemasan Tulisan Cantik Murid Tahun 3 Melalui Kaedah Penulisan Berperingkat	BK A02 & A03
Sesi selari 4: Jam 1100 – 1130			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Yii Shie Hui	部件分析法激发学生识字 Penggunaan Cara Analisis Struktur Aksara menyebabkan Murid berminat untuk Mengenal Aksara Cina	DK A
P.Mt	Chin Jet Yi	The Use of Cooperative Learning in Teaching Primary Three School Mathematics	DK B
P.Melayu	Anisah bt. Anuar @ Yong Hui Ming	Membetulkan tulisan huruf 'K' dan 'S' Kecil Murid Tahun 3K untuk Bahasa Melayu Melalui Penggunaan Lembaran Kerja Berkembar Tiga Dibantu Oleh Carta Huruf Besar dan Kecil Serta Kaedah Ansur Maju	BK A02 & A03
Sesi selari 5: Jam 1130 – 1200			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Chain Wee Yung	运用字理识字法指导小学三年级学生的识字 Menggunakan Cara "Zi Li Shi Zi" untuk Mengajar Mengenal Aksara Cina Murid Tahun 3	DK A
P.Mt	Siao Chin Tze	The use of Cooperative Learning as a Part of Mathematics Lesson to Improve Pupils' Learning and Interest in a Primary Three Class	DK B
P.Melayu	Assrudi bin Musa	Meningkatkan Kemahiran Mengarang Berkaitan Nilai-Nilai Murni dengan Menggunakan Kaedah Pelan Maklumat	BK A02 & A03

Sesi selari 6: Jam 1200 – 1230			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Jimmy Chiew Lian Chiong	应用田字格教学生生字 Penggunaan 'Tian Zi Ge' dalam Pengajaran Penulisan Aksara Cina Murid	DK A
P.Mt	Kueh Swee Sen	Use of Finger Method in Learning Multiplication Among Primary Three pupils	DK B
P.Melayu	Carmelya Loyanto ak Bronie	Mengatasi Kelemahan Penggunaan Huruf Besar di Hadapan Ayat Melalui Imej Visual	BK A02 & A03
1230 – 1400		Rehat / Makan tengah hari / Solat Zohor	
Sesi selari 7: Jam 1400 – 1430			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Ngieng Ing Hung	联想识字, 轻松学习 Menggunakan Imajinasi untuk Mengenali Aksara Cina menyebabkan Murid belajar dengan gembira	DK A
P.Mt	Kueh Li Chun	The Effectiveness of Using PowerPoint Presentation in Teaching Primary Four Mathematics	DK B
P.Melayu	Caroline ak Galin	Kesan Jigsaw dalam Pengajaran dan Pembelajaran Kata Adjektif	BK A02 & A03
Sesi selari 8: Jam 1430 – 1500			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Yeo Pei Pei	诵读《三字经》创设欢愉学习气氛, 让学生体验识字兴趣 Pembacaan San Zi Jing menyediakan suasana pembelajaran yang seronok, membolehkan murid-murid Menghayati Keseronokan Mempelajari Aksara Cina	DK A
P.Mt	Audrey Liaw Wen Ya	Using Cooperative Learning Strategy in a Primary Two Mathematics class	DK B
P.Melayu	Cindy Lairie ak Sojep	Mengatasi Masalah Mencampuradukkan Huruf Besar dan Huruf Kecil untuk Mata Pelajaran Bahasa Melayu dalam Kalangan Murid Tahun 3 Menggunakan Kaedah Cepak Menulis	BK A02 & A03
Sesi selari 9: Jam 1500 – 1530			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Cecilia Kho Hui Chen	表演法朗读与朗读训练的作用 Penggunaan Teknik Lakonan dalam Membantu Pembacaan Teks Murid Tahun Empat	DK A
P.Mt	Sii Ai Lin	The Use of Cooperative Learning to Enhance Year 4 Pupils' Learning and Interest in Mathematics	DK B
P.Melayu	Dayang Norliza bt Awang Yem	Kesan Kaedah Ansur Maju Bagi Mengurangkan Kesilapan Menulis Huruf 'k' dan 'p' Murid Tahun 5	BK A02 & A03
Sesi selari 10: Jam 1530 – 1600			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Ellen Cham Shwu Yuh	"短语"对小学四年级学生在华文识字教学里的功效。 Kesan Frasa Kata terhadap Murid Tahun Empat dalam Pengajaran dan Pembelajaran Mengenali Aksara Bahasa Cina	DK A
P.Mt	Lo Si Gan	Classroom Management and Mathematics Learning of Slow Learners in a Primary Four Class	DK B
P.Melayu	Dayang Nurmalisa bt Abg Mohd Selanie	Kesan Pendekatan Bimbingan Individu dalam Membantu Murid Tahun 3 Membaiki Tulisan yang Halus dan Rapat Menjadi Lebih Besar dan Jelas	BK A02 & A03
Sesi selari 11: Jam 1600 – 1630			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Ling Ka San	活泼生动表演法对二年级同学朗读能力的功效 Keberkesanan Teknik Berlakon Terhadap Kemahiran Membaca Teks Murid Tahun 2	DK A
P.Mt	Ang Yi Hui	The Use of Cooperative Learning Strategy in Teaching Primary Four Mathematics	DK B
P.Melayu	Freddy Xaviers ak Jamil	Kesan Penggunaan Peta Minda yang Berunsurkan Kata Tanya dalam Mengolah Isi Karangan Jenis Keperihaln Bahasa Melayu dalam Kalangan Murid Tahun 5	BK A02 & A03
Selepas 1630 Majlis bersurai			

ATUR CARA SEMINAR PENYELIDIKAN TINDAKAN 2010

Jumaat, 8 Oktober 2010

Sesi selari 12: Jam 730 – 800			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Wong Sin Ruh	“找朋友”对二年级非华裔学生在华文识字教学里的功效 Kesan Mencari Kawan terhadap Murid-murid Bumiputera Tahun Dua dalam Pengajaran dan Pembelajaran Mengenai Aksara Bahasa Cina	DK A
P.Mt	Tan Ley Ping	The Use of Cooperative Learning in Teaching Primary Four Mathematics	DK B
P.Melayu	Lina Ping Madang	Penggunaan Kertas Kotak Bergaris dalam Membantu Murid Tahun 2 Menulis Huruf 'J' besar dan huruf 'j' Kecil dengan Betul semasa Menjawab Soalan Kefahaman BM Tahun 2	BK A02 & A03
Sesi selari 13: Jam 800 – 830			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Law Seng Hie	运用循序渐进原则来指导硬笔字书写能够改善三年级学生的字体美观 Penggunaan Kaedah Unsur Maju untuk Memperbaiki Kekemasan Tulisan Aksara Cina Murid Tahun 3	DK A
P.Mt	Yeo Cai Wat	The Effectiveness of Using Song in Teaching Primary 5 Mathematics	DK B
P.Melayu	Marc Brady ak Mamut	Kesan Sistem Mata Ke Atas Penggunaan Dialek Melayu Sarawak Ketika Sesi Perbincangan dalam Pengajaran dan Pembelajaran Bahasa Melayu Tahun 3	BK A02 & A03
Sesi selari 14: Jam 830 – 900			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Lee Lih Chyng	运用循序渐进原则来指导硬笔字书写能够改善小学四年级学生的字体美观 Membaiki Tulisan Aksara Cina Murid Tahun Empat dengan Menggunakan Kaedah Ansur Maju	DK A
P.Mt	Lee Shan Ling	The Use of Cooperative Learning to Promote Students' Learning and Interest in Primary Five Mathematics	DK B
P.Melayu	Mary Charity ak Jitiep	Kesan kata tanya 'di mana' dalam membantu murid tahun 4 menulis kata sendi nama 'di' dalam ayat Bahasa Melayu	BK A02 & A03
Sesi selari 15: Jam 900 – 930			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Tan Ching Ching	运用循序渐进原则来指导写字能够改善小学三年级学生书写硬笔字的美观 Memperbaiki Kekemasan Tulisan Aksara Cina Murid Tahun Tiga dengan Kaedah Unsur Maju	DK A
P.Mt	Ngu Ling Yieng	Cooperative Learning in a Primary Four Mathematics Class	DK B
P.Melayu	Micheal ak Saten	Kesan Bimbingan Secara Individu untuk Membantu Murid Tahun 4 Mengatasi Masalah Penggunaan Huruf Besar dan Kecil dalam Matapelajaran Bahasa Melayu	BK A02 & A03
930 – 1000 Kudapan pagi			
Sesi selari 16: Jam 1000 – 1030			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Ha Tiing Wei	使用田字格引导二年级学生书写端正整齐的汉字 Keberkesanan Penggunaan "Tian Zi Ge" dalam Pembaikan Penulisan Aksara Cina Murid Tahun 2	DK A
P.Mt	Lee Jing Ying	The Use of Cooperative Learning Method in Teaching Primary Two Mathematics	DK B
P.Melayu	Morrission Jemment ak Jonathan	Memperbaiki Tahap Penulisan Karangan Bahasa Melayu Murid Tahun 5 dengan Menggunakan Peta Minda	BK A02 & A03

Sesi selari 17: Jam 1030 – 1100			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Huang Huat Wee	运用演示文稿培养学生识字兴趣的功效 Keberkesanan Penggunaan PowerPoint untuk Memupuk Minat Murid dalam Mengenal Aksara Cina	DK A
P.Mt	Sim Lee Sin	Implication of Numbered Head Together Strategy on Students' Interest and Learning in a Primary Four Mathematics Class	DK B
P.Melayu	Muhammad Azizi bin Rahim	Mengurangkan Kesilapan Menulis Huruf Besar di Tengah-Tengah Perkataan Menggunakan Bimbingan Individu	BK A02 & A03
Sesi selari 18: Jam 1100 – 1130			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Law Siew Mei	利用田字格改善二年级学生字体的功效。 Keberkesanan Penggunaan "Tian Zi Ge" dalam memperbaiki Penulisan Aksara Cina Murid Tahun 2	DK A
P.Mt	Loi Hui Lang	The Use of Multi-Ability Group Work to Increase Students' Interest and Learning in a Primary Five Mathematics Class	DK B
P.Melayu	Tungku ak Lapik	Membatang suku kata membolehkan murid membaca dengan baik	BK A02 & A03
1130 – 1430 Rehat / Makan tengah hari / Solat Zohor			
Sesi selari 19: Jam 1430 – 1500			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Cina	Wong Chai Ming	运用演示文稿培养学生识字兴趣的功效 Keberkesanan Penggunaan PowerPoint untuk Memupuk Minat Murid dalam Mengenal Aksara Cina	DK A
P.Mt	Ron Wee Chee Lon	The Effectiveness of Finger Method in Improving Primary Four Pupils' Multiplication Skills	DK B
P.Melayu	Vellilie Entalai ak Juan	Mengatasi masalah menulis huruf besar Bahasa Melayu Tahun 3 dengan menggunakan teknik garis tiga	BK A02 & A03
Sesi selari 20: Jam 1500 – 1530			
BIDANG	NAMA	TAJUK LAPORAN	TEMPAT
P.Mt	Ting Wei Ung	The Effectiveness of Finger Method in Improving Primary Four Pupils' Multiplication Skills	DK B

Catatan:

P.Cina = Pengajian Cina (Dewan Kuliah A/ DKA)

P.Mt = Pengajian Matematik (Dewan Kuliah B/ DKB)

P.Melayu = Pengajian Melayu (Bilik Kuliah A02 & A03/ BK A02 & A03)

DARI MEJA PENYELARAS

Salam sejahtera, salam perpaduan dan salam 1Malaysia.

Bersyukur kita kepada Tuhan yang Maha Esa, Maha Pengasih dan Penyayang kerana dengan berkat-Nya, Institut Pendidikan Guru Kampus Batu Lintang sekali lagi berjaya mendokumentasikan artikel Seminar Penyelidikan Tindakan (PT) Tahun 2010 IPG KBL dalam bentuk Buku Koleksi Artikel.

Buku Koleksi Artikel PT (Matematik Pendidikan Rendah) memuatkan 20 buah artikel PT yang disumbangkan oleh 20 orang pelajar Program Ijazah Sarjana Muda Perguruan (PISMP) Matematik Pendidikan Rendahambilan Januari 2007 selaku pembentang dalam Seminar PT Tahun 2010 IPG KBL. Para penyumbang telah menerokai dan menyelidik isu yang berkaitan dengan pengajaran dan pembelajaran Matematik Sekolah Rendah semasa praktikum Fasa III yang berlangsung pada Semester 7. Pelaporan dan perkongsian dapatan pula dilangsungkan pada Semester 8.

Seminar ini pula merupakan salah satu daripada aktiviti penyelidikan yang menyediakan landasan kepada para pelajar selaku penyelidik muda dalam PT berkongsi dapatan hasil daripada aktiviti tersebut dalam pengajaran dan pembelajaran mata pelajaran major dalam bilik darjah. Namun, hasrat paling penting seminar ini adalah untuk menjadi pencetus idea kepada bakal pendidik untuk merenung, membuat refleksi dan penilaian ke atas amalan pedagogi sendiri dan seterusnya menyelidik amalan tersebut. Para pelajar yang merupakan bakal pendidik diharapkan mendapat iktibar serta mengorak langkah susulan untuk menambah baik tindakan yang diketengahkan dalam seminar melalui penglibatan berterusan dalam aktiviti penyelidikan kelak. Semoga pendokumentasian Buku Koleksi ini memenuhi hasrat Seminar PT Tahun 2010 IPG KBL.

Seminar PT ini sememangnya diperakui tidak dapat dianjurkan tanpa sokongan padu dan usaha kolaboratif pelbagai pihak. Justeru, jutaan terima kasih dirakamkan kepada En. Abdillah Bin Adam, Pengarah IPG KBL dan Pn. Hamsiah Bt Abdullah Masni, Timbalan Pengarah IPG KBL atas galakan dan sokongan dalam pelbagai bentuk menggerakkan pembudayaan penyelidikan dalam kalangan

pelajar. Begitu juga ucapan terima kasih dirakamkan kepada semua penyarah dan staf IPG KBL yang terlibat dalam memberi bimbingan kepada AJK Kerja (Pelajar) serta sokongan padu dalam menjayakan Seminar PT Tahun 2010.

Rakaman penghargaan juga diberikan atas kerjasama yang diberikan oleh para penyarah Jabatan Matematik, Ketua Jabatan Matematik dan Ketua Jabatan Jab. Penyelidikan & Inovasi Profesionalisme Keguruan dalam mendokumentasikan artikel PT para pelajar yang membenteng hasil kajian mereka. Jutaan terima kasih juga dirakamkan kepada AJK Dokumentasi dan Laporan (Pelajar) atas kerjasama yang diberikan dalam mengumpul dan menyunting aspek teknikal 20 buah artikel PT yang dimuatkan pada Buku Koleksi ini.

Untuk makluman para pembaca, setiap artikel yang dimuatkan pada buku ini mempunyai kekuatannya yang tersendiri mengikut konteks pelajar serta pemahaman dan tafsiran pelajar tentang PT selaku penyelidik muda PT dalam mata pelajaran Matematik Sekolah Rendah. Para pembaca perlu mengambil perhatian bahawa kerja-kerja penyuntingan dibuat pada aspek teknikal sahaja tanpa menjejaskan makna yang hendak disampaikan oleh para penyumbang artikel. Perhatian juga perlu diberi bahawa pandangan yang diberi oleh penyumbang tidak semestinya menggambarkan pandangan panel penyunting.

Kami berharap Buku Koleksi ini akan memanfaatkan para pelajar, pendidik, penyelidik serta mereka yang berminat mengorak langkah memulakan PT. Atas hasil usaha para penyumbang buku ini, ucapan tahniah dirakamkan atas kegigihan dan kejayaan menghasilkan artikel di samping membenteng kertas kerja/ artikel dengan jayanya dalam Seminar PT Tahun 2010. Semoga usaha menyelidik pengajaran dan pembelajaran ke arah menjana kecemerlangan pendidikan dalam bilik darjah dapat diteruskan di sekolah kelak.

Sekian, terima kasih.

Penyelaras,
Buku Koleksi Artikel Penyelidikan Tindakan
Seminar Penyelidikan Tindakan Tahun 2010 IPG KBL
(Matematik Pendidikan Rendah) IPG KBL, Kuching.

IMPLICATION OF “NUMBERED HEADS TOGETHER” METHOD ON PRIMARY FIVE PUPILS’ INTEREST AND LEARNING IN MATHEMATICS

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ABSTRAK

Pembelajaran kooperatif semakin popular digunakan sebagai satu bentuk pedagogi pembelajaran. Penyelidikan tindakan ini mengkaji tentang implikasi “Numbered Heads Together” (NHT) sebagai salah satu kaedah pembelajaran kooperatif terhadap pengajaran Matematik bagi 38 orang murid Tahun Lima di sebuah sekolah rendah di Kuching. Ia berfokus kepada implikasi NHT terhadap pembelajaran murid dari segi minat dan pencapaian dalam Matematik, serta amalan pengajaran saya. Hasil keputusan soal selidik dan ujian topikal menjelaskan bahawa penggunaan NHT dapat membantu penambahbaikan dalam pembelajaran murid. Selain itu, markah yang diberi oleh pensyarah dan mentor saya dalam Borang Bimbingan Praktikum menunjukkan bahawa amalan pengajaran saya telah pun bertambah baik. Dalam kitaran penyelidikan tindakan seterusnya, langkah-langkah kaedah NHT ini boleh diubah suai supaya bersesuaian dengan konteks bilik darjah di Malaysia.

Kata kunci: Pembelajaran kooperatif, ‘Numbered Heads Together’, minat murid, pencapaian akademik murid, amalan pengajaran

ABSTRACT

Cooperative learning has gradually become a popular form of learning pedagogy. This action research explored the implications of using “Number Heads Together” (NHT) as a cooperative learning method for teaching Mathematics to 38 Primary Five pupils from a

primary school in Kuching. It focused on the implication on pupils in term of their interest and learning in Mathematics, and my own teaching practice as well. Findings from questionnaires and topical tests showed that NHT helped to improve pupils' learning. The marks given by my lecturer and mentor in Teaching Practice Appraisal form indicated that my teaching practice also improved. In the next cycle, procedures of NHT method can be amended to suit Malaysian classroom context.

Keywords: Cooperative learning, "Numbered Heads Together", pupils' interest, pupils' academic achievement, teaching practice

INTRODUCTION

Cooperative learning (CL) refers to the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson, Johnson & Holubec, 1993, p.9). According to CL theory, it incorporates the idea that the best learning occurs when students are actively engaged in the learning process and working collaboratively with other students to accomplish a shared goal. Teachers who make use of various cooperative learning activities can help to enhance students' understanding of a subject matter. Additionally, students who are asked to work together also tend to be less intimidated by the task and will work at the task with greater intensity for longer periods of time (Institute for Dynamic Educational Advancement, 2010).

In this action research, I would like to investigate the implication of "Numbered Heads Together" (NHT) method on students' interest and learning in Mathematics as well as my own teaching practice. In Kagan (1994), NHT is one of the CL methods. Many teachers have utilized it in their classrooms since it is easy to be carried out with only some simple steps yet interesting. This method is applicable in most subjects and also regardless students' gender and learning ability.

Context of Study

After teaching for a period of time at different schools during my practicum, I realized that most pupils have short attention span in

learning and doing exercises. I have observed in most Mathematics classes, after about half an hour, pupils began to lose their patience in listening to the teacher. They would distract others or talk to friends seated beside them. Consequently the class became chaotic and I could not carry out my lesson effectively. Pupils might learn nothing from my Mathematics lessons, and so have low performance in Mathematics.

Besides, I also conducted an initial survey of informal conversation with my Year 5 pupils in the first lesson. As a result, I found that most of my pupils like to do group work yet their teachers seldom give them group work. I also believed that pupils would be willing to learn and pay more attention if they found the lesson interesting. Hence, I was determined to have activities with NHT method as reinforcement group activities. At the same time, I also sought to enhance my teaching practice skills through NHT method.

Focus of Study

In order to attract my pupils to learn and do the reinforcement exercises given, I decided to implement NHT method in my Mathematics lessons. In this study, I sought to investigate that NHT as a CL method could bring positive implication on my Primary Five pupils. There were 38 pupils in the class. They were heterogeneous in terms of race, religion, family background and social economy status. They also have different learning abilities. Due to these differences, there was no doubt that pupils would have different interest in learning Mathematics. Their performances in Mathematics could also be affected. Therefore, the focuses of my action research were to improve pupils' interest and learning in Mathematics as well as my own teaching practice.

Objectives of Study

The main objective of this action research was to help my pupils improve their interest and learning with the use of NHT method in my Mathematics class. Besides, the use of NHT method also could help me improve my own teaching practice. Pupils' interest here refers to their interest in learning Mathematics whilst pupils' learning refers to their performance or marks scored in two

topical tests. In addition, teaching practice refers to the performance of my teaching in Mathematics lessons.

Research Questions

This action research project was designed to answer the following research questions.

- Can the use of NHT method help to improve pupils' interest in learning Mathematics?
- Can the use of NHT method help to improve pupils' learning in Mathematics?
- Can the use of NHT method help to improve my teaching practice in Mathematics?

REVIEW OF LITERATURE

According to Lewin (1947), action research is the process by which practitioners attempt to study their problems scientifically in order to guide, correct, and evaluate their decisions and actions (as cited in Singh, 2002). Meanwhile, Corey (1953) in Singh (2002) argued that action research in education is a study conducted by colleagues in a school setting for which the results of their activities is to improve instruction. Consequently, action research can help us to expand our knowledge and improve ourselves. We can reflect on our strengths and weaknesses especially in own teaching practice. Thus, we can carry out our lesson more efficiently and our students can learn more effectively.

Research has shown that cooperative learning model can promote students learning and academic achievement, increase students' retention, enhance students' satisfaction with their learning experience, help students develop skills in oral communication, develop students' social skills, and promote student self-esteem. It is also an educational tool for students to work in a collaborative environment and to learn from each other. Sometimes, teachers may use it as a competitive instrument to motivate their students to learn (Kagan, 1994). Hence, I have proposed my action research to carry out NHT method in my Mathematics lessons.

Jacobs, Power and Loh (2002) pointed out that, one of the obvious principles that NHT shows is the simultaneous interaction. They stated, "Working with their group motivates students to increase their competence" and "Interaction among students, whether spoken or written, builds competence" (p.58). These illustrate the importance of simultaneous interaction in CL and especially in NHT.

Why do we say that NHT promotes simultaneous interaction? When a task is given, every member in every group has to play their role in completing the task. Since the students do not know what number the teacher will call, every student has to be prepared. In order to get the best answer and to be the best group, members in a group will have to put their heads together for the best solution. When everyone is involving themselves and participating in the teaching-learning process, we say that the simultaneous interaction is happening. So, NHT has the same requirement with many other CL models. It required interaction and the value of cooperativeness among the students.

Rational of My Proposed Action

According to studies, by participating in CL, students can benefit in a few area. Students are not only able to learn knowledge that is related to their examination, but also improve in generic skills and positive behaviors, like collaborative skills as well as better attitudes toward learning, school, peers and self (Jacobs et al., 2002, p. xi). By using CL in the classroom, students can have more active involvement in learning, regardless of past achievement level or individual learning needs. They also become more responsible for their own learning.

In my belief, when I carry out interesting teaching-learning activity with NHT method, pupils would be attracted and become interested in learning. They will have a sense of achievement when they are able to solve the problem or complete the task. This sense of achievement will generate intrinsic motivation in pupils' inner self and encourage them to study more. As a result, pupils' learning is enhanced. Due to this belief, I proposed the action of conducting NHT in my Mathematics class as to improve pupils' interest and learning in Mathematics.

How NHT Work?

Kagan (1994) has derived NHT as one of the CL activities and it is done in many structured ways. Basically, NHT method is easy to carry out and it has only five steps. The first step involves the teacher who divides the students into groups of four and gives each one a number from 1 to 4. Then, the teacher poses a question or a problem to the class. Next, the students gather to think about the question and to make sure everyone in their group understands and can give an answer. The fourth step involves the teacher asking the question and calling out a number randomly. Finally, the students with that number will raise their hands, and when called upon, the student will answer for his or her team. Somehow, I have followed these steps when implementing NHT activities in my Mathematics lessons.

METHODOLOGY

Data Collection Method

I have used several methods to collect data. Table 1 shows the data collection method for each research question in this study.

Table 1.

Data collection method for each research question

Research Question	Data	Method	Source
Can NHT method help to improve pupils' interest?	Pupils' interest	Questionnaires	Pupils
Can NHT method help to improve pupils' learning?	Pupils' learning	Topical Tests	Pupils
Can NHT method help to improve my teaching practice?	Teacher's teaching practice	Teaching Practice Appraisal Form (PR1)	Lecturer Mentor Researcher

To measure the pupils' interest, I used questionnaire which consisted of six positive items and two negative items. In the questionnaire, I also used Likert scale rating to measure the responses given by my pupils. One represents 'disagree' whilst four refers to 'very agree'. The same questionnaire was given in pre- and post intervention.

Furthermore, for the pupils' learning, a pre-test and post-test before and after the implementation of NHT method were given. To increase the reliability, I have used the same Test

Specification Table based on Bloom's Taxonomy to create the test items.

For my teaching practice, I collected data from the teaching practice appraisal (PR1) forms which would be filled by my lecturer and mentor. The rating of PR1 form ranges from one to five whereby one refers to 'very weak' whilst five is 'excellent'. To be more specific, I only take into account the implementation part stated in the PR1 form.

Data Analysis Method

To be more efficient in data analysis, I have used Microsoft Excel to record and analyze all the data collected to calculate the mean and standard deviation of the data. For pupils' interest, I analyzed the mean and standard deviation for the responses of each item in the pre and post intervention questionnaire. The increase in mean shows pupils' interest has improved. Then, for pupils' learning, I analyzed the mean and standard deviation of the test scores. Higher mean in the post intervention indicates that the pupils have improved in their learning and vice versa. Meanwhile, lower standard deviation in the post intervention means the spread between pupils' score has decreased. In other words, not many pupils score extremely high or low in the tests. Next, for my teaching practice, I analyzed the mean of the rating in PR1 form which were assessed by my lecturer or mentor. The increase of the mean shows I have improved in my teaching practice and vice versa.

RESULTS AND FINDINGS

Based on the data analysis method, I analyzed all the data collected according to the research questions. I further interpreted the finding about the effect of NHT method on pupils' interest and learning, and also the implementation of my teaching practice of Mathematics lessons.

The Effect of NHT Method On Pupils' Interest

To know the effect of NHT method on pupils' interest, my data collection method involved questionnaire. The questionnaires were given to all my pupils. I gave the same questionnaire to my pupils to fill in on the second and the eleventh week respectively.

The difference of means and standard deviations between pre and post intervention indicated the effectiveness of using NHT method to improve my pupils' interest.

Table 2.
Mean and standard deviation of pupils' responses to each item in the interest questionnaire

No	Item	Pre		Post	
		Mean	SD	Mean	SD
1	Mathematics is useful in my daily life.	3.17	0.87	3.53	0.79
2	I like to study Mathematics.	3.52	0.77	3.44	0.61
3	Mathematics is an interesting subject.	3.24	0.82	3.47	0.74
4	Mathematics is a boring subject for me.	1.38	0.85	1.25	0.50
5	I think more exercises help me learn Mathematics better.	3.17	0.91	3.19	0.88
6	I feel tension when doing Mathematics.	1.66	0.99	1.38	0.96
7	I will do Mathematics even though nobody asks me.	2.59	1.07	2.66	1.19
8	Getting an A in Mathematics is important for me.	3.52	0.77	3.75	0.56

Maximum Mean Score = 4; N (pre) = 29; N (post) = 32

All the means of every item increased slightly based on the findings presented in Table 2. Since item 4 and 6 were negative items, the mean did show a decrease in the post intervention. On the other hand, the standard deviation also showed an increase for almost every item. This showed that many pupils become more interested in learning Mathematics through the use of NHT method. As we can see from Table 2, most of the items showed an increase in the mean except for item 2. Though there was an increase in the mean, the increase was not significant enough. Thus, I could not confidently say that NHT method improved pupils' interest effectively.

The Effect of NHT Method On Pupils' Learning

To measure the effect of NHT method on my pupils' learning, two topical tests were administered to my pupils before and after the implementation of NHT method.

Table 3.

Mean and standard deviation of pupils' score in the topical tests

	Pre-test	Post-test
Mean score	55.79	65.53
Standard Deviation	11.58	13.67

Maximum Mean Score = 100; N = 38

Table 3 displays the mean scores and standard deviations of the whole class in pre and post tests. The mean only increased by 9.74 marks and it was not significant enough to conclude that pupils have improved in learning. Besides, the standard deviation also increased from 11.58 (pre-test) to 13.67 (post-test). This indicated that the spread of score among the pupils became larger. There were pupils who scored extremely high and low marks in the topical tests.

Apart from that, I further analyzed the means and standard deviations of the result for boys and girls as shown in Table 4.

Table 4.

Mean and standard deviation of pupils' score in topical test for different gender

Pupils	Mean		Standard Deviation	
	Pre-test	Post-test	Pre-test	Post-test
Male	51.80	61.20	13.19	15.14
Female	60.22	70.33	7.24	9.78

Maximum Mean Score = 100; N (male) = 20; N (female) = 18

From Table 4, it was very obvious that female pupils scored higher than male pupils. Moreover, we also looked at the improvement of pupils after my intervention. Male pupils' mean score increased by 9.4 while female pupils' mean score increased by 10.11. There was not much difference in the improvement of male and female pupils. In addition, the standard deviation for male is higher than female. This indicated that female might learn better than male through NHT method. Apparently, the mean score for both male and female pupils had slightly increased. Therefore, I could say that NHT method did have positive effect on pupils learning regardless of their gender.

The Effect of NHT Method On My Teaching Practice

To investigate the effect of NHT method on my teaching practice, I have collected and analyzed all the Teaching Practice Appraisal (PR1) forms for the implementation phase. There were four observations by my mentor in school and three observations by my lecturer on my Mathematics lessons. For those lessons, I have implemented NHT method in the reinforcement group activities.

Table 5.
Rating of my lessons by mentor over four observations

Aspects	1st	2nd	3rd	4th
Introduction	3	2	4	4
Development	4	3	4	4
Classroom management	4	3	4	4
Communication	4	4	4	4
Learning quality	3	3	4	4
Closure	2	4	4	4
Achievement of objectives	4	4	5	5
Applications of values	4	4	4	4
Mean	3.50	3.38	4.13	4.13

Maximum Mean Score = 5

Meanwhile, Table 5 presents the rating of my lessons implementation given by my mentor over four observations. The mean has slightly increased from the first observation (3.50) until the last observation (4.13). Though the second observation showed a decrease, it increased again from 3.38 to 4.13 in the third observation and remained the same mean in the fourth observation.

Table 6.
Rating of my lessons by lecturer over three observations

Aspects	1st	2nd	3rd
Mean	4.25	4.00	4.86

Maximum Mean Score = 5

Table 6 illustrates the rating of my lessons given by my lecturer over three observations. The mean has slightly increased from the first observation until the last observation. However, the second observation showed a decrease and yet the third observation showed a significant increase from 4 to 4.86. Since

the means throughout the observations were inconsistent, I could not assertively state that the use NHT method helped to improve my teaching practice effectively.

CONCLUSION

As in my initial expectation and belief, the used of NHT method in my Mathematics classroom could probably help to improve pupils' interest and learning, likewise my own teaching practice. Nevertheless, these improvements might be due to other factors besides the use of NHT method. Johnson, Johnson and Holubec (1990), Kagan (1992), and Gan and Wong (1995) found that CL can bring positive effects whether from the aspects of academic achievement or behavior, interest, motivation, and social skills amongst students (as cited in Koh et al., 2008).

Reflection of the Study

In this action research, I positioned that I was partially successful in attaining the objectives. There were some aspects that I had overlooked like the limitation of time. The increase of the means in the finding was not large and hence it would not be significant enough to state that the use of NHT method helped to improve pupils' interest and learning as well as my teaching practice effectively. Apart from that, I observed that pupils had learnt to communicate and share.

As for myself, I learnt to be more reflective especially in my teaching practice. In the meantime, action research have also helped me to resolve my problems that I encountered in the class, such as, managing pupils' behavior, improve pupils' learning and interest, as well as my own teaching strategies.

Further Action in the Next Action Research

In the next cycle, I would like to reuse this NHT method again. I sought to have longer time to carry out this action research and some procedures need to be amended. I also plan to make the activity more competitive so that the pupils would feel that the activities are more challenging. In the meantime, I would like to consider the use of other CL methods as well.

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THE EFFECT OF FINGER METHOD IN IMPROVING PRIMARY FOUR PUPILS' MULTIPLICATION SKILLS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk menilai sejauhmanakah keberkesanan "Finger Multiplication Method" dalam menyelesaikan masalah murid lemah dalam pendaraban. Responden dalam kajian ini terdiri daripada 15 orang murid dari Tahun 4M yang memperoleh markah yang rendah bagi mata pelajaran Matematik dalam ujian semester yang lalu. Data dikumpulkan melalui ujian pra dan ujian pasca. Hasil analisis data mendapati bahawa seramai 13 orang responden menunjukkan peningkatan markah yang ketara dalam ujian pasca berbanding ujian pra. Keputusan kajian menunjukkan bahawa "finger multiplication method" berkesan dalam membantu murid lemah menguasai fakta asas darab dalam Matematik.

Kata kunci: Pendaraban dengan jari tangan, penyelesaian soalan pendaraban, matematik, keberkesanan, peningkatan minat dalam matematik

ABSTRACT

The purpose of the study was to determine the extent to which finger multiplication method could be effective in improving pupils' multiplication skills. The respondents consisted of 15 pupils from 4M class who obtained the lowest marks for Mathematics in the previous semester examination. The data for this study was collected using pre- and post tests. The results showed that 13 pupils achieved significantly higher marks in the post-test as compared to the pre-test. The results of the study showed that the finger multiplication method was

effective to a large extent in improving the pupils' multiplication skills.

Keywords: Finger multiplication method, solving multiplication question, mathematics, effective, increase of interest in mathematics

INTRODUCTION

Context

In many Malaysian primary school classrooms, primary school pupils' poor foundation in basic skills especially skills related to the four arithmetic operations has continually been quoted as the main reason for their poor performances in mathematics. At such, exploring and finding effective ways to help these pupils to master the basic facts of the arithmetic operations has remained as the main focus of many primary mathematics teachers. Due to Piagetian's theory of intellectual development influence, the use of concrete manipulative has stayed as one major approach in this exploration.

"Finger multiplication method" is a strategy that uses bodily movement to represent and perform multiplication. Since fingers are probably the most "easily available manipulative" in any classroom, it is no surprise that a lot of primary children are taught to use their fingers to perform multiplication operations. However, the effectiveness of this strategy depends very much on the way it is used.

This action research had been carried out at SK SJ, Kuching. SK SJ comprises of pupils from various backgrounds. There were 90.11 percent (%) Malay/Bumiputera pupils, 8.15% Chinese pupils and 1.52% Indian pupils in this school. The pupils were placed based on their achievement in the last-term examination. Top pupils would be placed in the same classroom which is 4I while the others would be placed in 4N, 4M and 4Z. During my last practicum at SK AA I found that the multiplication skills of my pupils were quite weak. I found out that they were unable to memorize the multiplication tables well. This was the main reason why they were weak when answering the multiplication questions. I had tried to ask them to recite the multiplication

tables before I started my mathematics lesson. However, I found that it was not an effective way to help them to improve their multiplication skills. For this practicum, I taught 4M Mathematics. Pupils in 4M were of mixed abilities and most of them were weak in mathematics especially in multiplication skills.

In teaching multiplication skills, the mathematics teachers in this school used two methods which are different from other schools and they believed that these two methods would help the pupils to master the multiplication skill, especially for the weak pupils to improve their multiplication skills.

The methods that they used in this school were the "Magic Maths" method for multiplication of 3, 4, 5, 6, 7, 8, and 9 and the "Lattice Method" for solving calculation problems involving multiplication. When it comes to learning multiplication concepts and skills, the pupils were introduced to these two methods before they learn to recite the time table for multiplication.

I found that the methods interesting as the methods were new to me and I had not discovered the idea about using "Magic Maths" and "Lattice Method" for teaching multiplication. However, I found that the methods that the teachers used did not work very effectively as there were pupils who cannot remember the steps involved in writing out the "Magic Maths" and "Lattice Method". Besides, if the pupils made any mistake in writing out the "Magic Maths" and "Lattice Method", would lead to wrong answers. Moreover, the usage of these two methods cannot work effectively in helping weak pupils to master the multiplication skill as they were forced to remember the multiplication facts and there were not much opportunities for them to understand the nature of multiplication such as "multiplication is the repeated addition".

This research was carried out on my pupils to help them improve their multiplication skills by using the finger multiplication method. The purpose of this action research study was to see whether the finger method could improve pupils' multiplication skills effectively.

Focus

During my second practicum at SK AA, I found out that the multiplication skills of my pupils were quite weak. I found out that they were unable to memorize the multiplication tables well. This was the main reason why they were weak when answering the multiplication questions. I had tried to ask them to recite the multiplication tables before I started my mathematics lesson. However, I found out that it was not an effective way to help them to improve their multiplication skills. I always believe that the pupils should memorize all the multiplication table in order to master the multiplication skills.

The traditional way of teaching mathematics facts such as asking the pupils to recite the time table followed by providing a lot of exercises for pupils to practice do not really help them in understanding the multiplication facts. The old way of teaching multiplication made the pupils feel that they are forced to learn, thus they do not improve their ability in applying the multiplication facts and concepts. I believe that pupils should acquire the understanding about multiplication by using the learning atmosphere where they can enjoy, express what they learned in creative ways and do not feel stressful to remember the facts.

For my action research, 15 pupils of Year 4M pupils at SK SJ were experiencing the problem in mastering the multiplication concept and skills. There was a strong need to improve pupils' multiplication skills. The goal of this action research was to improve the multiplication skills for year 4 pupils by using finger multiplication method. In order to make sure that this focus is suitable for the pupils in my class, I had done an initial survey to identify the pupils' multiplication skills and background so that I could cater to the needs of each pupil.

Objectives

- To improve the pupils' multiplication skills by using finger multiplication method.
- To raise the pupils' interest in learning mathematics by using finger multiplication method.

- The impact of finger multiplication method on my teaching performance.

Research Questions

- Can finger multiplication method improve the pupils' multiplication skills?
- Can finger multiplication method raise the pupils' interest in learning mathematics?
- Will the use of finger multiplication method in my teaching affect my teaching performance?

ACTION PLAN

Action research can be defined simply as the process of improving practice through self reflective enquiry (Carr & Kemmis, 1986). It is also the "systematic collection of information that is designed to bring about social change" (Bogdan & Biklen, 1992). Brown (1994) and Robinson (1991) suggest that any action undertaken by teachers to collect data and evaluate their own teaching can be termed action research.

According to Foley (2008), multiplication time tables take time to learn and before paper and pen were common, a finger based system was developed to aid rapid calculation. The usual approach to teaching tables is by rote learning but unfortunately, there is always a proportion of pupils who struggle to commit them to memory. Those who failed created disadvantage for the rest of their school mathematics life (Gardner, 1983). A simple and original system was developed which allows pupils to calculate results of multiplications using fingers. Although it applicable for tables 1 to 9, it turns out that it is easiest to use on the 6, 7, 8 and 9 times tables, the ones that pupils traditionally have the greatest problem with.

For this action research, I taught my pupils finger multiplication method or finger method in multiplication to solve the multiplication questions. This method is a very simple method and can be done easily.

By using finger method in multiplication, the 6, 7, 8, 9 and 10 times tables can be calculated with the aid of fingers. Place your

hands on the table and spread your fingers. Each finger has a numerical value from 6 to 10: The thumb = 6, the index finger = 7, the middle finger = 8, the ring finger = 9 and the little finger = 10 (Margo, 2010).

Let's presume we wish to calculate the exercise 7×8 . We will count on one hand until 7, beginning with the thumb which represents the number 6, and we will fold the two fingers down. We will count on the other hand until 8, beginning with the thumb which represents the number 6, and we will fold the three fingers down. We are left with five folded fingers on two hands (they represent 5 in the tens column), and the five unfolded fingers, two and one hand and three on the other. We will multiply the unfolded fingers - 3×2 and we will get the number 6 which will represent the units column, and so the answer is 56. The advantage of using finger method to solve the multiplication question is that the pupils can easily calculate the 6 to 10 time tables with their hands. They could actually get the right answer with their fingers.

In this action research, I administered a pre-test to my pupils before I use the finger method strategy in teaching and learning multiplication skills in class. This pre-test was used to identify the pupils who face difficulties in mastering multiplication skills. Besides that, this pre-test was also used to compare the result of the post-test in order to know how effective finger multiplication method strategy in helping the pupils to improve their multiplication skills.

After I have taught my pupils all the finger multiplication method of multiplication Time Table from 2 until 9, I gave them a post-test as the final evaluation on all the finger multiplication methods they had learned. The post-test was given to 15 participants at the end of the research to test their mastery of basic multiplication facts after being taught finger multiplication method in class. Besides, the post-test result was used to compare with the pre-test result to know the effectiveness of the finger method in helping the pupils master the multiplication skills. I also gave them the questionnaire related to their interest

in learning Mathematics. Apart from that, I taught my pupils finger multiplication method to solve the multiplication questions.

METHODOLOGY

Target Participants

The participants of this study consisted of 15 pupils from 4 M class at SK SJ, Kuching. There were 7 boys and 8 girls in this class. They were all 10 years old. Their academic achievement was below average. A pre-test on multiplication facts was used to identify the mastery level of the pupils in this study. The pre-test has a total of 45 questions. I designed the test based on the Time Table 1 until Time Table 9. There are five questions for each Time Table. Besides, the test can also help in identifying the Time Table that the pupils are not familiar with.

Method

For the first research question, I had used pre-test and post-test to collect the pupils' test scores. I administered a pre-test to my pupils before I used the finger multiplication method strategy in teaching and learning multiplication skills in class. This pre-test consists of 45 basic multiplication questions, ranging from multiplication Table 1 until 9 with five questions for each multiplication table. As for the second research question, I administered a questionnaire to measure pupils' interest in learning mathematics. The interest questionnaire that I gave to my pupils consists of eight items. I had given the interest questionnaire to my pupils before and after I taught them using the finger method in the classroom. For the third research question, I collected data on my teaching practice based on the rating score by my mentor. I had asked my mentor to observe me in the classroom while I was teaching.

RESULTS AND FINDINGS

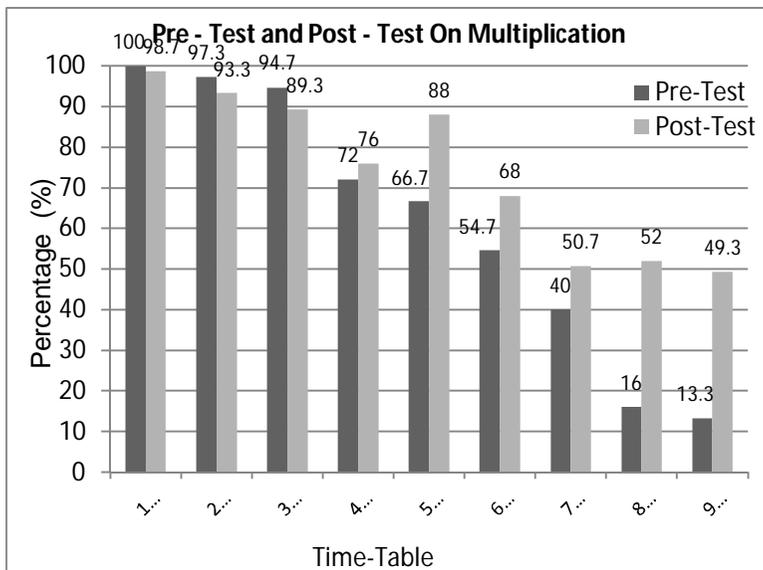


Figure 1. Pupils' pre-test and post-test.

From the graph, it was clearly shown that the pupils had improved in the post-test especially for multiplication Time Table 4, 5, 6, 7, 8 and 9. However, there was a slight decreased in the score for multiplication Time Table 1 until 3 in the post-test. For multiplication Time Table 1, the pupils' score slightly decreased from 100% to 98.7%. As for the multiplication Time Table 2, the pupils' score also slightly decreased from 97.3% to 93.3%. For multiplication Time Table 3, the pupils' score slightly decreased from 94.7% to 89.3%. There was improvement in the score for multiplication Time Table 4 (from 72% to 76%). As for multiplication Time Table 5, the pupils' score had also increased largely from 66.7% to 88% during the post-test. For multiplication Time Table 6, the score also increased slightly from 54.7% to 68%. As for multiplication Time Table 7, the pupils' score had increased from 40% to 50.7%. There was large improvement in the score of multiplication Time Table 8 which was from 16% to

52%. The percentage increased by 36% and it was a great improvement for this multiplication time table. Last but not least, multiplication Time Table 9 also showed large improvement in the score which increased from 13.3% to 49.3%. All the score for multiplication time table increased except for multiplication Time Table 1, 2 and 3. As I was more focus on improving the pupils' multiplication skills for Time Table 6 until 9 using finger method, the results still showed improvement for the larger number time table.

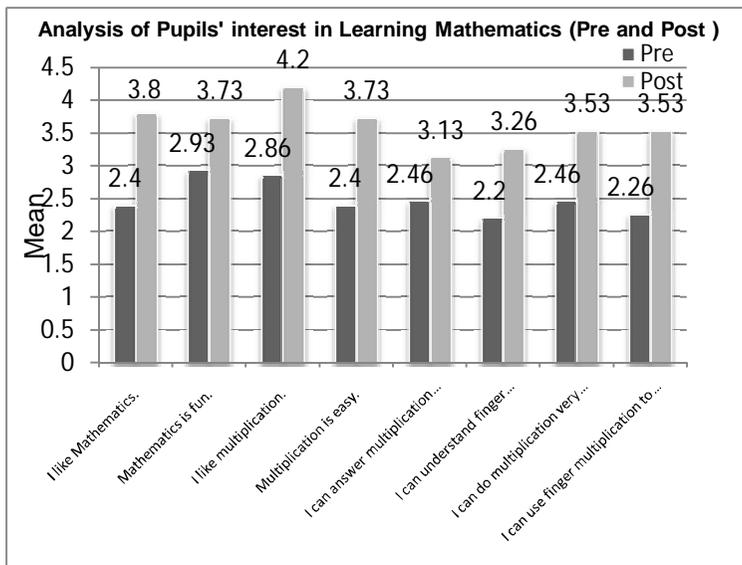


Figure 2. Analysis of Pupils' interest in Mathematics (Pre and Post).

The graph shows the result of pupils' interest in learning mathematics for pre and post implementation of finger multiplication method. It was very clear that the mean score had increased after the implementation of the finger method in multiplication. For item 1, the mean has increased from 2.40 to 3.80. For item 2, the mean has increased from 2.93 to 3.73. For item 3, the mean has increased from 2.86 to 4.20. For item 4, the mean has increased from 2.40 to 3.73. For item 5, the mean has

increased from 2.46 to 3.13. For item 6, the mean has increased from 2.20 to 3.26. For item 7, the mean has increased from 2.46 to 3.53. For item 8, the mean has increased from 2.26 to 3.53. From Figure 2, I could see that the mean for all the items has increased. This showed that the finger method was effective in increasing the interest of the pupils in learning mathematics.

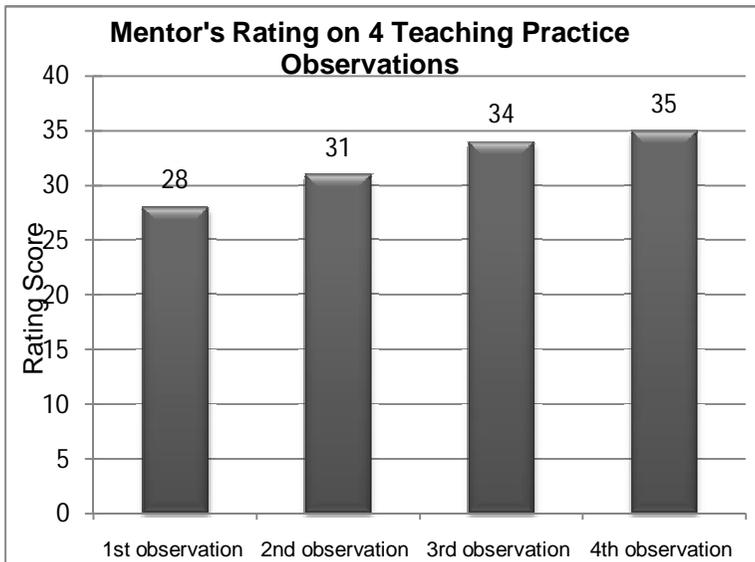


Figure 3: Mentor's rating on 4 teaching practice Observation.

The graph shows that there were four observations done by my mentor during the teaching practice at the school. For the first observation, the rating score I obtained was 28 out of 40. As for the second observation, the rating score was 31 out of 40. For the third observation, the rating score was 34 out of 40. During the last observation, my mentor gave me the rating score of 35 out of 40. From the Figure, it was very clear that the rating score for my teaching practice observation has increased from the first observation until the fourth observation. The rating score for the last observation was the highest. I can conclude that the finger

method had brought positive implication and effect to my teaching practice performance.

Reflection of Findings

For the first research question on evaluating the pupils' performance on multiplication question, I had collected the data and analyzed the result which had shown improvement in almost all the multiplication time table except Time Table 1, 2 and 3. There was only a slight decrease on the multiplication time-table of 1, 2 and 3. This was because some of the pupils were making careless mistake on the easy question. However, the percentages of correct answer for these three multiplication time table were still very high with 80% and above compared to the rest of the multiplication time table. The pupils showed good improvement for multiplication Time Table 4, 5, 6, 7, 8 and 9. The main reason was because they could understand the basic of multiplication after they learnt about the finger method. They can understand better the theory of multiplication by using finger method. Besides, finger method of multiplication Time Table 9 is very easy to practice and applied compared to other multiplication time table. Pupils could see clearly how they can get the answer for multiplication Time Table 9 using finger method with ease.

For the second research question, I had used the pre and post interest questionnaire to collect the data on pupils' interest in learning mathematics. I had analyzed the result which shown increasing of the mean score in the post interest questionnaire. This also means the increasing of pupils' interest in learning mathematics after the implementation of finger method in multiplication. From Figure 2, all pupils had shown their increased of interest in leaning mathematics. Before I taught my pupils the finger method in multiplication, they experienced difficulty in answering and completing the multiplication questions. This was because they could not memorize and recite the multiplication time table. When they could not memorize and recite the multiplication time table, they just could not solve any multiplication question on their own. This had caused them to lose interest in learning multiplication and mathematics in

general. It could be seen in the responses in the pre interest questionnaire which was given to them before the implementation of the finger method in multiplication. Most of them chose to agree that they did not like mathematics and it was not easy for them. After I had implemented the finger method in the classroom, the pupils' attitude had changed and this can be shown in the responses in the post interest questionnaire. Most of them are now agreed that they started to like mathematics and mathematics is fun to learn. They found that by using finger method, they can answer and solve the multiplication question easily. Besides, the pupils also found that multiplication was not that difficult because they can apply finger method when answering the multiplication questions. They actually could get the answer from their own fingers. Moreover, they are now more confident when solving the multiplication question.

Last but not least, for the third research question, I had asked my mentor to observe me using the rating scale based on my teaching practice. I had implemented the finger method in the classroom during my teaching practice. My mentor had observed me four times and I had collected the data and analyzed the result. The rating score given by my mentor had shown that my teaching practice has improved consistently. I also become confident while teaching mathematics in the classroom as the finger method in multiplication really helped me to teach my pupils to understand the topic of multiplication. By using this finger method, my pupils only have to memorize the smaller number multiplication time-table and use them in the finger method to find the correct answer for the multiplication question. I also found out that the pupils were very interested to learn this finger method as it helped them to engage in the learning process. They actually used their own hand and fingers to find the answer to the multiplication question. They felt satisfied when they were able to answer the multiplication question correctly using finger method. Thus, it also helped me a lot as I could carry out my teaching and learning process smoothly and effectively.

REFLECTION AND FUTURE ACTION

Reflection

I had implemented this finger method in the classroom while teaching my pupils about multiplication during the mathematics lesson. I found out that this method was very effective as what we can see from the result and findings in previous chapter. The performance of pupils in multiplication skills and the interest of the pupils in learning mathematics has improved and increased after the implementation of the finger method in multiplication. Besides, I myself also benefit from this finger method, as my teaching practice has also shown improvement and I can say that this finger method is very effective and efficient to help my pupils in their learning of mathematics and myself in improving my teaching practice. Apart from this, this method was practical enough as it would not take much time in implementing it in the classroom. For myself, I only used 5-10 minutes before I start my lesson to teach my pupils about this finger method. It served as a good set induction as well and can arouse the pupils' interest to learn mathematics and multiplication. Moreover, this is a free and very convenient teaching aid as every pupil just needs to use their fingers to do the finger multiplication method. Apart from this, the pupils can also engage themselves actively in the learning process and in the lesson as they were actually doing a hands-on activity by doing the finger multiplication method.

After carried out this action research in the school, I found out that this finger method was very suitable in a school context. This is because, from the experiences I went through during my practicum, most of the pupils were facing problem in memorizing the multiplication time-table. When they could not memorize and recite the multiplication time-table, they will feel frustrated as they were unable to answer the multiplication questions. However, with the implementation of finger method in the school, I believe the pupils will be more interested to learn multiplication and mathematics in general. This was because, when they have mastered the finger method in multiplication, they will start to like mathematics and find that learning mathematics is fun.

On the other hand, they will find it easy to solve the multiplication question and have more interest to learn mathematics in the classroom. They will feel happy and satisfy when they are able to answer the multiplication question correctly. Apart from this, by practicing this finger method in the classroom, pupils can learn universal values as well. Pupils will learn how to cooperate and work together with their friends in learning this finger method. They learn how to help each other by guiding each other in achieving the same goal that is to master this method. Besides, this method also helped the pupil to be more confident in answering the multiplication problems. This method had helped them to have a strong foundation which is necessary for them to learn mathematics. Furthermore, this action research also had helped me a lot in improving my teaching practice.

Future Action

After reflecting on my action research, I had planned for my future action which is the next cycle for my research. For the next cycle of my action research, I would like to focus on the problem solving method in multiplication. It will help the pupils to apply the mathematics knowledge they learnt in real life situation. I would like to focus on George Polya's problem solving method. There are four steps in this problem solving method which are understand the problem, devising the plan, carrying out the plan and looking backward. By learning about problem solving, the pupils will be able to apply what they had learnt in the classroom in their real life experiences. I would like to do the research on the problem solving method to help them understand the concept of multiplication and able to solve the mathematical problems in their daily living.

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THE USE OF COOPERATIVE LEARNING IN TEACHING PRIMARY THREE MATHEMATICS

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ABSTRAK

Kajian ini bertujuan untuk meninjau tentang penggunaan kaedah pembelajaran koperatif (PK) terhadap pembelajaran Matematik dalam kalangan murid Tahun 3A di SK LK, Kuching. Selain itu, kajian ini bertujuan menilai sejauh manakah keberkesanan penyelidikan tindakan dalam praktik mengajar. Penggunaan kaedah pembelajaran koperatif bertujuan untuk meningkatkan pembelajaran dan minat murid-murid dalam Matematik. Data dikumpulkan melalui ujian pra dan ujian pasca, soal selidik dan borang bimbingan praktikum. Hasil analisis data ujian pra dan ujian pasca mendapati bahawa min meningkat daripada 54.76 ke 58.38 manakala sisihan piawai menurun daripada 25.72 ke 19.30. Keputusan ini menunjukkan pembelajaran murid-murid dalam matematik meningkat. Selain itu, minat murid-murid terhadap matematik telah meningkat selepas membuat perbandingan min dan sisihan piawai bagi data soal selidik Masa satu, Masa dua dan Masa tiga. Hasil analisis data borang bimbingan praktikum mendapati bahawa min meningkat daripada 4 ke 4.5 manakala sisihan piawai tidak berubah (0.53). Pada keseluruhannya, keputusan kajian menunjukkan bahawa penggunaan kaedah pembelajaran koperatif dapat meningkatkan pembelajaran dan minat murid-murid dalam Matematik.

Kata kunci: Pembelajaran koperatif, "Team-Pair-Solo", "Numbered Heads Together", penyelidikan tindakan, pembelajaran murid

ABSTRACT

The purpose of the study was to determine the extent of using cooperative learning in teaching Year 3 Mathematics at SK LK, Kuching, Sarawak. This study was to determine the effectiveness of doing action research on teaching practice performance. The purposes of using cooperative learning were to improve the pupils learning and pupil's interest in Mathematics. Data collection methods comprised of pretest and post test, pupil's interest questionnaire and teaching practice appraisal form. The results showed an increase of mean score from 54.76 to 58.38 while the standard deviation has fallen from 25.72 to 19.30. The findings showed that the pupils learning of Mathematics has improved. Pupils' interest in Mathematics also improved after comparing over time the mean and standard deviation. The mean for the teaching practice performance increased from 4 to 4.5 while the standard deviation was maintained (0.53). Overall, the findings showed that the use of cooperative learning could increase pupils interest and learning in Mathematics.

Keywords: Cooperative learning, "Team-Pair-Solo", "Numbered Heads Together", action research, pupils' learning

INTRODUCTION

Context of the Study

Nowadays, pupils are highly dependent upon what teachers do in the classroom. As a mathematics teacher, I had to ensure that my teaching is effective so that the pupils can learn successfully from me. During my previous practicum, the teaching strategy that I applied was direct instruction. Direct instruction is teacher-centered. I preferred to use teacher-centered strategy. I think that it was effective and save time to carry out my mathematics lesson. However, I realized that pupils rarely asked me questions or discussed with me in my mathematics lessons. The pupils felt bored because they just sat there and listened to my teaching. I felt that I was like talking to a brick wall when they did not give

me any response in the class. I felt very sad because I could not arouse pupils' interest to study in my mathematics lesson.

I realized that teacher-centered strategy was not very effective for me in teaching the mathematics skills. My traditional teaching methods should change to more pupil-centered strategy. Cooperative learning may be defined as a learner-centered instructional process whereby small groups of 3-5 pupils work interdependently on a given learning task. According to Sapon-Shevin (1994), cooperative learning is a peer-centered pedagogy that can promote academic achievement and build positive social relationships (as cited in Tok Hoon Seng, 2006).

Focus of the Study

The Year 3A pupils lacked interest in learning mathematics. They showed their sleepy faces when I was teaching. I tried my best to prepare more teaching aids such as picture, flash cards and using Microsoft PowerPoint to teach them. However, the pupils also did not have much interest to participate in my teaching. They would do their own thing and did not listen to me when I was teaching. They did not listen to what I taught. When I asked them to do their work, they did not know how to do the given exercises because they did not pay attention in class. Pupils could not achieve the learning outcome and learning objective that I had prepared. In the end, they learn nothing from me.

I think it was due to my traditional teaching method, that is, direct instruction which is not very effective for me in teaching and learning mathematics. The pupils depended on me to decide how to learn the mathematical concepts. Hence, the pupils could not learn at a higher conceptual level of thinking. I felt very disappointed. I hope I could use pupils-centered method in teaching mathematics to improve my teaching practice during practicum at SK LK.

According to NCTM (2000), mathematics educators are changing from traditional mathematics classrooms to pupils-centered mathematics classrooms in cooperative settings (as cited in Effandi Zakaria & Zanaton Iksan, 2006). Therefore, I decided to change my teaching method from traditional, teacher-

centered to pupils-centered in order to improve pupils' interest and their learning of mathematics and my teaching practices. Cooperative learning is defined as a learner-centered instructional process. The pupils could increase their knowledge through their friends from cooperative learning. So, I decided to carry out an action research project in my 3A Mathematics class at SK LK. My main focus was to increase the pupils' interests as well as their learning in the subject of Mathematics by implementing cooperative learning strategies. The two strategies that I had planned to focus were "Numbered Heads Together" and "Team-Pair-Solo".

The strategy of "Numbered Heads Together" was to divide the pupils into small groups of four to five pupils. In every group, each pupil was assigned a number. After obtaining the tasks or questions from the teacher, they were required to discuss together to answer the questions so that all would answer the questions. Once they find their answers, the teacher would call out a number. Pupils from every group with that number need to stand up and give their answers. Group performance was based on each individual's contribution in the group. Meanwhile, "Team-Pair-Solo" required pupils to work as a team to solve a problem. The teams broke into pairs and pupils worked on either the same problem, or a related one. Finally, the pairs broke up and the pupils worked individually to complete the same or a related task.

"Numbered Heads Together" and "Team-Pair-Solo" were the simplest activity to carry out in my class because Year 3 is considered small and complicated activities would have confused them. The total number of pupils in my class was 23 pupils and considered small. Thus, I could implement cooperative learning easily in class. I could also control the situation in the class when conducting cooperative learning. I could make sure all of them cooperate and participate in completing a given task. Before conducting the cooperative learning, I had collected the data of pupils' monthly test result from my mentor which is shown in Table 1.

Table 1.
The February Monthly Mathematics Test Result of 3A

No.	Pupils	Marks (%)	Grade
1.	P1	42	C
2.	P2	21	D
3.	P3	95	A
4.	P4	89	A
5.	P5	95	A
6.	P6	42	C
7.	P7	66	B
8.	P8	34	D
9.	P9	53	C
10.	P10	23	D
11.	P11	47	C
12.	P12	71	B
13.	P13	84	A
14.	P14	39	D
15.	P15	24	D
16.	P16	21	D
17.	P17	66	B
18.	P18	42	C
19.	P19	50	C
20.	P20	16	E
21.	P21	63	B
22.	P22	68	B
23.	P23	21	D

I had interviewed my mentor about using cooperative learning strategies in the class. The main reason why I interviewed my mentor was I wanted to know if cooperative learning worked in that class. According to my mentor, cooperative learning worked in that class. She was of opinion that, "...by doing cooperative learning, pupils not only understand the topic more, but they also learn how to trust their friends....have more idea....rather than their friends." After interviewing my mentor, I decided to carry out cooperative learning strategies, such as, "Team-Pair-Solo", "Team-Pair-Share" and "Numbered Heads Together" in my class.

Objectives of the Study

The objectives of my action research were as follow.

- To use the selected cooperative teaching and learning techniques to improve pupils' learning in my mathematics class.

- To use the selected cooperative teaching and learning techniques to improve pupils' interest in my mathematics class.
- To determine the effect of action research on teaching practice performance

Research Questions

The research questions in this action research were as follow.

- What is the effect of using these cooperative techniques on my pupils' learning in mathematics?
- What is the effect of using these cooperative techniques on my pupils' interest in mathematics?
- What is the effect of doing action research on my teaching practice performance?

ACTION PLAN

Action research can be defined as a cyclical step-by-step process for guiding teacher research. McNiff stated that "action research is a powerful method of bridging the gap between the theory and practice of education; teachers are encouraged to develop their own personal theories of education from their own class practice" (as cited in Brown, 2002).

I had planned a time schedule of using cooperative learning in teaching mathematics in year 3A class. Before I used cooperative learning techniques in teaching Mathematics, I had done an initial survey in the first week in order to know whether my pupils preferred learning mathematics individually or in groups. I also interviewed my mentor about how often she carried out group activity in class and her opinion of using cooperative learning strategy in teaching mathematics. This was to know whether it was possible to carry out cooperative learning in teaching mathematics. The interview was audio-taped.

In the second week, I reviewed literature on cooperative learning strategies and activities to find the most suitable activities for my Mathematics class. I realized that the best activities for my class were "Team-Pair-Solo" and "Numbered Head Together". In the following week, I collected pupil's previous mathematics achievement results and formed groups based on their ability. I

wanted them to acquire knowledge from their friends through cooperative learning strategies. However, I faced problems when forming the groups. Some pupils disliked their group members as they preferred their best friends to be in the same group as them. As I tried to use cooperative learning in the class, I noticed that some pupils did not cooperate with their group members. To solve this problem, I explained to them the reason why I formed the groups that way. The pupils accepted their group members after I explained to them.

From the fifth until the thirtieth week, I used cooperative learning strategies namely, "Team-Pair-Solo" and "Numbered Heads Together" in my lessons. I used these strategies based on the suitability of Mathematics topic. I also used teacher-centered strategy so the pupils would not feel bored with the same teaching strategies. I started to collect data in March until the end of April. In the final week of practicum, I administered the topical test so I could collect test score data to determine the effect of cooperative learning on pupils' performances.

Daniel et al. (1991) stated that cooperative learning is now widely recognized as one of the most promising practices in the educational field (as cited in Tok Hoon Seng, 1996). Pupils could build up their knowledge from their friends through group work.

METHODOLOGY

Participants

The participants for this study were the students from Year 3A at SK LK. They consisted of 23 pupils from Year 3 class at SK LK, Kuching, Sarawak. There were 12 (52.2%) boys and 11 (47.8%) girls in this class. Four pupils in this class were considered as high achievers. Majority of them (11 of the pupils) were considered as average achievers. Eight pupils were considered as low achievers.

Data Collection

In order to answer the research questions of this action research, data was collected using various methods. Table 2 presents the research questions, the type of data to answer the questions, the methods used to collect the data and the source of the data.

Table 2.

Research Questions, Types of Data, Data Collection Method and Source of Data

Research Question	Data	Method	Source
What is the effect of using these cooperative techniques on my pupils' learning in mathematics?	Pupils' Learning	<ul style="list-style-type: none"> • Mathematics topical tests - Test scores - Test Specification table 	<ul style="list-style-type: none"> • Self • Pupils
What is the effect of using these cooperative techniques on my pupils' interest in mathematics?	Pupils Interest	<ul style="list-style-type: none"> • Pupil's Interest Questionnaire 	<ul style="list-style-type: none"> • Pupils
Can the use of the selected cooperative teaching and learning techniques in my mathematics class improve my teaching practice?	Teaching Practices	<ul style="list-style-type: none"> • Teaching Practice Appraisal form 	<ul style="list-style-type: none"> • Lecturer

Pre-test and post-test were administered to the pupils based on the lessons which I taught them to evaluate pupils' learning in mathematics. To determine the effects of cooperative learning on pupils' performance, an analysis of pupils' pre and post test mean scores and standard deviation was carried out and reported in the next chapter. I had done test specification table which is shown in Table 3.

Table 3.

Topical Test Specification Table for the Topic Subtraction and Multiplication

Topic	Skill Level				Total
	Knowledge	Understanding	Application	Analysis	
<u>Subtraction</u>					
i.Objective Questions	3	6	6	0	15
ii.Subjective Questions	1	2	5	0	8
Total	4 (17.39%)	8 (34.78%)	11 (47.83%)	0 (0%)	23
<u>Multiplication</u>					
i.Objective Questions	3	5	5	1	14
ii.Subjective Questions	3	4	6	0	13
Total	6 (22.22%)	9 (33.33%)	11 (40.74%)	1 (3.70%)	27

From the Table 3, the skill level for the two topical tests was unequal. It was due to the number of questions for the two papers was different. However, the percentage for both skill level was similar.

To answer the research question on whether my action research can improve pupils' interest, I had collected the data on pupils interest in learning mathematics by using the pupil's interest questionnaire. The questionnaire consists of four items with a Likert scale of four points ranging from *strongly disagree*, *disagree*, *agree* and *strongly agree*. The data was analysed using frequency counts and percentages and comparison over time were used to determine if pupils' interest has improved.

The last research question, that is, "To what extent action research affects my teaching practice?" I had collected the data based on observation of my teaching practice using appraisal form. My lecturer evaluated my teaching practice performance in terms of implementation. My lecturer observed and rated me two times. The implementation part in teaching practices appraisal form consists of eight items with a Likert scale of five points ranging from 1, 2, 3, 4 and 5. 1 means "very weak", 2 - "weak", 3 - "average", 4 - "good" and 5 - "excellent". The data was analyzed and comparison was made to determine if my teaching practice has improved.

RESULTS AND FINDINGS

Effect of Cooperative Learning on Pupils' Learning

Analysis of pupils' pre and post test mean scores was carried out and displayed in Table 4.

Table 4.
Pre and Post Tests Scores for 3A Pupils

Pupils	Pre-test (%)	Post-test (%)
P1	77	59
P2	-	-
P3	74	84
P4	51	70
P5	94	84
P6	31	43
P7	66	66
P8	71	52

P9	31	73
P10	-	-
P11	17	36
P12	57	52
P13	86	80
P14	26	39
P15	14	39
P16	69	61
P17	60	70
P18	66	55
P19	49	45
P20	57	59
P21	80	70
P22	74	80
P23	0	9

Table 5.
Mean and Standard Deviation of Pre-test and Post-test

	Pre-test	Post-test
Mean	54.76	58.38
Standard Deviation	25.72	19.30

Table 5 shows that the class mean has increased from 54.76 to 58.38 while the standard deviation has fallen from 25.72 to 19.30.

Effect of Cooperative Learning on Pupils' Interest

The second research question sought to find out the effect of cooperative learning on pupils interest in mathematics. The Pupils' Interest Questionnaire was administered three times and the analysis is shown in Table 6, 7 and 8.

Table 6.
Distribution of responses by item for first administration of questionnaire (Time 1)

No	Items	Frequency Count				Total	Mean 1	Standard Deviation 1
		Scale 1	2	3	4			
1	I like to learn Mathematics.	2	0	8	10	20	3.30	0.92
2	I like to do Mathematics exercises.	4	2	3	11	20	3.05	1.23
3	I like to attend Mathematics class.	3	2	4	11	20	3.15	1.14
4	Mathematics is interesting.	2	1	4	13	20	3.40	1.00

There were only 20 pupils in the class as two pupils went to mathematics remedial class and another pupil was absent. From Table 6, we could see that 10 pupils strongly agreed with item 1, 11 pupils strongly agreed with item 2 and 3; and 13 pupils strongly agreed with item 4.

Table 7.

Distribution of responses by item for second administration of questionnaire (Time 2)

No.	Items	Frequency Count				Total	Mean 2	Standard Deviation 2
		Scale 1	2	3	4			
1	I like to learn Mathematics	0	1	7	8	16	3.44	0.73
2	I like to do Mathematics exercises.	0	1	7	8	16	3.44	0.63
3	I like to attend Mathematics class.	1	3	5	7	16	3.13	1.09
4	Mathematics is interesting.	0	2	4	10	16	3.50	0.73

There were only 16 pupils as shown in Table 7 as pupils attended Malay Language and Mathematics remedial classes. Based on Table 7, if compared with the mean in Time 1, the mean in Time 2 for the items 1, 2 and 4 have increased. Only the mean for item 3 has decreased.

Table 8.

Distribution of responses by item for third administration of questionnaire (Time 3)

No.	Items	Frequency Count				Total	Mean 3	Standard Deviation
		Scale 1	2	3	4			
1	I like to learn Mathematics.	2	0	5	14	21	3.48	0.93
2	I like to do Mathematics exercises.	1	1	6	13	21	3.48	0.81
3	I like to attend Mathematics class.	1	2	4	14	21	3.48	0.87
4	Mathematics is interesting.	3	1	3	14	21	3.33	1.11

There were 21 pupils as shown in Table 8 as two pupils went to Malay Language remedial class. If compared with the mean in Time 2, the mean in Time 3 for the items 1, 2 and 3 has increased. Only the mean for the item 4 decreased.

Effect of Action Research on Teaching Practice Performance

Analysis of data based on the observation teaching practice form was carried out and shown in Table 9.

Table 9.
Teaching Practice Performance after using Cooperative Learning Strategies in Teaching Mathematics

Component	No.	Aspect	Observation	
			Time 1	Time 2
Implementation	1.	Introduction	5	5
	2.	Lesson Development	4	5
	3.	Classroom Management	4	4
	4.	Communication	4	5
	5.	Learning Quality	4	4
	6.	Closure	3	4
	7.	Achievement of Learning Outcome	4	4
	8.	Integration of Moral Value	4	5
	Total		32	36
	Mean		4	4.5
	Standard deviation		0.53	0.53

From Table 9, Time 2 rating scores for the aspect of 2, 4 and 8 showed in increase compared to Time 1. The rating scores for aspect of 1, 3, 5 and 7 were maintained. The results showed that the mean has increased from 4 to 4.5 while the standard deviation was maintained at 0.53. The results here indicated that the effect is very small. Difference in the mean was only 0.5 and there was no difference in the standard deviation. This means that the effect of doing action research on my teaching practice performance is small.

Reflection on Findings

From the findings, the results here indicated that the effect was very small. Difference in the class mean was only 3.62 while the difference in the standard deviation was only 6.42. This means that the effect of cooperative learning on pupils' learning was

small. I think this maybe because I could not carry out cooperative learning smoothly in the class. The class was at times noisy when I conducted the cooperative learning. So, I scolded the pupils and ordered them to keep quiet. This could have caused the pupils to have bad impression of me. Hence, the effect of cooperative learning on pupils' learning is small.

From the findings, we could see that the mean for items 1 and 2 increased over time. The mean for item 3 was lower for Time 2 (3.13) compared to the mean for Time 1 (3.15). Item 3 is related to the statement "I like to attend Mathematics class". Pupils rated their "liking" or "dislike" of attending mathematics based on their mood on that day. It may be because I had scolded them for making noise and not paying attention in class. Thus, they disliked attending my mathematics class. Besides, the mean for item 4 is lower for Time 3 (3.33) compared to the mean for Time 2 (3.50). Item 4 is related to the statement "Mathematics is interesting". This could be due to the difficulty of the topic. The difficulty for the mathematics topic was from easy to difficult. Some of the topics were complicated for the pupils, such as, multiply 3-digit numbers by 1-digit numbers with regrouping. Pupils felt that mathematics was complicated and not interesting.

From the findings, the effect of doing action research on my teaching practice performance is small. The results presented here indicated that doing action research did not affect my teaching practice performance negatively. My concern that my supervisor might rate me lower in my teaching performance when doing action research has been addressed. In fact, the results showed that my supervisor's rating of my teaching was higher during the second observation compared to the rating during the first observation. The mean has increased from 4 to 4.5 while the standard deviation is maintained at 0.53.

REFLECTION AND FURTHER ACTION

After carrying this action research, I realized that it really helped me a lot in teaching Mathematics. My teaching practice improved because I applied cooperative learning strategies in teaching Mathematics. I could arouse pupils' interest in doing Mathematics questions. During cooperative learning, such as,

Numbered Head Together, the pupils would do it together because any of them would be called to show their answers in front of the class. The pupils wanted to obtain scores for their group. So, the clever pupils would teach the weak pupils to solve the given question. Thus, every pupil would discuss and solve the question together in their group. Through the findings on the pre-test and post-test, pupils in this class had shown improvement in learning mathematics.

Furthermore, this cooperative learning strategy was suitable for my mathematics lesson. Pupils could learn Mathematics in a democratic way. Every pupil was given chance to give opinion during the mathematics activities. For example, during the activities of Numbered Head Together, every pupil would be given chance to present their answers and share the understanding about the topic that they had learnt before in class. During cooperative learning, pupils could also give opinion and exchange opinion with their group members. Thus, the pupils learning could be more democratic through cooperative learning in class.

I also realized that this strategy was very useful in teaching mathematics. When I conducted cooperative learning strategy in class, I could see the effect of cooperative learning strategy on my pupils' social skills. During cooperative learning, the pupils would not sit in group quietly. They would discuss, exchange ideas and explore the task given together. And when they have any questions, they would ask me to guide them to solve the task given. Hence, I think cooperative learning is very useful compared to teacher-centered strategy.

The cooperative learning strategy should be continued as a teaching method to enhance the social skills among the pupils. I will conduct more cooperative learning in class to improve the pupils' intrapersonal and interpersonal skills so that the pupils can adapt themselves in the society. I can implement other cooperative learning strategy in my class such as "Jigsaw" and "Round Robin". Pupils will get bored if I always use the same cooperative learning strategies in class. So, I will try other cooperative learning strategies to make my lessons more interesting. I will conduct the research about the problems which

are faced by teacher in conducting cooperative learning in primary school. I will do further research on whether other cooperative learning strategies, such as, "Jigsaw" and "Round Robin" can improve the pupils learning of Mathematics.

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THE USE OF COOPERATIVE LEARNING IN MATHEMATICS LESSONS TO IMPROVE PUPILS' LEARNING AND INTEREST IN A PRIMARY THREE CLASS

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ABSTRAK

Tujuan penyelidikan ini adalah untuk meningkatkan pembelajaran serta minat murid-murid terhadap Matematik melalui penggunaan "Numbered Heads Together" dan "Mix and Match". Selain itu, penyelidikan ini dilaksanakan untuk mengkaji kesan-kesan melakukan penyelidikan tindakan terhadap prestasi amalan pengajaran saya. Sasaran kajian ini ialah 24 murid dari SK SKH, Kuching. Data untuk kajian ini dikumpulkan dengan menggunakan soal selidik, ujian topikal dan borang Penilaian Praktikum (PR1). Keputusan kajian menunjukkan bahawa pembelajaran murid telah meningkat sebanyak sembilan markah secara keseluruhan. Selain itu, minat murid terhadap Matematik telah ditingkatkan sebanyak 15.8%. Dari segi amalan pengajaran, saya telah menunjukkan peningkatan dalam empat aspek dari lapan aspek yang terdapat pada borang PR1. Pembelajaran koperatif boleh digunakan untuk meningkatkan pembelajaran murid. Penyelidikan tindakan juga boleh dilaksanakan untuk meningkatkan amalan mengajar guru dari semasa ke semasa.

Kata kunci: Pembelajaran kooperatif, "Numbered Heads Together", "Mix and Match", pembelajaran, minat, amalan mengajar

ABSTRACT

The purpose of this study was to increase pupils' learning and interest in Mathematics through the use of "Numbered Heads Together" and "Mix and Match". Besides that, it was implemented to determine the

effects of doing action research on my teaching practice performance. The target participants of this study were 24 pupils from SK SKH, Kuching. The data for this study was collected using questionnaires, topical tests and Teaching Practice Appraisal (PR1) form. The results showed that the pupils' learning has improved by a mean score of nine marks. In addition, pupils' interest towards Mathematics has shown an increase of 15.8%. From the aspect of teaching practice, I had shown improvement in four aspects out of eight aspects in the PR1 form. Cooperative learning could be used to enhance pupils' learning. Action research could also be implemented to improve teachers' teaching practices from time to time.

Keywords: Cooperative learning, "Numbered Heads Together", "Mix and Match", learning, interest, teaching practice

INTRODUCTION

Context of study

Leblanc (1998) mentioned that the first requirement of a good teaching is not only motivated students to learn, but also teaching them how to learn, and doing so in a manner that is relevant, meaningful, and memorable. In my opinion, constructivist approach fulfills the requirement of a good teaching. I highly recommend it in Mathematics teaching as it encourages pupils to be more independent in the process of acquiring knowledge. Constructivist approach is mainly about guiding pupils to generate their own knowledge through different activities which are designed by teacher. Usually, I integrated constructivist approach in my teaching through group activities. The main problem or issue arose during group activities was the smarter pupils having the tendency to monopolize the task. This situation had caused the weaker pupils to feel unmotivated and thus lost interest in learning Mathematics. Furthermore, the pupils could feel that Mathematics is a boring subject. They always showed unhappy expressions and frowned when Mathematics was mentioned. I interpreted it as the pupils were not interested in it. Therefore, I had used the opportunity of

phase three practicum to carry out this study to solve the problems.

Focus of the Study

I focused my study on using cooperative learning strategies such as “Numbered Heads Together” and “Mix and Match” to solve the problem that I faced. Huff (1997) defines cooperative learning as pupils working in small groups and helping each other to learn academic materials. In cooperative learning, the smarter pupils are encouraged to teach, guide and help their weaker friends to learn. With this element, it was hoped that the smarter pupils would not monopolize the whole task but help their weaker friends to learn.

Moreover, the group of participants had never been exposed to cooperative learning strategy before. Thus, I wanted to expose them to this learning strategy. Through this study, I hoped that the level of pupils’ learning and interest could be increased. In my opinion, interest and learning are closely related. Once you are interested in the subject, you are motivated to learn the knowledge or skills related to it. Therefore, there is a need for me to increase pupils’ interest in order to help them learn Mathematics better. In my point of view, “Numbered Heads Together” and “Mix and Match” are suitable for Level 1 pupils. It is easy to organize. The simple and short steps enable the young learners to understand what their responsibilities are in a very short time. Other than that, these two strategies require pupils to interact among themselves to achieve the target goal. Through these activities, they would learn social skills either directly or indirectly.

Before this study was carried out, an initial survey was conducted. During the initial survey, I had collected data about the pupils’ background. I obtained my mentor’s feedback on the use of “Numbered Heads Together” and “Mix and Match” in Mathematics lesson. I interviewed the school Mathematics teacher, distributed Initial Survey Questionnaire and collected data such as pupils’ academic performance results and socio-economy status from the class teacher. Table 1 displays the frequency count of favourable response for each item in the Initial Survey Questionnaire.

Table 1.

*Frequency of favorable response for each item in Initial Survey
Questionnaire (N = 24)*

	Items	Frequency
1.	Are you a boy or a girl?	-
2.	Do you like to go to school?	24 (100%)
3.	Do you like today's lesson?	24 (100%)
4.	What subject does you like the most?	12 (50%)
5.	Do you like to work in groups?	24 (100%)

The first item would not be interpreted. The responses for item 2, item 3 and item 5 was favorable ("Yes") while the favorable response for item 4 is "Mathematics". Table 1 shows only 50 percent (%) of the pupils like Mathematics. Therefore, there was a need for me to carry out this study to increase pupils' learning and interest in learning Mathematics.

Objectives

The objectives of this study were:

- to increase pupils' learning in Mathematics through the use of numbered heads together and mix and match;
- to enhance pupils interest in learning Mathematics by using cooperative learning strategies; and
- to investigate the effect of doing action research on my teaching practice performance.

Research Questions

This study was carried out with the purpose to answer the following research questions.

- Can I increase the pupils' learning and interest by using the selected cooperative learning strategies?
- What are the effects of carrying out this action research on my teaching practice performance?

"Learning" in the context of this study refers to the amount of learning that has taken after the topic had been taught. Topical tests were used to access the amount of learning. The scores are the indicators of the amount of learning that occurred.

In this study, "pupils' interest" refers to something that you like to learn and do something related to it during your free time. You would look forward to it and like to do homework which is related

to it. Furthermore, you would not feel bored when you are doing the things related to it.

“Teaching practice performance” refers to my supervisors’ rating of my teaching performance in the aspects of induction set, lesson development, classroom management, communication, lesson’s quality, closure, achievement of learning outcome(s) and integration of moral values.

ACTION PLAN AND LITERATURE REVIEW

After discussing with my other three partners, the action plan that we chose for this study was using “Numbered Heads Together” and “Mix and Match” to solve the problems that we faced in our teaching. To implement these learning strategies, 15 to 20 minutes are needed. It was used during Step 2, set induction and closure of a lesson.

Action Research and Teaching Practice

Ferrance (2000) explained that action research is a process in which participants examine their own educational practice systematically and carefully using the techniques of research. In other words, it is a reflective process and it enables the practitioner to have a better understanding of their own weaknesses and strengths. The aim of carrying out action research is helping the practitioner to improve themselves. In other words, action research enables us to be more holistic and perfect in our teaching practices.

Numbered Heads Together

According to Kagan (2003), “Numbered Heads Together” conveys the idea that each student had a number and that all the students on the team put their heads together to come up with their best answer. As usual, pupils are divided into groups of four. Each of them will be numbered as one, two, three and four. A task will be assigned for each group and the group members need to work together to solve the problem. About ten minutes will be given for each group to find the answer. After that, the teacher will call a number and the pupils with the number from each group have to stand up to tell the class their answers.

Mix and Match

On the other hand, "Mix and Match" is organized as a classroom activity. The pupils are not divided into small groups. In order to use this strategy in teaching, the teacher should prepare a pile of cards. Pupils find their partners by matching the cards that they hold. When they have found their partner, they can either sit or stand together with their partners. Then, each partner shows their cards to the class at the front of the class. This type of activity can be carried out for a few rounds in a particular lesson.

Grouping

Pupils need to be distributed evenly according to their ability and performance before cooperative learning is being carried out. According to McCracken (2005), four seems to be an ideal number for each group. I decided to divide them into groups of four as there were 24 pupils in the class. Since the school had streamed the pupils based on their abilities, I gave freedom to the pupils to form their own group. The grouping of the pupils was different every time.

METHODOLOGY

Target Participants

I needed to know the Mathematics academic ability and socio-economy status of the participants before I implemented the action. Table 2 shows the academic ability and socio-economy status of the target participants.

Table 2.

Profile of participants' Mathematics academic ability and socio-economy status (N = 24)

	Mathematics Academic Ability	Socio-Economy Status
High	10 (41.7%)	4 (16.7%)
Middle	13 (54.2%)	20 (83.3%)
Low	1 (4.2%)	-

The target participants of this study was a group of nine year old children from Year 3M at SK SKH, Kuching. The class consisted of 13 girls and 11 boys. Most of them were from middle income family and their achievements in Mathematics were above average.

Data Collection

I had collected three types of data for this study, such as, data of the pupils' learning, pupils' interest and my teaching practice performance as assessed by my mentor.

The data of pupils' learning was collected using topical tests. I had administered Test 1 and Test 2 among the pupils. Test 1 was tested on the topic of "Money" while Test 2 was tested on the topic of "Time".

On the other hand, Pupils' Interest Questionnaire was used to collect data of pupils' interest. The instrument consists of five items. The response for each item is a closed-ended answer which is either a "Yes" or a "No".

Apart from that, the data on my teaching practice performance was collected by using the PR1 form. It is actually an observation checklist used by lecturer to rate teacher trainees' teaching performances. My mentor rated my teaching based on the eight criteria. The ratings for each aspect range from one to five. The rating of one indicates that I am poor in that aspect. However, the rating of five indicates that I am excellent in that particular aspect. Written comments by my mentor were also collected.

Data Analysis

The data collected was analyzed quantitatively and qualitatively. The data of pupils' learning and interest was analyzed quantitatively using mean and standard deviation. However, the data of my own teaching practice performances as assessed by my mentor was analyzed quantitatively and qualitatively. Qualitative data such as mentor's comments was summarized and conclusions drawn.

FINDINGS

Effect of cooperative learning strategies on pupils' learning

I administered Test 1 during the second week of internship while Test 2 was administered in the fourth week of internship. Figure 1 presents bar graphs of the mean scores of Test 1 and Test 2.

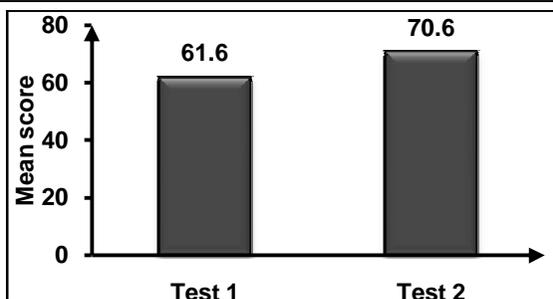


Figure 1. Mean scores of Test 1 and Test 2.

The mean score for Test 1 was 61.6 out of 100 while the mean score for Test 2 was 70.6 out of 100. During Test 2, the mean score has increased by nine marks. It means that more learning had taken place as the pupils involved actively in their learning.

Standard deviation indicates the spread of the data. Table 3 displays the values of standard deviation for Test 1 and Test 2.

Table 3.

Standard deviation of Test 1 and Test 2

	Test 1	Test 2
Standard Deviation	23.9	22.6

The standard deviation for Test 1 was 23.9. The value of the standard deviation was quite big. It was due to the existence of extreme values. The marks obtained by the pupils ranged from the lowest 21 marks to the highest 99 marks in Test 1. The value of standard deviation for Test 1 was undesirable because it meant that the individual differences between the pupils were big. For Test 2, the standard deviation is 22.6. The value of standard deviation has become smaller and it showed a decrease of 1.3. The decrement indicates the individual differences between the pupils have slightly decreased.

Effect of cooperative learning strategies on pupils' interest

Pupils' Interest Questionnaire was administered three times during the internship in order to find out about the pupils' interest level. Figure 2 shows the bar graphs for each of the five items for Week 2, Week 3 and Week 4.

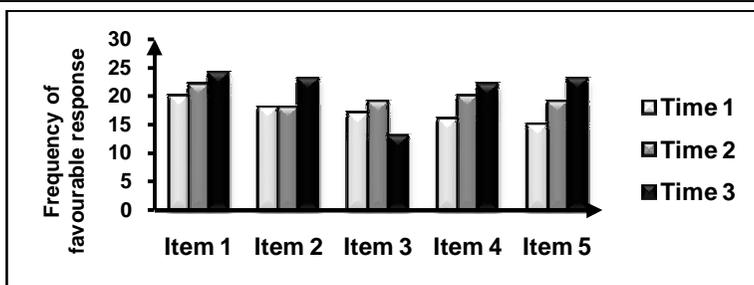


Figure 2. Bar graphs of frequency of favourable response to each item for Time 1, Time 2 and Time 3 (N = 24).

The Pupils' Interest Questionnaire contains five items. The five items that were stated in the questionnaire are as follow.

Item 1: Do you like to learn Mathematics?

Item 2: Do you like to do Mathematics homework?

Item 3: Do you look forward to Mathematics homework?

Item 4: Do you do something related to Mathematics during your free time?

Item 5: Do you feel bored when learning Mathematics?

For each item, it is clear that there was an increase except for the third item. In my opinion, the pupils were no longer looking forward to Mathematics lessons because they disliked the topic of "Time". Furthermore, the pupils' attention span was very short. They were bored of the two cooperative learning strategies and thus did not look forward to the lessons anymore. Figure 3 graphically represents the frequency of total favorable responses for Time 1, Time 2 and Time 3.

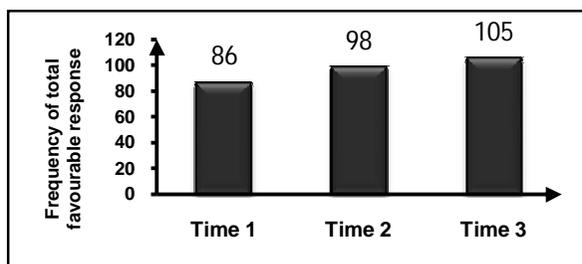


Figure 3. Frequency of total favorable responses for Time 1, Time 2 and Time 3

The frequency of total favorable responses has increased from 86 to 105. The highest possible frequency of total favorable responses was 120. It showed an increase of 15.8%. I interpreted it as the selected cooperative learning strategies had slightly increased the interest level of the pupils towards Mathematics.

Effect of doing action research on my own teaching practice performance

The highest rating for each aspect is 5 while the lowest rating is 1. Table 3 presents the mean scores of Observation 1, Observation 2 and Observation 3.

Table 4.

Mean scores of Observation 1, Observation 2 and Observation 3

	Observation 1	Observation 2	Observation 3
Mean score	3.6	4.1	4.6

The mean score for the rating has increased from 3.6 (Observation 1) to 4.6 during Observation 3. The value of 4.6 was near to the rating of 5. Therefore, I could interpret it as my teaching practice performance was excellent in many aspects by doing action research.

REFLECTION

This study was quite effective in increasing pupils' learning and interest in Mathematics. Doing action research was effective in improving my teaching practice. The improvement was significant. I felt that these learning strategies and action research should be encouraged in every school in order to maximize pupils' learning as well as improving the quality of teaching.

Apart from that, this study was flexible in the sense that it could be adapted in any school in any area. The cost that is needed for this study to be carried out is low and is affordable. Cooperative learning strategies not only help the pupils to learn new knowledge but also help them to enhance their social skills.

Cooperative learning strategies provided an equal opportunity for the pupils to learn. The smarter pupils enjoyed the fun of learning Mathematics through various activities. They also enjoyed the

opportunity to work with their friends. On the other hand, the weaker pupils felt more comfortable learning from their friends. Moral values like cooperation and respect were infused during the activities. Cooperative learning emphasize on team work. It provides a learning environment which is similar to the scenario of a society. These values are very important to ensure the harmony and the success of a country with different races.

Other than that, I believed that I could have more improvement on my own teaching practice if more time was given. I would have more time to reflect on my teaching by identifying my own weaknesses and take action to cope with it.

FURTHER ACTION

The action plan that I would like to take in the next action research were "Three-minute review" and "Circle the sage". For "Three-minute review", the teacher can stop at any time during a lesson and give teams or groups three minutes to review on what has been taught, what has been discussed or what has been said either by the teacher or their friends. "Circle the sage" means stand around the sage and know something new from him or her. If the teacher wants to carry out this type of activity, he or she needs to raise the pupils' attention to see which pupils have special knowledge to share. Johnson and Johnson (1989) stated that cooperative learning promotes academic achievement, increases retention, and vastly improves students' self-esteem and communication (as cited in Huss, 2006). As a result, the outcomes that I would like to expect for the next cycle were to increase pupils' participation and attention towards Mathematics lessons.

CONCLUSION

In conclusion, the use of Numbered Heads Together and Mix and Match had slightly increased the level of pupils' learning and interest in Mathematics. Besides that, through doing action research, I also showed improvement in my teaching practice performances as assessed by my mentor. In other words, the study answered the two research questions. Undeniably, there were some limitations of this study. Some of the pupils misused the opportunity of working together to play with their friends.

Moreover, time was a constraint for pupils who were weak in English language and weak in Mathematics. Besides, action research is contextual and it cannot be used to generalize over the population.

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**CLASSROOM MANAGEMENT AND MATHEMATICS
LEARNING OF SLOW LEARNERS
IN A PRIMARY FOUR CLASS**

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk menilai kesan teknik pengurusan bilik darjah yang dilaksanakan dalam mengurangkan gangguan tingkah laku dalam kelas. Responden dalam kajian ini terdiri daripada 26 orang murid Tahun 4 dari SK JOTS yang memperoleh markah terendah bagi mata pelajaran Matematik dalam ujian lalu. Data dikumpulkan melalui ujian pra dan pasca. Hasil analisis data mendapati bahawa kebanyakan responden menunjukkan peningkatan markah dalam ujian pasca berbanding ujian pra. Keputusan kajian menunjukkan bahawa teknik pengurusan bilik darjah yang dilaksanakan berkesan dalam membantu murid lemah meningkatkan markah ujian mereka.

Kata kunci: Pengurusan bilik darjah, murid lemah, teknik pengurusan bilik darjah, amalan mengajar

ABSTRACT

The purpose of the study was to determine the effect of class control techniques in reducing disruptive behavior in the classroom. The respondents consisted of 26 Year 4 pupils from SK JOTS who obtained the lowest marks for Mathematics in their previous examination. The data was collected using pre-test and post-test. The results showed that most of the respondents achieved better marks compared to the pre-test. The results of the study showed that the used of class control techniques were effective in helping the slow learners achieved better results in their examination.

Keywords: Classroom management, slow learner, class control techniques, teaching practice

INTRODUCTION

Contexts of the Study

Managing class behavior is a complex task, one that requires self-questioning and careful reflection that even the best teachers must work to acquire and maintain (Kauffman et al., 1993). As classroom managers, teachers regularly use commands to direct students to start and stop activities. Command is a crucial tool for classroom management that serves as instructional signals that help students to conform to the teacher's expectations for appropriate behaviors. Command is a very important aspect in classroom management when the lesson is in progress. When giving command, teachers need to consider the effectiveness of the command to enable students to receive the given command and continue to do their own things. Achieving effective teaching requires much more than keeping students' behavior under control. Without reasonable control over students' classroom behavior, a teacher will have no chance of being effective.

During practicum 1, I was given a large size class at SK GR. There were 39 pupils in the class and I found it hard to control the class compare to other classes that I had. Before this, I had no experience managing a class with more than 35 pupils. Most of them were very active, rebellious and disobedient. Teachers commented that I was not firm enough but even other teachers in the school had difficulty in controlling the pupils. During practicum 2, I had a chance to teach a medium-size class of 20 pupils in SK LK. It was a suitable class size for me. I did not have difficulty in managing the class. During my third practicum, I was given a class with most of the pupils being weak in their academic performance in all subjects. Therefore, most of the pupils in my class did not like to study especially mathematics. Sometimes, they would say, 'I don't like maths, it's too hard'. They always did not pay attention to the lessons especially long sessions. When they started to feel bored in the class, they would run around the whole class. I had to shout at them and asked them to go back to their seats.

Focus of the Study

During my previous practicum, I taught Primary 2 Mathematics. I carried out a lot of activities that I learnt during the lectures at the

teachers' institute. Some of the activities were able to attract pupils' attention. Pupils would learn more things when they pay attention during the teaching and learning process. I found that most of the pupils only had a very short attention span around 10-20 minutes. After that, the pupils would start to talk to each other and made lot of noises. I had to shout and made them quiet before I could continue my lesson.

I learned about classroom behavior in the college. One of the most important things about classroom behavior is that if the classroom is not well-managed, learning would be jeopardized. Pupils would start to disrupt the lesson because the teacher did not stop their misbehavior. After my experiences during practicum, I believe that classroom management is indeed an important factor in pupils' learning. However I had difficulties in managing my classroom well.

In order to solve the problem, my mentor had suggested me some tips to help me to control my class. One of the suggestions was to control the ring leader who has more influence on other pupils in class. The other pupils would not dare to misbehavior unless being influenced by the ring leader. Therefore, in order to have an effective way of controlling the class, a teacher must find the pupils who have more influence on other pupils. Then, their influence would be used to help the teacher control the class or control their behavior to prevent other pupils' from misbehaving. I found that this tip quite useful especially in controlling the class and making the class more organized.

Objective of the Study

The purpose of my study was to try out a few class control strategies to manage pupils' disruptive behavior. The class control strategies that I used were limit settings, eye contact, prompt and punish.

Research Questions

The purpose of my study was to answer the following questions.

- Can the use of the class control techniques (limit setting, eye contact, prompt and punishing) help to reduce disruptive behaviors in my mathematics class?

- What is the effect of using class control techniques (limit setting, eye contact, prompt and punishing) on my pupils' learning?
- Do the class control techniques (limit setting, eye contact, prompt and punishing) help me to improve my teaching practice methods, skills and knowledge?

ACTION PLAN

The following is the description of the class control techniques that I have implemented.

- Limit settings - action taken by the teacher to control the pupils' natural reflexes and prompt pupils back to work while pupils are doing set work or teacher is lecturing.
- Eye contact - eyes are the most expressive non verbal communication tool. It is a direct challenge or exercise of power to stop misbehavior in the class.
- Prompt - move across the room and stand before the pupil's desk. Teachers have to break the pupil's comfortable bubble by reaching in with our hand and signaling a prompt to an action that teachers want.
- Punish – used when pupils do not care or ignore the signal or prompt that the teacher has given. Some punishment will be given to those pupils who are disobedient to the teacher's instruction.

In my initial survey, I checked on pupils' socio economic status (SES) where most of them were discovered to be from low income group and some of them were from the middle class. I also administered a pre-test to see their performances in Mathematics. I found that most pupils had very low achievement in Mathematics. I collected data related to class discipline (pupils' behavior) and pupils' learning. The methods and instruments that I used were questionnaire, interviews, assessment (tests) and observation as shown in Table 1.

Table 1.

Data Collection Methods and Sources

Data	Methods	Sources
➤ Class discipline	➤ Questionnaire	➤ Lesson plans
➤ Pupils' learning	➤ Interviews	➤ Mentor evaluation
	➤ Assessment	➤ Test papers
	➤ Observation	

METODOLOGY

The participants of this study consisted of 26 pupils from 4C class at SK JOTS. There were 16 boys and 10 girls in this class. The profile of the pupils in terms of their abilities and gender is shown in Table 2.

Table 2.
Profile of 4C Class

	Low	Average	High	Total
Male	12	3	1	16
Female	7	3	0	10
Total	19	6	1	26

The focus of this research was to reduce disruptive behavior among the pupils. To answer the research questions three types of data were collected. Table 3 shows the data collection methods used to answer the research questions.

Table 3.
Data Collection Methods

Research Question	Data	Method	Source
<ul style="list-style-type: none"> • Can the use of the class control techniques help to reduce disruptive behaviors in my mathematics class? 	<ul style="list-style-type: none"> • Pupils' discipline • Managing class discipline 	<ul style="list-style-type: none"> • Observation (structured) • Interview 	<ul style="list-style-type: none"> • Peer and class teacher • Class teacher
<ul style="list-style-type: none"> • What is the effect of using class control techniques on my pupils' learning? 	<ul style="list-style-type: none"> • Pupils' learning 	<ul style="list-style-type: none"> • Tests 	<ul style="list-style-type: none"> • Pupils
<ul style="list-style-type: none"> • Do the class control techniques help me to improve my teaching practice methods, skills and knowledge? 	<ul style="list-style-type: none"> • Teaching practice methods, skills and knowledge. 	<ul style="list-style-type: none"> • Observation • Comments of mentors 	<ul style="list-style-type: none"> • Class teacher • Supervisor and class teacher

For the data on my pupils' discipline, I asked my mentor to observe the behavior of the pupils during the lesson. After the observation, my mentor gave comments about the pupils' discipline when the class control techniques were implemented in my lesson. I jotted down the comments of my mentor.

In order to evaluate my pupils learning, I gave them a test to see whether they had learnt the skills taught during the implementation of class control techniques and the result would indicate whether their performance have improved or not. I used statistical method to analyze and compare the pre-test and post-test. Mean and standard deviation would determine whether my pupils' learning has increased or not when I taught Mathematics.

For the data related to my teaching practice, data was collected from my mentor using the Teaching Practice Appraisal Form (PR1). I had extracted the comments given by my mentor. Other than that, I analyzed the total score given. All the data collected was interpreted to see whether I had improved in my teaching practice.

REFLECTION OF FINDINGS

For the first research question, the data related to pupils' discipline and how I managed the class discipline was assessed by my class teacher. Figure 1 shows the mean and standard deviation of my pupils' discipline and my management of the class discipline.

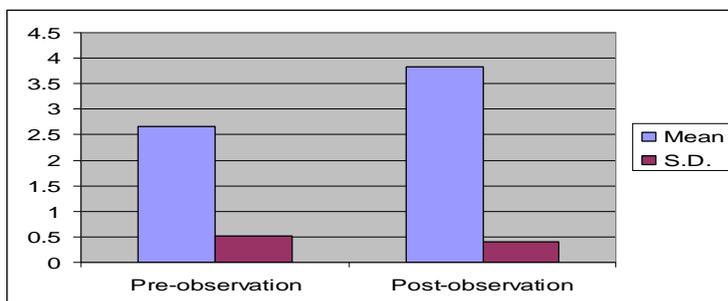


Figure 1. The mean and standard deviation on pupils' discipline and my management of class discipline.

During pre-observation (previous observation), my mentor had given me mostly rating of 2 and 3 out of 5 and the mean was 2.63. After post-observation, the mean of my pupils' discipline and my managing of class discipline had increased to 3.75. This showed that my class control had improved significantly after implementation of the class control techniques for two months during the practicum.

Pupils' results in pre-test and post test related to the implementation of class control techniques are shown in Figure 2.

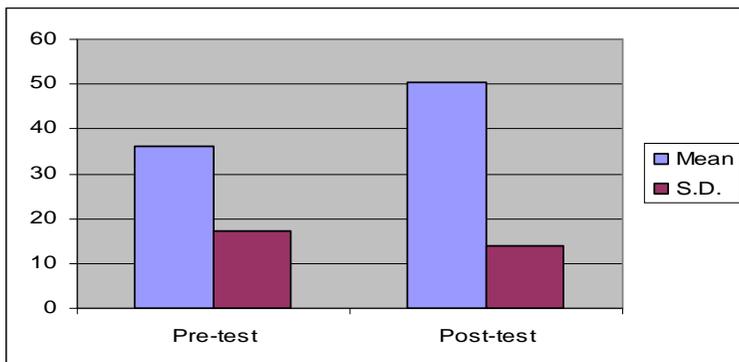


Figure 2: The mean and standard deviation of pupils' pre-test and post-test.

The pre-test showed that the mean score was 36.08 percent (%). After two months of implementing the class control techniques, the post-test showed that the mean score had increased to 50.23%. This study showed that most of the pupils' learning had improved and able to catch up the lesson during the implementation of the class control techniques. These techniques helped me in controlling the class and also pupils' behavior in order to help them master the lesson faster and more effectively.

Besides, the standard deviation between pupils' pre-test and post-tests result also decreased from 17.18 to 14. This showed that the gap or difference among pupils' learning had decreased. The good pupils performed well in their test and the average and weak pupils also showed improvement on their learning.

The result of my teaching practice that was assessed by my class teacher is shown in Figure 3.

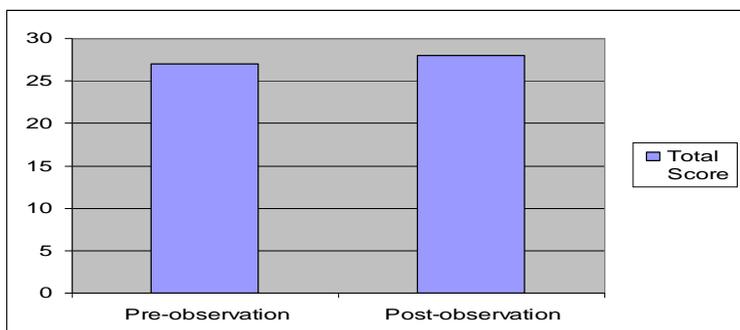


Figure 3. The total score given my mentor on PR1 form.

In pre-observation, my mentor had given me an average rating. The total score was 27 out of 40. During post-observation, my mentor had rated me more or less the same with my pre-observation, that is, a total score of 28 out of 40. This showed that my teaching practice based on my mentor rating had no big difference between pre- and post-observation. My mentor mentioned that there are still a lot to learn and improve to become an effective teacher and I should continue to learn and study.

REFLECTION/SUGGESTION FOR NEXT CYCLE

This study helped me to improve my class control. The selected class control techniques (limit settings, eye contact, prompt and punish) helped me in managing the class environment, so that the pupils have a more conducive environment to learn and study. Majority of the pupils' performances had improved as shown in their post-test results. This showed that the pupils' learning had increased during the implementation of class control techniques. However, this study did not improve my teaching practice based on the observation and rating by my mentor. But my mentor was of opinion that my teaching practice could be improved later on.

For my next action research plan, I would like to integrate information and communication technology (ICT) in my lessons to find out if ICT would increase my pupils' learning and improve my teaching practice.

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COOPERATIVE LEARNING IN A PRIMARY FOUR MATHEMATICS CLASS

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ABSTRAK

Objektif utama penyelidikan ini dilaksanakan adalah untuk meningkatkan minat dan pembelajaran murid-murid dalam subjek Matematik. Di samping itu, kajian ini dijalankan bertujuan untuk mengkaji kesan-kesan penggunaan strategi pembelajaran koperatif iaitu "Numbered Heads Together" dan "Mix and Match" dalam pengajaran saya. Data dikumpulkan melalui soal selidik, ujian topikal dan pemerhatian yang menggunakan Borang PR1. Hasil analisis data menunjukkan bahawa pembelajaran dalam kalangan murid-murid terhadap topik Matematik yang diajar telah meningkat sebanyak 5 peratus (%). Selain itu, pembelajaran murid-murid Tahun 4H dalam topik Matematik yang diajar turut meningkat sebanyak 10%. Berdasarkan keputusan kajian, didapati bahawa pelaksanaan strategi pembelajaran koperatif dapat meningkatkan kemahiran mengajar saya.

Kata kunci: Pembelajaran koperatif, pembelajaran murid terhadap topik Matematik, minat murid, amalan pengajaran, motivasi dalaman

ABSTRACT

The objective of this study was to increase pupils' interest and learning process in the subject of Mathematics. In addition, this study was conducted to analyze the effect of using the selected cooperative learning strategies namely, "Numbered Heads Together"

and “Mix and Match” on my teaching practice. The data for this study was collected using questionnaires, topical tests and observations using practicum evaluation form (PR1). The analysis of results showed that pupils’ learning in Mathematic topic had increased by 5 percent (%). In addition, pupils of Year 4H interest had also increased by 10%. The results of the study showed that the application of cooperative learning strategies had effectively improved my teaching practice.

Keywords: Cooperative learning, pupils’ learning, pupils’ interest, improvement in my teaching practice performance, intrinsic motivation

INTRODUCTION

Context of the Study

During the seventh semester of my training as a teacher, I had chosen SK SKH to complete my Phase 3 Practicum. This school consists of two medium, that is, the Chinese medium and Malay medium. There are only six classes of pupils in the Malay medium, that is, one class for each year. I was assigned to teach Primary Four pupils Mathematics. There were 18 pupils in the class. Most of the pupils were quite weak in their Mathematics subject and only four pupils were categorized as high-achievers. I have tried to use simple English while teaching.

In my previous practicum, I had experienced difficulties in organizing group activities. My teaching was more teacher-centred and I was more familiar in using demonstration and explanation in my teaching. Besides that, I failed to carry out group activities which I had planned because of time constraint. During group activities, the pupils refused to cooperate with other members or disturbed others when task was given. For the smarter pupils, they did the task by themselves and did not help the weaker members in their group. Thus, I would like to improve my own teaching through the application of cooperative learning

strategies in my class as well as to increase my pupils' learning and interest in Mathematics.

Focus of the Study

In this action research, I focused on encouraging pupils to learn cooperatively and promote greater interest in learning Mathematics. Besides that, I would also improve my own teaching practices through this study. I administered a questionnaire to find out if the pupils like or dislike learning in groups during the initial survey. The questionnaire consisted of five items. The pupils responded to each item by selecting either a "Yes" or "No" answer to the statement. Through the questionnaire, I found that my pupils like to work in groups. Thus, I could use the strategies of cooperative learning to encourage the pupils to improve the pupils' interest in learning Mathematics.

By using cooperative learning, pupils would be able to share their opinion and discuss the answer with each other. The pupils would also be given equal chance to voice their ideas and opinion during group activities. The two strategies that I have decided to focus were "Numbered Heads Together" and "Mix and Match" as they are easy to carry out. The steps are short and simple. Besides that, the strategies would enable the pupils to interact among themselves during the cooperative learning.

Objectives of the study

The objective of this study was to use the cooperative teaching and learning techniques of "Mix and Match" and "Numbered Heads Together" to improve pupils' learning and interest in Mathematics.

Besides, this study would also help me to improve my teaching practice especially in organizing group activity through cooperative learning.

Research Questions

This action research was aimed at answering the following research questions.

- What is the effect of using the cooperative learning techniques of “Mix and Match” and “Numbered Heads Together” on pupils’ learning in Mathematics?
- What is the effect of using the cooperative learning techniques of “Mix and Match” and “Numbered Heads Together” on pupils’ interest in Mathematics?
- Will this action research affect my teaching practice performance as assessed by my supervisor?

ACTION PLAN

According to Sawyer (2005), cooperative learning is a teaching strategy in which small groups or teams, comprised of students of different levels of ability, work together to accomplish shared goals and to maximize their own and each other’s learning (as cited in McCracken, 2005). Slavin (1991) reported that research on cooperative learning shows that for the academic achievement, cooperative learning techniques are at least as good as traditional techniques and usually significantly better. As we know, cooperative learning is a new strategy for the pupils. The pupils normally feel excited when new things are introduced to them. I only chose two strategies for this study, that is, “Numbered Heads Together” and “Mix and Match”.

For “Numbered Heads Together”, each group member would get a number and all the group members would put their heads together to solve the problem given. After that, the teacher would call a number and the pupil with the number would answer the question posed. “Mix and Match” was organized as classroom activity. The teacher would distribute different picture cards and number cards to the pupils randomly. Pupils would then find their partner by matching the cards that they held. If they got the wrong partner, the pupils needed to find the correct partner again. These two strategies are more suitable for Mathematics lesson. Besides that, I was afraid that if I focused on too many strategies, I would not be able to collect sufficient data to answer my research questions. Huff (1997) defines cooperative learning

as pupils working in small groups with different levels of ability, pupils working together to accomplish shared goals and pupils maximizing their own and each other's learning.

METHODOLOGY

Target Group and Participants

There were 18 pupils in Year 4H class at SK SKH. There were nine female pupils and nine male pupils in that class. The class was quite evenly distributed in terms of gender. Besides that, nine pupils in this class were from the middle income families. There were only three pupils who came from high income families. The rest of the pupils could be categorized in low income families.

Data Collection

Table 1 shows the data collection methods and sources of data based on the research questions of this action research.

Table 1.

Research Questions, Data Collection Methods and Sources of Data

Research questions	Data	Method	Sources
1. What is the effect of using the cooperative learning techniques of "Mix and Match' and "Numbered Heads Together" on pupils' learning in mathematics?	Pupils' learning	Topical Tests (Test 1 & Test 2)	Pupils
2. What is the effect of using the cooperative learning techniques of "Mix and Match' and "Numbered Heads Together" on pupils' interest in mathematics?	Pupils' interest	Questionnaire	Pupils
3. Would carry out action research effect my teaching practice performance as assessed by my supervisor?	Feedback on my own teaching practice performance	Practicum Evaluation Form (PR1) Mentor's comments	Teachers

I had collected three sets of data, that is, the pupils' interest, pupils' learning and feedback on my own teaching practices performance. To answer my first research question on the effect of using the cooperative learning techniques of "Mix and Match" and "Numbered Heads Together" on pupils' learning, I administered a test at the beginning (pre-test) and at the end (post-test) of my action research.

To answer the second research question on pupils' interest, I used a questionnaire to gauge their level of interest. This questionnaire was administered before and after the intervention. There are five items in this questionnaire and pupils would respond to each item by selecting either "Yes" or "No" to the statement. To answer the third question related to whether this action research affected my teaching practice performance, a checklist in PR1 form was used by my mentor. There were eight criteria stated in each item. The criteria that were evaluated were set induction, development of lesson plan, classroom management, communication, the quality of the lesson, closure, achievement of learning outcome(s) and the application of moral values.

Data Analysis

Table 2 shows the types of data and techniques of analysis of this action research.

Table 2.

Type of Data and Technique of Analysis

Type of Data	Analysis
Pupils' learning	◆ Find the mean score and compare the results which are before and after the implementation of cooperative learning
Pupils' interest	◆ Use frequency count of each item in the questionnaire ◆ Compare total favorable response in the questionnaire

Effect of action research to my teaching practice performance	<ul style="list-style-type: none"> ◆ Use frequency count of each item in the observation form ◆ Find the mean score of teaching performance
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RESULTS AND FINDINGS

Effect on Pupils' Learning

Mean score is the measurement used to show the amount of learning in the topic I taught. The mean score for Test 1 was 57.33 while the mean score for Test 2 was 62.17. During Test 2, the mean score has increased by 4.84 marks that meant more learning has taken place for the higher mean score in Test 2.



Figure 1. Mean score of the pupils' Test 1 and Test 2.

Effect on Pupils' Interest

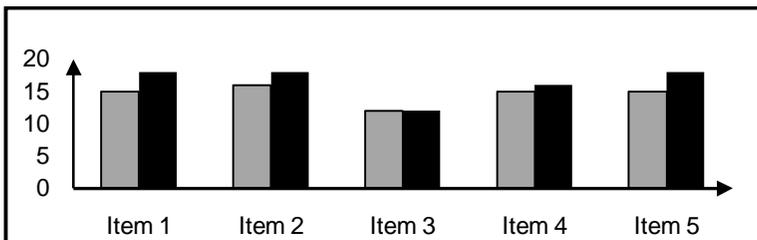


Figure 2. Frequency of favorable response by item for time 1 and time 2.

For the five items in the questionnaire, the pupils in Year 4H stated they were already quite interested in Mathematics

learning during the questionnaire time 2 as compared to questionnaire time 1. However for the item 3, most of the pupils still retained their responses about looking forward to the mathematics lesson. Meanwhile, a response for Item 5 was “no” because this item is a negative item about the pupils being bored studying Mathematics.

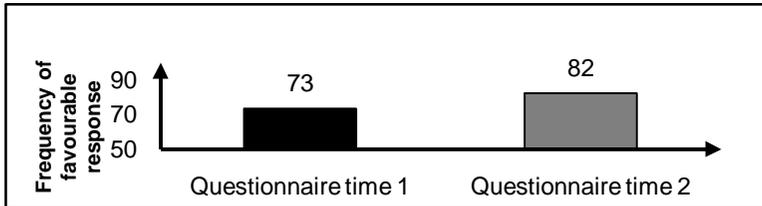


Figure 3. Comparison the total score of questionnaire time 1 and questionnaire time 2.

The pupils became more interested in learning Mathematics. The frequency of total favorable response was quite high - the total score for Questionnaire time 1 was 73 out of 90 while the total score for Questionnaire time 2 was 82 out of 90. After cooperative learning was carried out during the Mathematics lesson, the interest of the pupils in learning Mathematics had increased from 81.1 percent (%) to 91.1% (an increase of 10%).

Effect of Action Research on My Teaching Practice Performance

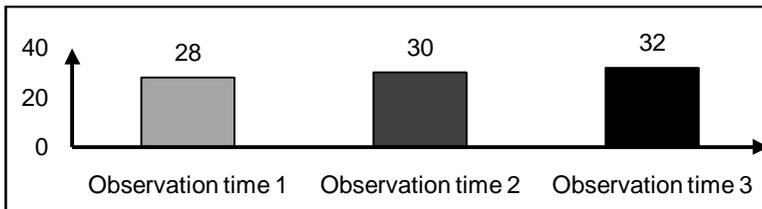


Figure 4. Mentor's rating of teaching practice for three observations.

Three observations were evaluated by my mentor during my teaching practice. The ratings indicate that the teaching practice performances increased in total scores from 28 to 30 in Observation time 2 and from 30 to 32 in Observation time 3 as shown in Figure 5.

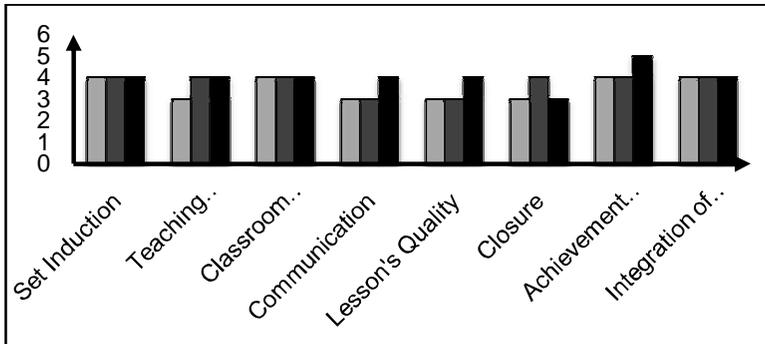


Figure 5. Comparison of mentor's rating of teaching practice for three observations.

I only showed improvement in four areas which were development of my teaching, communication, lesson's quality and achievement of learning outcomes. From the rating of my mentor about my teaching performance, I noticed that I had shown improvement in most of the aspects especially in terms of achievement of learning outcomes. For set induction, classroom management and integration of moral values, the rating remained unchanged. The ratings for these three aspects recorded a four for all the three observations.

CONCLUSION

Reflection on Findings

The used of cooperative learning in my Mathematics lesson did influence the pupils' learning level and interest towards the subject of Mathematics and also influence the teacher's teaching practice. Through this study, I was able to reflect on strengths

and weaknesses of my own teaching practices. The cooperative learning strategies that I decided to use have simple and clear steps that enable the pupils and I to follow. The “Numbered Heads Together” and “Mix and Match” are the cooperative strategies that are quite acceptable by the pupils because both strategies are easy to carry out in the class. After applying the cooperative learning strategies during group work, the pupils inculcate some team work values directly or indirectly from their peers. During the group work, they would slowly realize that they needed to cooperate with their group members in order to complete the task given. They also learned how to be responsible to their own group by practicing moral values like respect, tolerance, helpful and following instructions given by the leader. This could also indirectly develop the social interaction skill for the pupils. The pupils became more active in learning too through these cooperative learning strategies.

Evaluation and Reflection of the Implemented Action

The main reason why teachers carried out action researches is to help them discover their strengths and weaknesses during reflection. This action research helped me to gain new knowledge concerning action research. Besides that, through this study I was able to choose the most appropriate teaching activities or teaching method to enhance the pupils’ learning and interest towards the subject of Mathematics.

Before this, the pupils in my class had not been introduced to cooperative learning strategies during their Mathematics lesson. So, when I first introduced the “Numbered Heads Together” strategy in the group activity, the pupils felt very excited and showed their willingness to cooperate with me in order to find out what was the strategy all about. By showing interest in the activities, the pupils were able to learn new concepts in mathematics and this was a good sign that the pupils liked the selected cooperative learning strategies incorporated in group

work. Most of the pupils showed positive responses about the cooperative learning strategies.

I feel happy to see that the pupils had benefited from this research. Through this study, the pupils in Year 4H had improved in their level of learning and also increased their interest in learning mathematics through selected cooperative learning. The findings of this study also have some implications on teaching and learning activity in school. This study would be very helpful to school teachers who face similar problems.

The purpose of this research was to investigate the effect of a teaching pedagogy - cooperative learning strategy. The findings suggested that the use of cooperative learning in the classroom encouraged the pupils to like to learn and discover knowledge by themselves. When the pupils have interest in learning the subject, they would automatically work harder in this subject and thus achieve good results for the subject. In other words, their learning could be increased too. After going through all the action research processes, I have a better understanding of myself, and therefore, helped me to improve my teaching continuously.

Future Action

For the next cycle of action research, I would continue to implement other cooperative learning strategies which I think would also have a positive effect on my teaching practice. The two strategies that I would like to try out in next study are "Team Pair Solo" and "Round Robin". By using these two strategies, the pupils will be required to express their thoughts in group, pair or individually in the lesson. In other words, I would like to encourage pupils to think more mathematically and relate Mathematics knowledge that they learn with their daily life activities. I think this could promote pupils' learning and interest by involving them actively in cooperative learning activities.

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**IMPLICATION OF “NUMBERED HEADS TOGETHER”
STRATEGY ON PUPILS’ INTEREST AND LEARNING
IN A PRIMARY FOUR MATHEMATICS CLASS**

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ABSTRAK

Faedah pembelajaran kooperatif telah disokong oleh ramai pihak terutamanya dalam konteks pendidikan. Penyelidikan tindakan ini melaporkan implikasi strategi “Numbered Heads Together” (NHT) terhadap 41 orang murid Tahun 4. Implikasi ini termasuklah minat murid-murid dan pencapaian mereka dalam Matematik, dan juga amalan pengajaran saya sendiri sebagai guru Matematik. Saya telah menggunakan kedua-dua pendekatan kualitatif dan kuantitatif untuk mengumpul dan menganalisis data. Keputusan penyelidikan ini menunjukkan bahawa pengajaran menggunakan NHT dapat meningkatkan minat murid-murid untuk mempelajari Matematik. Walau bagaimanapun, kemajuan pencapaian Matematik murid-murid tidak konsisten. Selain itu, amalan pengajaran saya juga menunjukkan kemajuan setelah mengaplikasikan NHT selama tiga bulan. Dalam penyelidikan tindakan ini, saya telah mengaplikasikan strategi NHT. Saya ingin mencuba strategi pembelajaran kooperatif yang lain seperti “Jigsaw” dan “Team Game Tournament” pada kitaran akan datang.

Kata kunci: Pembelajaran kooperatif, minat, pencapaian, amalan pengajaran, strategi “Numbered Heads Together”

ABSTRACT

The benefits of cooperative learning have been advocated in a wide range of educational contexts. This action research reported the implications of "Numbered Heads Together" (NHT) strategy on 41 pupils of Year 4 in terms of their interest in learning and achievement in Mathematics, as well as on my own teaching practice. I used both qualitative and quantitative approaches to collect and analyze the data. The results showed that incorporating NHT strategy into the Mathematics learning process could increase pupils' interest in learning Mathematics. However, the improvement of their results in doing Mathematics was not consistent. My own teaching practice was also improved after applying the NHT strategy for about three months. In this action research, I had implemented the NHT strategy. I would like to try other cooperative learning strategies such as "Jigsaw" and "Team Game Tournament" in the next cycle.

Keywords: Cooperative learning, interest, achievement, teaching practice, "Numbered Heads Together" strategy

INTRODUCTION

Context of the Study

I was placed in several schools during my School-Based Experience and practicum. The common scenario that I could see was that, most of the teachers used the traditional "chalk and talk" style of teaching. There were not many teachers who carried out group work or tasks that needed pupils to cooperate and collaborate to accomplish the goals set.

I found that, some new teachers would conduct group work or cooperative learning once in awhile. However, after years of teaching, these teachers would go back to the traditional way, which is solely individual work. Is individual work better than

cooperative learning? Or else why are most teachers practising it? What would be the implications if a teacher practises cooperative learning in his/her teaching?

Therefore, I decided to do an action research on the implications of "Numbered Head Together" (NHT) strategy on pupils and the teacher. I would like to discover whether NHT could assist me in improving my practice and my pupils' learning.

Focus of the Study

I did my preliminary survey for two weeks. My methods included observation and interview. I observed the whole school as well as my own Mathematics class. My observation was mainly about the classroom activities. I also interviewed the Mathematics teacher of my Year 4 class.

Through my observation during the two weeks, I found that from Year 1 to Year 6, the main and only teaching strategy used "chalk and talk". Besides, I also found that most pupils would like to have group activities like quizzes, but they were seldom given such opportunity. Thus, I came up with the idea of conducting an action research which involves group activities. I decided to implement cooperative learning in my class. There are a lot of strategies or techniques for cooperative learning and for this action research, I chose only one of them as my focus of action research, that is, NHT introduced by Kagan (1994).

I carried out NHT strategy in my Year 4 Mathematics class to find out about the implications of this strategy on my own teaching practice and my pupils' results. I also collected data on my pupils' interest in learning Mathematics. I decided to focus on NHT strategy because of the importance of cooperative learning to pupils. Most of the students in my class did not have the skills of working together or realize the importance of individual accountability and positive interdependence. Research has shown that cooperative learning improves pupils' collaborative skills (Jacobs, Power & Loh, 2002).

Objectives

The objectives of my study were:

- to raise pupils' interest in learning Mathematics
- to teach and guide pupils to improve their results
- to improve myself in planning interesting activities and managing the classroom effectively.

Research Questions

My research questions were:

- Can NHT strategy help to raise pupils' interest in learning Mathematics?
- Can NHT strategy help to improve pupils' result?
- Can NHT strategy help to improve my own teaching practice?

ACTION PLAN AND REVIEW OF LITERATURE

“Numbered Heads Together”

The structure of NHT is derived from the work of Kagan (1994). The following are the steps in NHT.

1. Number of the pupils in each group - up to four. Teacher can give numbers or pupils can give numbers themselves.
2. Teacher asks the pupils a question or problem. It must be stressed that everyone in the group must participate and answer the question.
3. Ensure enough wait time is given for the groups to do the task.
4. The teacher asks for an answer by calling a number (this can be at random or can be initially decided by the teacher in order to ensure the process is successful). The pupils whose number is called then take turns to answer.
5. If there are not enough pupils who are ready to respond, the teacher may give more time or support (Kagan, 1994).

Howard and Sharp (1983) define research as 'seeking through methodical processes to add to one's own body of knowledge and hopefully, to that of others, by the discovery of non-trivial

facts and insights'. Drew (1980) agrees that 'research is conducted to solve problems and to expand knowledge (as cited in Bell, 1993, p 2). Carr and Kemmis (1986) describe action research as being about the improvement of practice; the improvement of the understanding of practice; and the improvement of the situation in which the practice takes place.

Furthermore, Stringer (2008) also agrees that, action research is a process that helps a practitioner to develop a deeper understanding about what he or she is doing as an insider researcher (p 13). From all of these, we can say that, through research, people are able to expand their knowledge and improve themselves.

Research has shown that by participating in cooperative learning (CL), students can benefit in a few areas. Firstly, students can improve their academic achievement. Students are not only able to learn knowledge that is related to their examination, but they can also improve their generic skills and have positive behaviors, like collaborative skills, inter-ethnic relations and acceptance of academically challenged students as well as better attitudes toward learning, school and self (Jacobs et al., 2002, p xi).

METHODOLOGY

Target Group and Participants

The purpose of doing this action research was to improve my own teaching practice. Thus, I was one of the participants in this research. Other participants in the research were 41 Year 4B pupils from the school that I did my third phase practicum. There were all together four classes in Year 4. The pupils were streamed into these four classes and Year 4B was a class with medium achievement pupils. 18 pupils were females and 23 pupils were males. The class consisted of Malay, Chinese, Indian and Iban pupils. Their academic performances varied and there was a big gap between the good pupils and the weak ones.

Data Collection Method

Table 1.

Types, methods and sources of data

Types of data	Methods	Sources
Pupils' interest in Mathematics	Questionnaire, Observation	Pupils, Teacher
Pupils' learning	Test (exercises)	Pupils
Teacher's teaching practice	Checklist Personal Reflection	Lecturer and mentor

Table 1 describes briefly the types of data collected, the methods to collect the particular data, and the sources of data. Basically, to know the interest of students in learning Mathematics, I distributed questionnaires which consisted of six “yes” and “no” questions. Before I started to implement the NHT strategy, I gave the pupils the questionnaire and explained item by item so that they thoroughly understand it. I told them that their identities and replies would be kept secret. After I had implemented the NHT strategy for about ten weeks, I gave the same questionnaire again to all the pupils. To analyze it, I calculated the percentage of pupils who answered “yes” and “no” respectively.

On the other hand, I used the daily exercises to evaluate the results of the pupils and to know whether the learning objectives were achieved. I gave them exercises to do almost every lesson. However, I did not implement NHT strategy in every lesson. I only did it about two times per week. Therefore, to know the effectiveness of NHT strategy in helping my pupils improve in learning, I only analyzed the results of exercises during the lesson which I had implement NHT strategy. To evaluate the pupils, I converted their score into 100 percent (%). For example, if there were 15 questions in a particular exercise, and pupils obtain 10 out of 15 answers correctly, I divided 15 by 10, then obtain the mean score.

To investigate whether I have improved in my teaching practice, I used the teaching evaluation form (PR1). It has a five-point

rating scale regarding several aspects of my teaching practice, including the lesson plan, implementation, reflection and attitude. In this study, I only took into account the aspect of implementation of the lesson. Besides the rating scale, there is a column for remarks and comments about my performance while teaching.

RESULTS AND FINDINGS

Impact of NHT Strategy on Pupils' Interest

A questionnaire on interest in learning Mathematics was given to the pupils to find out about their interest before and after the implementation of NHT strategy. Table 2 shows the distribution of pupils' responses to items related to pupils' interest in Mathematics.

Table 2.

Distribution of Pupils' Responses to Items related to Pupils' Interest in Mathematics

Item	Response			
	Pre		Post	
	Yes	No	Yes	No
1 Do you like Mathematics?	37 (100%)	0 (0%)	38 (100%)	0 (0%)
2 Is Mathematics an interesting subject?	35 (95%)	2 (5%)	36 (95%)	2 (5%)
3 Do you think Mathematics is useful in your life?	28 (76%)	9 (24%)	31 (82%)	7 (18%)
4 Is Mathematics an easy subject for you?	25 (68%)	12 (32%)	21 (55%)	17 (45%)
5 Do you feel tension when you are doing Mathematics?	21 (57%)	16 (43%)	22 (58%)	16 (42%)
6 If you were given a chance to choose 5 subjects to study in the school, would you choose Maths as one of the subjects?	31 (84%)	5 (16%)	34 (89%)	4 (11%)

Table 2 shows that in the pre- and post-intervention, the percentage of pupils who liked and were interested in Mathematics remained the same. In pre-intervention, 76% of the pupils thought that Mathematics is useful in daily life while in post-intervention, the percentage increased to 82%. However, the percentage of pupils who felt that Mathematics is an easy

subject had decreased from 68% to 55%. In pre-intervention, 57% of the pupils felt tension when doing Mathematics and this increased to 58% for post-intervention. The percentage of pupils who would like to have Mathematics as one of the school subjects had increased from 84% to 89%. The results indicated that most of the pupils liked Mathematics and felt that Mathematics is an interesting subject, though some of them could not do Mathematics well. The percentage of pupils who found that Mathematics is useful in daily life had increased probably because I integrated the application of Mathematics in most of the lessons.

The percentage of pupils who felt that Mathematics is easy had decreased significantly. This may due to my inefficiency in making them understand the topics. Besides, the other possible reason was the difficulty of the topics which varied, such as, fractions and decimals. Pupils may find these two topics abstract and they are more difficult compared to the topic of "whole number" that they have learnt before. More pupils chose Mathematics to learn. The pupils were probably motivated by the NHT strategy that I used during my lessons.

Impact of NHT Strategy on Pupils' Learning

To evaluate the improvement of pupils' learning, I gave my pupils exercises during my Mathematics lessons. I then recorded and analyzed the results.

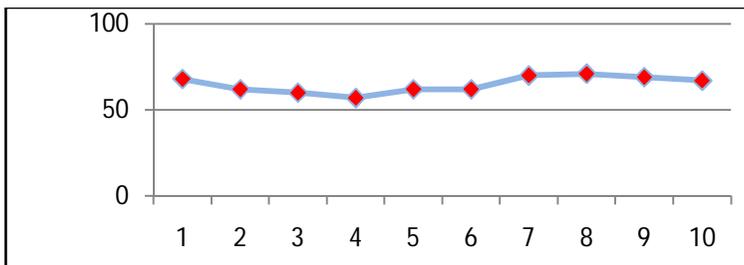


Figure 1. Mean score of Year 4B pupils in 10 Mathematics exercises.

Figure 1 illustrates the mean score of Year 4B pupils in 10 Mathematics exercises and demonstrates inconsistent improvement of pupils' results. Besides that, the improvement of the pupils' results was not obvious as well. The minimum value of the mean score was 57 (the fourth exercise) while the maximum value of the mean score was 71 (the eighth exercise). Each time, the mean score increased or decreased not more than 10. The inconsistent improvement might due to the level of difficulty of the topics taught. For example, the introduction to the main topic would be easier than the next subtopic, and the topic fractions would be more difficult than whole number. Furthermore, the mean score that was not consistent probably was due to my teaching method and my ways of carrying out the NHT strategy. Therefore, by referring to this action research, I could not confidently say that NHT strategy helped to improve the pupils' results.

Impact of NHT Strategy on My Teaching Practice

To evaluate the improvement on my teaching practice, an evaluation form named PR1 was given to the assessor (lecturer or mentor) for each observation. The PR1 is a form with 5-point rating scale ranging from 1 to 5. Table 3 and 4 show the rating for implementation of the lesson by my lecturer and mentor respectively.

Table 3.

Lecturer's Rating for Implementation of Lesson (Three Observations)

No.	Item	1st	2nd	3rd
1	Introduction	4	5	4
2	Development	4	5	5
3	Classroom management	5	4	4
4	Communication	5	5	4
5	Learning quality	4	4	5
6	Closure	-	4	5
7	Achievement of objectives	4	5	5
8	Application of values	-	4	5
Mean		4.33	4.5	4.63

The mean rating for the first observation was 4.33. The rating had increased to 4.5 for the second observation and to 4.63 for the third observation.

Table 4.

Mentor's Rating for Implementation of the Lesson (Four Observations)

Item	1st	2nd	3rd	4 th
Mean	4.38	4.75	4.38	4.63

The mean rating for the implementation of my lesson for the first observation by my mentor was 4.38. For the second observation, the rating increased to 4.75 but decreased again to 4.38 for the third observation. For the fourth observation, the mean rating was 4.63.

Apart from the 5-point scale rating, my lecturer and mentor also provided comments in the remark column of the PR1 form. During the first observation of my lecturer, the comments given indicated that I was weak in planning the lesson creatively and also in managing the class effectively. The classroom management problem was especially obvious during group activity, which was when I carried out the NHT strategy. During the third observation by my lecturer, I had improvement in a few aspects. From the lecturer's comments, I could see that I had improved in my classroom management, though the class control was not consistent. Though I had improved in classroom management, my creativity in carrying out the activity was still lacking.

Generally, after conducting the NHT strategy for eleven weeks in the school, I had improved in some aspects of my teaching practice. I could carry out the reinforcement activities better. This could be seen from my improvement in writing lesson plan, confidence level while conducting the activities and classroom management during group activities.

REFLECTION AND CONCLUSION

Reflection and Evaluation

I think that this action research that I had carried out is partially successful. Based on my findings, incorporating NHT strategy in learning Mathematics was able to raise my pupils' interest in learning Mathematics. However, I could not see apparent improvement of pupils in my Mathematics class after I implemented the NHT strategy for about three months. The mean scores of the pupils' exercises fluctuated. Besides, my findings showed that I had improved in several aspects of teaching practice. Thus, there is no doubt that this action research helped me as practitioner to enhance my own practice.

I think that my action research was lack of practicality in terms of time allocated. It was hard to see obvious improvement of pupils after teaching for less than three months. Apart from time constraint, the setting of the classroom also made my job harder. The classroom was not very big. Pupils' chairs were very close to the tables of pupils sitting behind them. They were seated in lecture style too. It was hard and took time for me to arrange pupils to sit in groups and I could not move to pupils who sat at the corner.

Anyway, I changed my opinion from "pupils learn not much during group work" to "pupils learn much more than what they could learn from books during group work". Before this, I thought that every group would have at least one free-loader who would not contribute at all. The task was divided among many pupils and hence each pupil would have less to do. However, after knowing cooperative learning deeper through my action research, I found that my perception was wrong. As a teacher, I cannot deny the opportunity for the pupils to learn cooperatively and collaboratively in groups just because of my fear of free-loaders.

Suggestions for Next Action Research

I had completed the first cycle of my action research on my Year 4 Mathematics class. In the next cycle, I would like to conduct this research for a longer time instead of three months. Besides, I am also interested to use various and other strategies of cooperative learning, namely, "Jigsaw", "Think-Pair-Share", "Think-Pair-Solo" and "Team Game Tournament" in my teaching. I would like to investigate any positive effects of various cooperative learning strategies on my pupils.

Last but not least, I would like to say that, when I know more about cooperative learning, I love it better. For all the teachers who have never tried cooperative learning strategy yet, you need to try it and see its "magic" effect!

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*Buku Koleksi Artikel Penyelidikan Tindakan
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**THE EFFECT OF COOPERATIVE LEARNING
ON PUPILS' INTEREST AND LEARNING
IN A PRIMARY THREE MATHEMATICS CLASSROOM**

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ABSTRAK

Penyelidikan ini telah dijalankan untuk mengkaji kesan pembelajaran koperatif terhadap minat serta pembelajaran murid-murid Tahun 3 dalam subjek Matematik. Di samping itu, penyelidikan ini bertujuan untuk mengkaji kesan menjalankan penyelidikan tindakan terhadap pengajaran saya dalam kelas. Peserta kajian ini terdiri daripada 11 orang murid dari Tahun 3H di sebuah sekolah rendah. Data kajian dikumpul melalui soal selidik, ujian topikal dan penilaian daripada mentor saya, menggunakan borang PR1. Keputusan daripada penyelidikan tindakan ini telah menunjukkan bahawa strategi pembelajaran koperatif dapat membantu dalam meningkatkan minat serta pembelajaran murid-murid saya terhadap subjek Matematik. Selain itu, kemahiran mengajar saya juga telah bertambah baik setelah menjalankan penyelidikan tindakan ini kerana proses reflektif ini telah banyak membantu saya untuk memperbaiki kelemahan saya semasa pengajaran.

Kata kunci: Pembelajaran koperatif, minat, pembelajaran, kemahiran mengajar, penyelidikan tindakan, proses reflektif

ABSTRACT

The purpose of this study was to determine the effect of cooperative learning on the pupils' interest and learning of Mathematics. In addition, this study also meant to investigate the effect of doing action research on my teaching practices. The target participants of this study were 11 pupils from Year 3H of a primary school. The data was collected using questionnaires, topical test and

teaching practices appraisal form (PR1). The results showed that the pupils' interest and learning in Mathematics increased and improved. There were improvements too for my teaching practices as shown in the total score of each observation. The results of this study showed that cooperative learning strategies improved the pupils' interest and learning of Mathematics, and helped to improve my teaching practice through reflective process.

Keywords: Cooperative learning, learning, interest, teaching practice, action research, reflective process

INTRODUCTION

Learning Mathematics can be interesting or be dull for some pupils. The teacher should actively involve his or her pupils in the learning process. Teachers can update themselves from time to time on any of the new teaching strategies available. One of the popular methods is cooperative learning that emphasizes group work as it brings a lot of benefits for the pupils. Many research studies have been conducted to test the effectiveness of cooperative learning and Slavin (1991) stated that cooperative learning is indeed effective in enhancing learning (cited in Lang & Evans, 2006).

I was first introduced to cooperative learning in the teacher training institute. After experiencing it myself, I found it to be very useful in enhancing the learning process. I was also introduced in detail on the aspects of cooperative learning and how I could apply it in my teaching practice. This was to prepare me to be a good teacher for my future teaching career. Since this learning strategy is helpful for me, I wanted to introduce this to my pupils. I had been for practicum since my fifth semester and I realized that cooperative learning is quite a new idea in schools. Cooperative learning is also useful in arousing pupils' interest in learning Mathematics.

Context of the Study

During my first practicum, I taught Mathematics in a Year 2 class. At first, conducting group-work learning for this Year 2 class almost seem impossible. The class was very noisy and

active most of the time, and it was very difficult for me to teach according to what I planned. I had tried giving them group work, and it only worked successfully for a few times. I had trouble controlling the class while the pupils were doing group work. The naughty pupils in the class refused to cooperate, and some did not complete the task together with their group mates.

My second practicum was a different experience from the first practicum. I was placed at SK KG and I was assigned a Year 3 class. For this Year 3 class, I was able to do group activity with them for the Mathematics lessons. I conducted group activity in class once and I realized that this class had some minor problems too. One thing that I observed was that usually the better pupils in the group would be the one to complete most of the work, while the rest of the group mates would be just watching, or doing some simple things. Slowly, the weaker pupils began to lose interest in learning Mathematics as they found studying was meaningless even when they were working in a group.

For the third practicum, I chose SK SKH. I taught Year 3 Mathematics but the situation was even more different when compared to the previous experiences. This time, I had only 12 pupils in the class. This was really a small class. I was quite surprised to see that the pupils were well-disciplined. I did not have to shout for the pupils to listen to me. I also discovered that most of the pupils in the class were quite good in their Mathematics. Teaching 12 pupils was very different indeed from my previous experiences.

Focus of the Study

The main issue during my practicum in relation to my teaching was grouping pupils for more effective learning, especially in using group work for cooperative learning. Cooperative learning is pupil-centered teaching and learning strategy in line with the official school curriculum. Noraini Binti Idris (2006) emphasized that cooperative learning is very effective to encourage motivation and increase the learning in the classroom. I used this learning strategy to ensure my pupils to have interest in learning Mathematics efficiently.

I believed that cooperative learning could help pupils feel successful in their learning. In cooperative learning groups, the weaker pupils would be able to participate and make contributions to the group as well. They would be able to experience success, and moreover all the members of the groups would be able to increase their understanding of ideas by sharing their knowledge with each other. To help in my decision making, a simple questionnaire was given to the pupils to help me understand them better. The questionnaire consisted of five simple questions which were appropriate to ask the pupils.

Besides, my mentor had been very helpful to provide me with useful and relevant information on how I could use cooperative learning in teaching Mathematics. She had agreed too that using cooperative learning in class would be something new and fresh for the pupils and would arouse the pupils' interest in learning Mathematics. My mentor had been very supportive of me using the cooperative learning method, as long as the method could help the pupils to learn.

There are many cooperative learning strategies that could be used in the class. I discussed with my friends and finally, we had decided on the strategies of "Numbered Heads Together" and "Mix and Match". I believed that these cooperative learning strategies would be of help to the pupils in their learning of Mathematics.

Objectives of the Study

I believe cooperative learning would be useful in the Mathematics class. It could enhance pupils' interest and learning. It is also a teaching and learning strategy that is pupil-centered and in line with the requirements of the national curriculum. The purpose of my action research was therefore to help increase the pupils' interest and learning in the Mathematics classroom.

The other objective of this action research was to overcome my weaknesses in my teaching practice through the process of doing action research.

Research Questions

My research questions were:

- Can pupils' interest in learning Mathematics be improved through cooperative learning strategies of "Numbered Heads Together" and "Mix and Match"?
- Can pupils' learning in Mathematics be improved through cooperative learning strategies of "Numbered Heads Together" and "Mix and Match"?
- Can doing action research affect my teaching practice performance?

ACTION PLAN

There are many types of cooperative learning strategies which are useful to be implemented in the primary school for the young learners. For this action research, I had planned to apply two different types of cooperative learning strategies for the Year 3H pupils, that is, "Numbered Head Together" and "Mix and Match".

"Numbered Heads Together" Strategy

"Numbered Heads Together" is one of the famous cooperative learning strategies that are widely used. It is an interesting method compared to the traditional teaching method of "chalk and talk". According to Coffey (2008), this strategy also gives confidence to lower achievers in a group because they know they will have the correct answer to give to the class.

For this method, each member in a group was involved in the activity and accountable for their own learning. Each pupil in the group was numbered accordingly. For an instance, if each group had a total number of four pupils, each of the pupils in a group would be given a number from one to four. Then, the teacher would start to post a question or a problem for the groups to solve. Immediately, the pupils would start discussing, and find the solution. When the time is up, the teacher would call a number, and each pupil with the number called from each group would share the answer with the class.

"Mix and Match" Strategy

The other strategy that I had chosen is "Mix and Match". This strategy involved every pupil in the class during the activity. First of all, each pupil would receive a card with numbers, pictures, or

even equations on it. When the teacher started the activity, pupils would move around in the classroom and find a person who has a match to their card. For instance, if Pupil A has a card with the equation " $4 \times 3 = _$ ", then he would look for another pupil who hold the card with the answer, and in this case, the card with the answer "12". After they have found their partner, they would share their answers with their classmates. Later, the cards would be mixed again and the same steps would be repeated for the second round.

"Mix and Match" is another cooperative learning strategy that is practical to be carried out with the pupils. The pupils would find this strategy interesting as they could move around in the classroom. A little movement in the classroom would help to prevent the pupils from feeling bored. Being able to interact with their friends would also help to increase the pupils' interest in learning Mathematics.

Through action research, teachers would have opportunities to try out different approaches or any new strategies for their teaching. In a classroom research, the concern is more with understanding a problematic situation. The skills required of classroom researchers are, as Strauss and Corbin (1990, p 18) noted, '...the ability to step back and critically analyze situations, to recognize and avoid bias, to obtain valid and reliable data, and to think abstractly' (as cited in Hopkins, 1993, p 147).

Cooperative learning had been introduced and applied in the education field all around the world and proved to be very useful in enhancing the pupils' learning processes. Slavin (1980) mentioned that the focus of cooperative learning is to actively involve students in the learning process (as cited in Panitz, 1982). One of the major purposes of cooperative learning is to help young learners learn to work collaboratively with their peers, to share ideas, to listen to others' ideas, and to see the pleasure of sharing a task with another person.

Cooperative learning, in which students work in groups towards a common goal, has proven to be a powerful instructional tool to promote improvement in achievement (Slavin, 1990, as cited in Noraini Idris, 2006, p 7). Young learners tend to learn better through interesting and fun teaching and learning strategies.

In addition, Lau (2004) also commented that cooperative learning does provide an opportunity for the pupils to actively discuss a problem, give suggestions and examples to help to solve the problem. Through discussion with their peers, cooperative learning helps to develop higher level of thinking skills for the pupils.

Employing cooperative learning as a strategy in teaching Mathematics could bring lots of advantages to the pupils, and one of them would definitely be to increase the pupils' interest in learning Mathematics. The cooperative learning strategies used would be interesting and fun for the young learners.

METHODS

Participants

The participants of the study were a group of pupils who were in Year 3H in a primary school in Kuching, SK SKH. Table 1 describes the profile of each of the pupils in the class, including their gender, Mathematics performance and the socio economy status.

Table 1.

Profile of Gender, Mathematics Achievement and Socio Economy Status of Pupils in Year 3H

Pupils	Gender	Mid semester 2010 Maths exam test score	Socio Economy Status Background
P1	M	34 D	Lower
P2	F	77 B	
P3	M	47 C	
P4	F	52 C	Middle
P5	M	69 B	
P6	F	70 B	
P7	M	71 B	
P8	F	83 A	Upper
P9	M	82 A	
P10	F	92 A	
P11	F	98 A	

Data Collection and Data Analysis

For my action research, a few instruments were used to collect certain data needed according to my research questions. For different research questions, certain instruments were used to collect the data. I had summarized them into Table 2.

Table 2.

Data Collection Method and Source

Data	Method	Source
Pupils' interests	Questionnaires on Pupils' Interest	Pupils
Pupils' amount of learning	Mid Semester 2010 Result Test & Assessment (Test 1, Test 2)	Mentor Pupils
My Teaching Practice	Teaching Practice Appraisal Form (PR1 Form); Comments and feedbacks	Mentor

From the data collected, I analyzed the data by using the appropriate methods. First, the pupils' interest in learning Mathematics was tested through Questionnaire on Pupils' Interest. The frequency of the favorable answer were counted and then being compared between pre-test and post-test.

For the pupils' learning in Mathematics, the instrument used to collect the data was the topical test. Therefore, statistical method was used to analyze the test score. Mean score for both Test 1 and Test 2 were calculated to show the average amount of learning of the pupils before and after implementing the Cooperative Learning strategies. Other than mean, I also calculated the standard deviation for both of the tests. The standard deviation is a statistic that tells how tightly all the various examples are clustered around the mean in a set of data.

As for my teaching practice, the PR 1 Form was used by my mentor to evaluate my teaching in the primary school. Rating scale from 1 to 5 was used in the PR1 Form, and the total score were added up after each observation. The score of each item would also be compared among Observation 1, Observation 2 and Observation 3. Other than that, comments provided after each observation to support the evaluation were used.

RESULTS AND FINDINGS

Effect of Implementing Cooperative Learning on Pupils' Interest

All the questionnaires that I had used to find out about the pupils' interest towards Mathematics was analyzed. It was given twice to the pupils, first time was before I started with cooperative learning strategies, and the second time was after the strategies were applied. Table 3 is the summary on the results for the questionnaire on pre-test and post-test.

Table 3.

Frequency of the Favorable Response for Questionnaire on Pupils' Interest in Pre-Test and Post-Test

		Pre-Test	Post-Test
Item 1	Do you like to learn Mathematics?	9	10
Item 2	Do you like to do Mathematics homework?	9	10
Item 3	Do you look forward to Mathematics lesson?	8	9
Item 4	Do you do something related to Mathematics during your free time?	9	9
Item 5	Do you feel bored when learning Mathematics?	6	8
Total Frequency		41	46

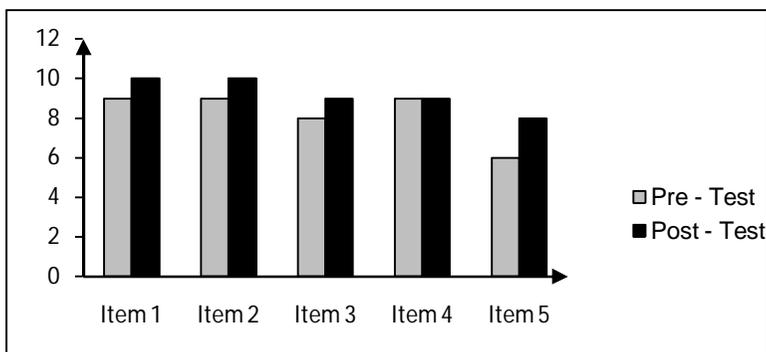


Figure 1. Comparison of five Items of questionnaire on pupils' interest in pre-test and post-test.

From Table 3 and Figure 1, it was found that since the beginning, the pupils in Year 3H were already quite interested in Mathematics learning. The total frequency was quite high, with 74.5 percent (%) of the pupils in the class who were interested in learning Mathematics with the teacher using the traditional method.

For the post-test, I distributed the same questionnaire to the pupils after I had applied cooperative learning strategies. For the post-test, the interest of the pupils had increased slightly to a total of 46. After applying cooperative learning strategies in

class, 83.6% of the pupils in class were now more interested in learning Mathematics, which shown an increase of 9.1%.

Effect of Implementing Cooperative Learning on Pupils' Learning

In order to see whether the pupils' amount of Mathematics learning had improved, I had administered topical tests. Test 1 was a topical test on the topic of "Money". For this topic, my mentor had taught the pupils by using the traditional method, which was mainly "chalk and talk". After I used the cooperative learning strategies with the pupils, I administered another test for the pupils, but this time, on the topic of "Time". The main purpose of administering the tests to the pupils was to find out about the pupils' amount of learning in the subject of Mathematics. The results of the tests are shown in Table 4 and further illustrated in Figure 2.

Table 4.
Pupils' Mean Score for Test 1 and Test 2

	Test 1	Test 2
Mean Score	59.82	66.91
Standard Deviation	19.36	17.93

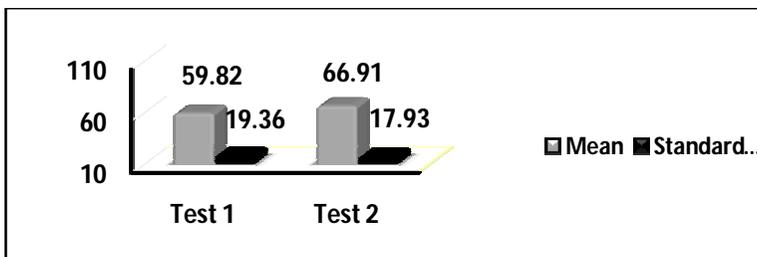


Figure 2. Mean score and standard deviation of pupils' learning for topical Test 1 and Test 2.

Table 4 and Figure 2 clearly show that the pupils' amount of learning in Mathematics had increased. In Test 1, the mean score was 59.82 and Test 2 the mean score was 66.91, which shows an increase of 7.09.

As for the standard deviation, Test 1 was 19.36 and Test 2 was 17.93, which shows a decrease of 1.43. For Test 1, the value of standard deviation was quite big, which indicates that there was

quite a big difference among the pupils' learning. As for Test 2, the value of standard deviation had decreased, showing that the learning difference among the pupils had lessened in class Year 3H.

Effect of Doing Action Research on My Teaching Practice

My third research question was related to my teaching of Mathematics in class. I used the Teaching Practice Appraisal Form which is known as the PR 1 Form, as the instrument for evaluation. For this PR1 Form, my mentor evaluated my teaching according to the criteria in the checklist. All the observations were carried out when I taught and applied the cooperative learning strategies in class. The results are presented in Table 5.

Table 5.
Mentor's Rating of Teaching Practice for Three Observations

Item	Aspects	Observations		
		1	2	3
1	Set Induction	3	4	4
2	Teaching Development	3	4	4
3	Classroom Management	4	2	4
4	Communication	4	3	4
5	Lesson's Quality	3	4	4
6	Closure	4	5	4
7	Achievement of Learning Outcome(s)	4	4	4
8	Integration of Moral Value	3	4	4
Total Score		28	30	32

From the data collected, it was obvious that the total score of my mentor's observation had increased over the period. For my first observation of my mentor, I got a total score of 28; 30 for my second observation and 32 for my third observation.

CONCLUSION

Evaluation and Reflection on the Implemented Action

Implementing cooperative learning in my class had also helped me inculcate some values within the pupils. For cooperative learning, each member of a group would work together for the success of their team. They had to assist each other and help each other to overcome obstacles faced.

In addition, cooperative learning helped to encourage cooperation and self-confidence in the process of learning among my pupils. The pupils realized the importance to work as a team with their group members to achieve the goal of a task. Self-confidence is another important value that should not be neglected as the degree of self-confidence in the young learners is responsible to a large extent for their success and failures in learning.

Doing an action research had provided me a great opportunity to know my teaching practice better. There were some weaknesses in my teaching, and with comments from the mentor, I had been able to reflect on my teaching practice and realized which aspects I needed to improve on. Doing action research helped me to discover what works best in a classroom situation. In my point of view, action research had been able to provide insights into my teaching that resulted in individual continual improvement in the future. It provided new lens for examining my teaching. By knowing the weaknesses of my teaching practices, I could hence improve the teaching process for the pupils.

Suggestion for Next Action Research

For my next cycle in action research, I would like to focus on the use of Information and Communication Technology (ICT) in teaching Mathematics. At the teacher education institute, much of the learning process were done with the help of ICT, and with these highly developed technologies, the teaching process was made easier and more convenient for the lecturers as well as the students.

Hence, I would like to implement this new technology in the process of teaching. The Education Ministry of Malaysia has placed great emphasis on the usage of ICT in Mathematics teachings. It is shown in the Five Pillars of Teaching and Learning Mathematics and stated at the beginning of the Mathematics Curriculum Specification for primary school.

The main purpose of using the hi-tech devices is to make the teaching and learning process more effective. With the development of the ICT, learning through internet, which is also known as e-learning, is made possible because of the fast connection among computers. Through self-access learning,

pupils would be able to access knowledge or skills and information independently according to their paces. Technology is essential in teaching and learning Mathematics as it influences the quality of the Mathematics lessons that are taught and also affects the attitude of the pupils towards learning Mathematics.

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THE EFFECT OF USING POWERPOINT PRESENTATION IN TEACHING PRIMARY FOUR MATHEMATICS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk meningkatkan pembelajaran dan minat murid-murid dalam subjek Matematik melalui persembahan PowerPoint. Penyelidikan ini juga dilaksanakan untuk mengkaji kesan pelaksanaan penyelidikan tindakan dengan menggunakan persembahan PowerPoint dalam pengajaran saya. Peserta responden dalam kajian ini terdiri daripada 45 orang murid Tahun 4P. Data dikumpulkan melalui ujian topikal, soal selidik dan pemerhatian dengan menggunakan borang penilaian PR1. Hasil analisis data mendapati bahawa pembelajaran dan minat murid-murid tidak menunjukkan peningkatan yang ketara. Bagi aspek pengajaran, saya telah menunjukkan kemajuan dalam lima aspek pada borang PR1. Keputusan kajian menunjukkan bahawa pelaksanaan persembahan PowerPoint mempunyai kesan dalam membantu murid-murid meningkat dari segi minat mereka terhadap subjek Matematik. Hasil kajian turut menunjukkan bahawa pelaksanaan penyelidikan tindakan dengan menggunakan persembahan PowerPoint membawa implikasi terhadap kemahiran mengajar saya.

Kata kunci: Teknologi Maklumat dan Komunikasi, persembahan PowerPoint, pembelajaran, minat, kemahiran mengajar

ABSTRACT

The purpose of this study was to improve pupils' learning and interest in the subject of Mathematics through PowerPoint presentation. Besides that, this study was implemented to identify the effect of carrying out action

research by using PowerPoint presentation on my teaching practice. The target participants of this study were 45 pupils from Year 4P. The data for this study was collected through topical tests, questionnaires and observations using PR1 forms. The results did not show any significant improvement on pupils' learning and interest. From the aspect of teaching practice, I had shown improvement in five of the aspects stated in PR1 form. The results of the study showed that implementing action research by using PowerPoint presentation brought implication in my teaching practice.

Keywords: Information and Communication Technology (ICT), PowerPoint presentation, learning, interest, teaching practise

INTRODUCTION

Context of the Study

From my previous practicum, I found that my mentors did not use PowerPoint presentation at all. They only used the CD-ROM that was provided by the Ministry of Education to the schools. They had never tried to use this software before. The pupils at SK GR comprised of good pupils who were well-behaved. Teachers would not have any problem in managing the discipline of the pupils. In this school, I had tried to use PowerPoint presentation in a few lessons. The pupils provided good responses during the lessons.

As for my subsequent practicum at SK LK, the class that I taught was quite noisy and the pupils liked to walk around in the classroom during lessons. However, when I used PowerPoint presentation in my Mathematics class, I discovered that they paid more attention to the teacher. They began to show interest in the PowerPoint slides as they gathered around the laptop.

I had my third practicum at SK JOTS. The pupils were very good in their studies, attentive and easy to manage. They were proficient in English which is the medium of instruction for Mathematics. Most of them were from the middle class or from rich family background. The parents were concerned about their children's academic achievement.

In my opinion, the use of PowerPoint presentation in teaching Mathematics is more attractive compared to the use of other media as teaching aid. Furthermore, PowerPoint presentation is a powerful tool that helps me teach abstract concepts better than the use of other more traditional teaching aids. Thus, I wanted to explore the implementation of PowerPoint presentation in my teaching of Mathematics in this research.

Focus of the Study

This action research was carried out in my Mathematics class among 4P pupils at SK JOTS. In this study, my main focus was the effect of using PowerPoint presentation in teaching Mathematics on pupil's learning and interest. The effect of carrying out action research by using PowerPoint presentation on my teaching practice during practicum was another focus.

Based on my teaching experiences during practicum, I discovered that the use of PowerPoint was able to help the pupils learn better due to better attention towards the lesson. A lesson starts with a set induction. If PowerPoint presentation is used as set induction of a lesson, it could attract the pupils' attention. Thus, the pupils would participate and involve actively in the lesson.

This action research could be easily implemented in this school and the classroom. This school has the technology tool such as Liquid Crystal Display (LCD), laptops and desktops which could be used to display PowerPoint slides in teaching. Teachers would also discover the usefulness and importance of using PowerPoint in Mathematics. This focus is also practical in this school context because there is an LCD displayed at 4P classroom.

I had carried out an initial survey to obtain the pupils' feedback of their interests in learning Mathematics by using questionnaire. Table 1 and Table 2 show the analysis of the data collected.

Table 1.

Frequency Counts & Percentages of the Subject that Pupils Like Most

Item 2	English	Mathematics	Bahasa Malaysia	Science	Moral	Art
Which subjects do you like the most?	4 (9%)	10 (23%)	10 (23%)	6 (14%)	4 (9%)	10 (23%)

Table 1 represents the frequency counts and percentages of the subject that pupils like most. Table 1 also shows that the subjects of Mathematics, Bahasa Malaysia and Art are the subjects which the pupils like most [10 pupils each or 23 percent (%)].

Table 2.

Frequency Counts & Percentages of "Yes" and "No" Responses based on Item 3, 4 and 5 in Questionnaire

Item 3, 4 and 5	Yes	No
Do you know how to use a computer?	43 (98%)	1 (2%)
Do any school teacher(s) use computers to teach?	16 (36%)	28 (64%)
Do any school teacher(s) use teaching aids to teach?	34 (77%)	10 (23%)

Table 2 shows the frequency counts and percentages of "Yes" and "No" responses based on Item 3, 4 and 5 in the questionnaire given to the pupils. It is clearly seen that there are 43 pupils (98%) who know how to use a computer. Most of the school teachers (64%) did not use computers to teach.

I would continue to use PowerPoint presentation to find the effect on pupil's learning and interest as well as improving my own teaching practice based on the data collected during the initial survey.

Objectives

The objective of this study were:

- to improve pupil's learning by using PowerPoint presentation in Mathematics lessons.
- to increase pupils' interest by using PowerPoint presentation in Mathematics lessons.
- to identify the effect of carrying out action research by using PowerPoint presentation in my teaching practice.

Research Questions

In relation to the objectives, my research questions were:

- Does the use of PowerPoint presentation affect pupils' learning in mathematics?
- Does the use of PowerPoint presentation affect pupils' interests in learning Mathematics?
- Will the use of carrying out action research by using PowerPoint presentation affect my teaching practice?

ACTION PLAN AND REVIEW OF LITERATURE

Action plan

During the first two weeks in the school, I had carried out my initial survey to collect data of the existence of this focus in the school. I collected data of my pupils' interest by using questionnaire. I had used PowerPoint presentation during all the teaching and learning process in the class. The PowerPoint slides that I had prepared included graphics, animations, audio, video clips as well as pictures which made the presentation interesting and colorful enough to attract the pupil's attention.

Basically, in a lesson, I would teach the concept of Mathematics by displaying step by step clearly in the PowerPoint slides. Pupils were able to see the concepts clearly. Then, I would provide some examples for the pupils to solve so that they could easily grasp the concept of Mathematics. I had also displayed questions to test the pupils' understanding of the topic in the slides. Quiz was done to assess their understanding.

Observations were carried out by my mentor to collect data of my teaching practice when using PowerPoint presentation. Questionnaire was given to the pupils to find out about their responses. Topical tests were administered after each topic of Mathematics were taught to test their understanding of the topics.

Carr and Kemmis (1986) described action research as the improvement of practice, the improvement of the understanding of practice as well as the improvement of the situation in which the practice takes place (as cited in Stephen, 2006). Basically, action research is a procedure to improve on oneself in either social or educational practices. There are four phases in doing action research: planning, acting, observing and reflection.

Information and Communication Technology (ICT) had been reported as an important tool in the teaching and learning of Sciences and Mathematics in Malaysia. According to Bates and Waldrup (2006) in a survey conducted by the Educause Center for Applied Research, 48.5% of the respondents said the biggest benefit of classroom technology is convenience. Only 12.7% of the students said improving learning was the greatest benefit.

According to Rabinowitz, Kernodle and McKethan (2010), PowerPoint is a tool that hold great potential for engaging pupils. Besides that, Wet (2006) mentioned that PowerPoint is easy to use. In its simplest presentation, it could be a lecture with pictures. Pupils' comprehension and understanding could be increased through visual learning. Moreover, PowerPoint presentations are easy to change and adapt to various situations due to its design and layout templates which are in varieties.

Learning is a lifelong process. Along the way, every pupil would encounter teachers who teach by using different methods and strategies. A study by Lowry (1999) reported that "student scores on tests were even improved with PowerPoint lectured as opposed to traditional lectures" (51.8% versus 43.5%) (as cited in Wet, 2006). Thus, it is said that PowerPoint has some effects on pupil's learning.

Passey, Rogers, Machell, McHugh and Allaway (2003) mentioned in their study that all of the primary school pupils being interviewed claimed that ICT made the lessons more interesting. It allowed them to play games, to hear and see things better and to be able to move things around. Wet (2006) stated that PowerPoint presentation is able to raise students' interest by adding suitable clip art, animations, transitions and timing. These features are used to draw attention on important ideas.

METHODOLOGY

Target Group and Participants of the Study

My target participants were 45 pupils from Class 4P. There were 19 boys and 26 girls. Most of the pupils were average in their academic achievement. Six pupils were good in Mathematics while ten pupils were weak in that subject.

Data Collection

Table 3 represents the data collection of this study.

Table 3.

Data Collection in the Study

Research Question	Data	Method	Sources
Does the use of PowerPoint presentation affect pupils' learning in mathematics?	Pupils' learning	Topical tests	Pupils

Does the use of PowerPoint presentation affect pupils' interests in learning Mathematics?	Pupils' interest	Questionnaire	Pupils
Will the use of carrying out action research by using PowerPoint presentation in my teaching affect my teaching practice?	Feedback (effect of carrying out action research by using Power Point)	Observation checklist (PR1 form) Mentor's comments	Teacher

I had administered three topical tests to collect data on pupils' learning. The first topical test was carried out before I used PowerPoint presentation in learning. The test consisted of 10 objective questions and five subjective questions. Each learning outcome as stated in the Mathematics Curriculum Specifications for Primary Four was tested to ensure the test validity. The other two tests also comprised of 15 test items each. The topics taught were "Decimals" and "Money".

I had used questionnaire to collect data on pupils' interest in learning Mathematics. The questionnaire comprised of six items. The responses for each item are "True" or "Not true". The pupils needed to choose one response for each item. A negative item is used to increase the reliability of the instrument.

I had used PR1 form to collect data on the effect of carrying out action research by using PowerPoint presentation in my teaching practice. PR1 form consists of five major parts. In this study, I only used the second part (eight criteria), which is evaluating the teaching practice. For each item, the scale rating ranges from one (lowest rate) to five (highest rate). I had also used my mentor's comments to evaluate my own teaching practice performance. The comments were used to support the rating that the mentor had given for each observation.

Data Analysis

Table 4 briefly shows the data of the study, types of data and the way to analyze each data.

Table 4.

Data Analysis in the Study

Data	Types of data	Analysis
Pupils' learning	Quantitative	Use statistics • Topical tests

Pupils' interest	Quantitative	Use quantitative method • Questionnaire
Feedback on the effect of carrying out action research by using PowerPoint presentation in my teaching practice	Qualitative	Use qualitative methods • Observations • Mentor's comments

Statistics were used to analyze the data on pupils' learning. In this context, I used the term mean and standard deviation to describe my findings of this data. Mean is the measurement of pupils' mark scores averagely. Standard deviation is the measurement of dispersion of the observed data from the mean.

For the data of pupils' interest, statistics were used to analyze the data. Questionnaires were administered four times to measure the favorable response of the pupils towards learning Mathematics. I used the term frequency to describe my findings.

The last data that I collected was the data on the effect of carrying out action research in my teaching practice performance. Observations were carried out using PR1 form. This form was analyzed based on the rating scales from one to five. As for the comments given by my mentor, they were analyzed based on the words and phrases used.

RESULTS AND FINDINGS

Effect of using PowerPoint presentation on pupils' learning

In this study, I had administered three topical tests to the pupils after teaching each topic. The tests were on the topic of "Fractions", "Decimals" and "Money". Each topical test consisted of 10 objective questions and five subjective questions. Each objective question was given five marks while five, 10 or 15 marks were awarded for different subjective questions.

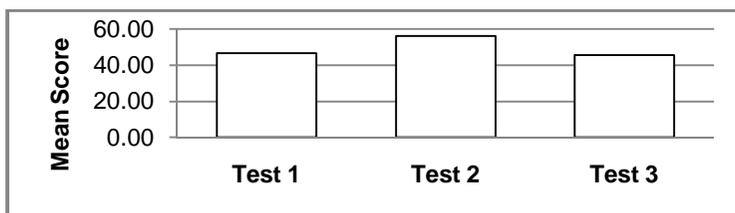


Figure 4. Bar graph of mean score for Test 1, Test 2 and Test 3

The result of mean score is graphically presented in Figure 1. It is clearly seen that in Test 1, the mean score (46.55) increased to 56.28 in Test 2. The mean score then decreased from 56.28 (Test 2) to 45.48 (Test 3). A decrease in mean score means that less learning had taken place. Thus, it could be concluded that the amount of learning of the pupils did not show any improvement at the end of this study.

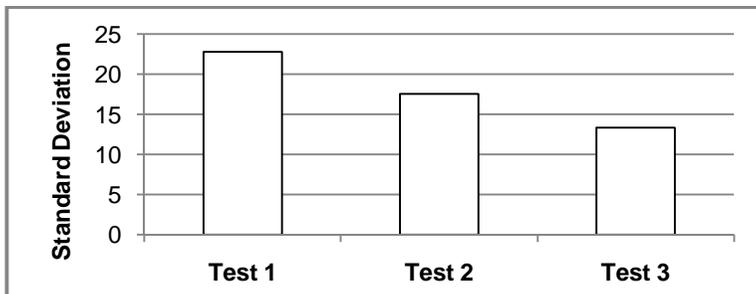


Figure 2. Bar graph of standard deviation for Test 1, Test 2 and Test 3.

Figure 2 shows that the standard deviation decreased from 22.83 (Test 1) to 17.54 (Test 2). It continued to decrease from 17.54 (Test 2) to 13.33 (Test 3). Henceforth, it could be concluded that the individual difference among the pupils had decreased at the end of this study. To conclude, the use of PowerPoint presentation in teaching Mathematics did not really increase pupils' learning but the individual difference among them had become smaller.

Effect of using PowerPoint presentation on pupils' interest

Questionnaire had been used to collect data on this aspect. I had administered the questionnaires four times during the practicum. The questionnaire that I had designed comprised of six items. To calculate the responses, one mark was allocated for positive items with the response "True" while for the negative item, one mark was assigned for the response "Not True". The frequency of the pupils' favorable response by item for Time 1, Time 2, Time 3 and Time 4 was calculated and as shown in Table 5.

Table 5.

Frequency of Favorable Responses by Item for Time 1, Time 2, Time 3 and Time 4

Items	Frequency of Favorable Response			
	Time 1 (N=43)	Time 2 (N=44)	Time 3 (N=43)	Time 4 (N=45)
I found that today's lesson interesting	40 (93%)	39 (89%)	34 (79%)	36 (80%)
I enjoyed today's lesson	42 (98%)	39 (89%)	31 (72%)	36 (80%)
The lesson was easy to learn.	22 (51%)	35 (80%)	33 (77%)	36 (80%)
I can understand the teacher clearly.	34 (79%)	33 (75%)	34 (79%)	38 (84%)
The class was noisy.	13 (30%)	25 (57%)	29 (67%)	32 (71%)
Everyone was happy.	43 (100%)	40 (91%)	37 (86%)	34 (76%)
Total	194 (75%)	211 (80%)	198 (77%)	212 (79%)

For item 1, 40 pupils (93%) found today's lesson interesting in Time 1. The figure dropped from 39 pupils (89%) in Time 2 to 34 pupils (79%) in Time 3. Time 4 showed a slight increase of 1% to 80% (36 pupils). For item 2, 42 pupils (98%) enjoyed today's lesson. The number of pupils who enjoyed today's lesson decreased by three pupils to 89% in Time 2 and decreased again in Time 3 by eight pupils. In Time 4, the responses increased to 36 pupils (80%) from the previous Time 3.

For item 3, 22 pupils (51%) in Time 1 said that the lesson was easy to learn and that increased to 35 pupils (75%) in Time 2 and decreased to 33 pupils (77%) in Time 3 and lastly, it increased again to 36 pupils (80%). For item 4, there were 34 pupils (79%) who could understand the teacher clearly in Time 1. However, the number increased to 38 pupils (84%) in Time 4.

Item 5 is a negative item. 30% of the pupils in Time 1 found the class not noisy and the responses increased to 71% of pupils who found the class not noisy in Time 4. It meant that the class was getting quiet at the end of this study.

From the data, it was found that the frequency of total favorable responses of the pupils was inconsistent. It could be interpreted

that the use of using PowerPoint presentation did not increase the interest of my pupils towards the subject of Mathematics. Their level of interest also did not show any significant decrease.

Effect of action research on my teaching practice

I used PR1 form as an instrument to evaluate my teaching practice performance when using the PowerPoint presentation. This form was used three times by my mentor to evaluate my teaching practice. The evaluation was done at the same time when the questionnaire was administered. Table 6 displays my mentor's rating of my teaching practice for three observations.

Table 6.

Mentor's Rating of Teaching Practice for 3 Observations

Item	Observation		
	1 st	2 nd	3 rd
Set Induction	4	3	4
Teaching Development	4	3	4
Classroom Management	3	3	4
Communication	3	3	4
Lesson's Quality	4	3	4
Closure	4	4	4
Achievement of Learning Outcome(s)	4	4	4
Integration of Moral Value(s)	4	4	4

Note: Indicators of each rating scale

Level 1: Need to improve in a lot of aspects

Level 2: Need to improve in some of the aspects

Level 3: Average performance

Level 4: Good in many aspects

Level 5: Excellent in many aspects

Table 6 shows that five aspects of teaching practice that I had shown improvement. They were the set induction, teaching development, classroom management, communication and lesson's quality. Closure, achievement of learning outcomes and integration of moral value were the aspects that did not show any improvement with a rating of 4 for all the three observations.

Besides that, my mentor also gave some feedback and comments based on my teaching practice performance for three observations. My mentor mentioned that the use of ICT was good in the aspects of set induction, class management and activity for the pupils. However, I needed to improve in the animation as well as knowing the way of dealing with LCD

technical problems that occurred. In conclusion, the use of PowerPoint presentation in my teaching affected my teaching practice performance in a significant way. However, there are still a lot of things for me to learn and improve especially in my teaching practice.

REFLECTION AND FURTHER ACTION

Evaluation and reflection

In this research, I encountered some problems which distracted the implementation of the intervention. From the aspect of technical efficiency, I faced technical problems of using PowerPoint presentation due to LCD breakdown. Thus, I need to have Plan B to counter this problem.

Besides that, not all the topics in Mathematics Curriculum Specifications can be taught by inculcating technology in the lessons. Some of the topics are better taught through other methods and strategies to maximize pupil's learning.

In terms of contextual practicality, this intervention is practical in every school context. This research can be done in any school or any class as long as there is availability of technology equipments in the school. This action is suitable to be implemented in this school context. This is because there is only one LCD in the school and it is located in Class 4P. Through these findings, I can encourage other teachers to try to use this intervention in their class.

From the aspect of critical considerations, the use of technology as a teaching aid should be the norm for the school in this age of information technology. Likewise, pupils comprises of mixed abilities. Thus, teachers need to use different methods and strategies to teach pupils with different learning styles.

Through conducting this action research, I have learnt to be self-reflective. This research involved a lot of deep thinking into the issue concern, in collecting the data needed, in interpreting the findings and so forth. From here, I was able to reflect my own strengths and weaknesses in carrying out this study.

From this study, I have more confident in teaching, especially through the use of ICT in my lessons. It helped me in organizing

my teaching phase orderly and aided me in creating fun in learning.

Apart from that, the application of technology is also one of the pillars in the teaching and learning of Mathematics. The application of technology could help the pupils to understand mathematical concepts in depth, meaningful and enabling them to explore mathematical concepts. Mathematics is integral in the development of science and technology. Thus, the acquisition of mathematical knowledge should be upgraded periodically to improve teachers' knowledge and skill.

Suggestion for Further Research

Based on the evaluation and reflection from this study, I have a few suggestions for the next action research cycle. If I have the opportunity to continue to do this research, I would like to do collaborative action research with my friends in the same course. I hope to challenge myself by developing my skills in teaching. I would like to explore the effectiveness of using PowerPoint presentation in pupils' participation as well as their interests.

I plan to use PowerPoint during the whole lesson. PowerPoint presentation is also multi-purpose. Set induction could be done by showing stimulating pictures and interesting video clips. Then, for the teaching and learning process, the Mathematical concept could be taught in a more systematic way. Along the way, assessment such as quiz could be carried out to test the pupils' understanding of the concept. Furthermore, PowerPoint presentation could also be used for group work in order to increase the pupils' participation. In a nutshell, action research is indeed a good way of improving my own teaching practice as well as bringing benefit to the pupils.

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THE USE OF COOPERATIVE LEARNING STRATEGIES IN TEACHING PRIMARY FOUR MATHEMATICS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk menilai keberkesanan strategi pembelajaran koperatif, iaitu "Numbered Heads Together" dan "Think-Pair-Share" dalam peningkatan pembelajaran dan minat murid untuk mempelajari Matematik Tahun 4 dan juga amalan mengajar saya. Responden dalam kajian ini terdiri daripada 43 orang murid yang sederhana dalam pencapaian akademik dari kelas 4K. Data dikumpulkan melalui ujian pra dan ujian pasca. Hasil analisis data mendapati bahawa purata markah menunjukkan peningkatan dalam ujian pasca daripada 48.45 kepada 49.85 manakala sisihan piawai telah menunjukkan penurunan daripada 11.84 kepada 10.86. Selain itu, soal selidik digunakan untuk menilai keberkesanan strategi ini dalam meningkatkan minat murid dalam pembelajaran Matematik. Hasil analisis data menunjukkan strategi ini membawa pengaruh terhadap minat murid-murid dalam pembelajaran Matematik. Borang bimbingan praktikum juga telah digunakan untuk menentukan pengaruh strategi pembelajaran koperatif terhadap amalan mengajar saya. Keputusan menunjukkan strategi ini tidak membawa kesan negatif terhadap amalan mengajar saya.

Kata kunci: Pembelajaran koperatif, minat, amalan mengajar, "Numbered Heads Together", "Think-Pair-Share"

ABSTRACT

The purpose of the study was to determine whether the cooperative learning strategies, which were "Numbered Heads Together" and "Think-Pair-Share" were effective

in increasing the pupils' learning and interest in Primary Four Mathematics as well as my own teaching practice performance. The respondents consisted of 43 pupils from 4K class who were average pupils. The data for this study was collected using pre-test and post-test. The results showed that the mean score in the post-test had increased from 48.45 to 49.85 while the standard deviation had decreased from 11.84 to 10.86. Moreover, questionnaire was also used to determine the effect of these strategies on pupils' interests in learning Mathematics. The results of the study showed that these strategies affected the pupils' interest in learning Mathematics. Teaching practice appraisal form was also used to identify whether the cooperative learning strategies affected my teaching practice performance. The result showed that these strategies did not have negative effect on my teaching practice performance.

Keywords: Cooperative learning, interest, teaching practice performance, "Numbered Heads Together", "Think-Pair-Share"

INTRODUCTION

Context of the Study

During my first and second practicum, I incorporated group activities in my Mathematics lessons so that the pupils could work together and learn better. However, I was grouping the pupils without using any technique. During group activities, the pupils formed several groups and completed the exercises given. The first group that could answer all the questions correctly would be the winners. Subsequently, smart pupils did all the questions while weak pupils chit-chatted until the time was over. What I observed was that most of the weak pupils became not interested during my lesson and also showed no improvement in their Mathematics performances.

During the first two weeks of my third practicum at SK SM, I noticed that the school teachers were also grouping the pupils without using any particular technique. There was no group task that needed pupils to cooperate in order to accomplish the goal. Thus, the common scenario that I could see was that the pupils

showed no interest in learning and not performing well in all the subjects. Only certain self-disciplined and smart pupils could perform well in their learning.

From my point of view, group activities were always better than individual activities. Normally, I divided the pupils into heterogeneous groups because the smart pupils would help the weak pupils in learning. However, according to Johnson and Johnson (1994), not all groups are cooperative groups. Putting groups together in a room does not mean cooperative learning is taking place (as cited in Dahley, 1994). Johnson, Johnson, and Holubc (1994) stated that, "...cooperative learning is the instructional use of small groups through which students work together to maximize their own and each other's learning" [as cited in "A guide to cooperative learning" (No Author, n.d.)]. Hence, putting pupils into heterogeneous group did not mean that the pupils could maximize their learning.

Focus of the Study

The focus of my research was on the issue of pupils' lack of learning and interest as well as my own teaching practice performance in Mathematics subject. I had carried out my initial survey on this problem. Firstly, I collected pupils' February Monthly Mathematics test scores (pre-test). The pupils' grades in the pre-test are shown in Table 1.

Table 1.
Pupils' Grades in Pre-test

Grade	A	B	C	D
No. of pupils	0	7	26	10

Next, I interviewed my mentor, who was an experienced teacher and she knew the pupils well, to obtain more information about the pupils' interest in learning Mathematics. The following quotations were taken from the transcripts of my interview with her:

".....the poor (weak) pupils need more practice..."

"Pupils easily got bored when the calculation was too complicated or when there's long way to get answer."

"..only the good pupils reply teacher's answer..."

"...although it is a good class, still got one or two pupils no interest in Mathematics" (sic)

The data collected showed that the pupils were quite weak in Mathematics and also showed not much interest in learning. To address these issues, I had chosen cooperative learning strategies which were "Numbered Heads Together" and "Think-Pair-Share" to be implemented in my 4K Mathematics class.

Objectives of the Study

The objectives of this study were to improve the pupils' learning and interest in learning Mathematics as well as my own teaching practice performance by using "Numbered Heads Together" and "Think-Pair-Share".

Research Questions

The research questions I had sought to answer were:

- Can the use of "Numbered Heads Together" and "Think-Pair-Share" improve pupils' learning in Mathematics?
- Can the use of "Numbered Heads Together" and "Think-Pair-Share" increase pupils' interest in Mathematics?
- Does the use of "Numbered Heads Together" and "Think-Pair-Share" affect my teaching practice performance?

ACTION PLAN AND REVIEW OF LITERATURE

Action Plan

The implementation of "Numbered Heads Together" and "Think-Pair-Share" in my Mathematics lessons were carried out throughout my 12 weeks of practicum and is as shown in Table 2.

Table 2.

Action Plan

Week	Action
1 (1-5 February 2010)	<input type="checkbox"/> Reviewed literature <input type="checkbox"/> Interviewed mentor about pupils' interest (initial survey)
2 (8-12 February 2010)	<input type="checkbox"/> Reviewed literature <input type="checkbox"/> Pupils filled in the questionnaires
3 (15-19 February 2010)	
4 (22-26 February 2010)	<input type="checkbox"/> Divided pupils into heterogeneous groups <input type="checkbox"/> Numbered pupils 1, 2, 3, 4 or 5 <input type="checkbox"/> Collected pupils' pre-test scores (initial survey)

5 (1-5 March 2010)	<input type="checkbox"/>	Conducted group activity
	<input type="checkbox"/>	Observe pupils' learning and interest
6 (8-12 March 2010)	<input type="checkbox"/>	Conducted group activity
	<input type="checkbox"/>	Observed pupils' learning and interest
7 (15-19 March 2010)		-
8 (22-26 March 2010)	<input type="checkbox"/>	Numbered Heads Together
9 (29-March -1 April 2010)	<input type="checkbox"/>	Numbered Heads Together and Think-Pair-Share
10 (5-9 April 2010)	<input type="checkbox"/>	Numbered Heads together
11 (12-16 April 2010)	<input type="checkbox"/>	Numbered Heads Together and Think-Pair-Share
12 (19-24 April 2010)	<input type="checkbox"/>	Numbered Heads Together and Think-Pair-Share
	<input type="checkbox"/>	Collected pupils' April Monthly Mathematics test scores
13 (26-30 April 2010)	<input type="checkbox"/>	Think-Pair-Share
	<input type="checkbox"/>	Pupils filled in the questionnaires.
	<input type="checkbox"/>	Collected feedback from pupils in 4K class

REVIEW OF LITERATURE

Action Research and Teaching Practice

Brockerville (n.d.) defined action research as a viable tool for teachers to take on the challenge and claim a voice in shaping their practice. Mettetal (n.d.) stated that action research will help to discover what works best in our own classroom situation. It is a powerful integration of teaching and scholarship that provides a solid basis for instructional decisions. It is an easily mastered technique that provides insights into teaching that result in continual improvement.

Cooperative Learning

Cooperative learning is an approach of instruction in which students in small groups work on specific tasks towards the achievement of a common goal (Slavin, 1982). A cooperative learning classroom requires its pupils of all levels of performance to work together to attain common goals of their group.

“Numbered Heads Together” is a useful strategy for quick reviewing of materials in a fun way. Pupils are divided into groups of four and numbered 1, 2, 3 and 4. The teacher then poses a question and the pupils help each other in solving the problem. The teacher will then call a number randomly. Only the pupils with that number will be allowed to answer and earn points for their team.

“Think-Pair-Share” involves three steps of cooperative structures. Firstly, individuals think silently about a question posed by the instructor. Secondly, individuals pair up and exchange thoughts. Thirdly, the pairs share their responses with other pairs, other teams, or the entire group (Kagan, 1994).

Effect of Cooperative Learning on Pupils’ Learning

Cooperative learning benefits the pupils in several aspects especially in their academic performance. Based on an experiment, Hamm and Adams (1992) drew the following conclusions about the effects of cooperative learning on pupils’ learning such as improving academic performance among higher achieving and lower achieving pupils; and by teaching others, all the pupils actually come to understand the materials better (as cited in Numbered Heads Together, 2010).

Cooperative learning strategies reduce pupils’ anxiety in learning Mathematics since the pupils are structured in groups. These strategies not only motivate the pupils in their own learning and learn from others but also help others to learn. Hence, this will promote pupils’ higher achievement and greater productivity regardless of being high-achievers, medium-achievers or low-achievers. Other than that, these strategies also increase pupils’ long-term retention of information, higher-level reasoning and critical thinking.

Effect of Cooperative Learning on Pupils’ Interest

Astin (1977) stated that pupils who are actively involved in the learning process are much more likely to become interested in learning and make more effort to attend school [as cited in Panitz (n.d.)].

Through the application of the cooperative learning strategies, pupils will have fun in learning Mathematics. Therefore, they will tend to participate actively in the teaching and learning process. When they are given opportunity to discuss with their friends or have some questions to challenge their mind, the pupils will have interest in learning that particular subject as they are more likely to learn from their friends.

METHODOLOGY

Participants of the Study

The participants of this study consisted of 43 pupils in Year 4K class at SK SM, Kuching. This class was a mixture of Malay, Iban, Chinese, Bidayuh, Kenyah and Bugis. Most of the pupils in 4K were average pupils because they had been streamed according to their results in Year 3 final year of examination. High ability pupils were those who obtained marks in the range of 80-100 percent (%) whereas the low ability pupils were those with marks below 40%. The profile of the pupils in terms of their ability is shown in Table 3.

Table 3.
Profile of pupils in 4K class

	High	Average	Low	Total
	0	33	10	43

Data Collection Methods

There were four data collection methods that I used to answer my research questions. The data collection methods of this study are shown in Table 4.

Table 4.
Data Collection Methods and Sources of Data

No.	Research Questions	Data Collection Method	Sources
1	Can the use of "Numbered Heads Together" and "Think-Pair-Share" improve pupils' learning in Mathematics?	Test scores	Pupils
2	Can the use of "Numbered Heads Together" and "Think-Pair-Share" increase pupils' interest in learning Mathematics?	Questionnaires Feedback	Pupils Pupils
3	Does the use of "Numbered Heads Together" and "Think-Pair-Share" affect my teaching practice performance?	Observations	Lecturer

I collected pupils' pre-test scores and post-test scores to determine the effect of cooperative learning on pupils' learning. February Monthly Mathematics test (pre-test) was administered on 25 February 2010 while April Monthly Mathematics test (post-test) was administered on 8 April 2010. There were 40 objective items in paper one and 20 subjective items in paper two.

I asked the pupils to fill in the questionnaires in the form of rated responses to collect data on their interest towards the application of cooperative learning in Mathematics lessons. There were eight items in the questionnaire. Furthermore, I asked the pupils to give me feedback on the use of cooperative learning strategies in Mathematics lessons.

I used the rating in the component of implementation part in teaching practice appraisal form which had been ranked by my lecturer during Observation 1 and Observation 2. There were eight items in this component.

Data Analysis

Table 5 shows the methods I used to analyze the data collected.

Table 5.

Data Analysis

Research Questions	Methods	Technique analysis
Can the use of "Numbered Heads Together" and "Think-Pair-Share" improve pupils' learning in Mathematics?	Test scores (pre-test and post-test)	Find the mean score, standard deviation and compare the results which were before and after the implementation of cooperation learning Strategies
Can the use of "Numbered Heads Together" and "Think-Pair-Share" increase pupils' interest in learning Mathematics?	Questionnaires (supported by pupils' feedback on the use of cooperative learning strategies)	Use of frequency count and find the percentage of each item
Does the use of "Numbered Heads Together" and "Think-Pair-Share" affect my teaching practice performance?	Observations (teaching appraisal form)	Comparison of mean score of Observation 1 and Observation 2

RESULTS AND FINDINGS

Effect of Cooperative Learning Strategies on Pupils' Learning

The difference of mean scores of pre-test and post test are shown in Table 6.

Table 6.

The Difference of Mean Scores of Pre-test and Post-test

Test	Pre-test	Post-test	Difference
Mean	48.45	49.85	1.4

The mean score of pre-test was 48.45 while the mean score of post-test was 49.85. This indicated that the mean score has increased by 1.4 marks that showed that pupils had slightly improved in their learning. Since the pupils in 4K were average pupils, therefore this slightly improvement could be a motivation for them to study even harder.

The difference of standard deviation of pre-test and post-test is shown in Table 7.

Table 7.
The Difference of Standard Deviation of Pre-test and Post-test

Test	Pre-test	Post-test	Difference
Standard Deviation	11.84	10.86	0.98

The standard deviation of pre-test was 11.84 while the standard deviation of post-test was 10.86 that showed a reduction of 0.98. It could be said that the individual difference among the pupils became smaller.

Effect of Cooperative Learning Strategies on Pupils' Interest

The frequency count and percentage of favorable responses of the pupils for each item are presented in Table 8.

Table 8.
Frequency Count and Percentage of Favorable Responses of the Pupils for Each Item

No.	Items	Pre	Post
1	I like to learn Mathematics.	40 (100%)	40 (100%)
2*	I don't like to do Mathematics homework.	39 (97.5%)	36 (90%)
3	I like to spend more time on Mathematics than on other subjects.	29 (72.5%)	29 (72.5%)
4*	I wish I don't have to learn Mathematics.	40 (100%)	40 (100%)
5*	I find Mathematics very boring.	38 (95%)	39 (97.5%)
6	Mathematics is very useful in life.	38 (95%)	38 (95%)
7	I always look forward to Mathematics class.	31 (77.5%)	31 (77.5%)
8	Mathematics is an interesting subject.	39 (97.5%)	39 (97.5%)

Note: * These are negative items

Items 1, 3, 4, 6, 7, and 8 showed no difference between pre-questionnaire and post-questionnaire. Only item 2 and item 5 showed some changes. For item 2, there was a decrease of 7.5% which indicated that the pupils have much interest in doing Mathematics homework. This was because the pupils preferred

to work in group to discuss and find out the answer together than doing homework individually. For item 5, it increased by 2.5%. The pupils found that Mathematics is not as boring as before. Results of Table 8 are presented graphically in Figure 1.

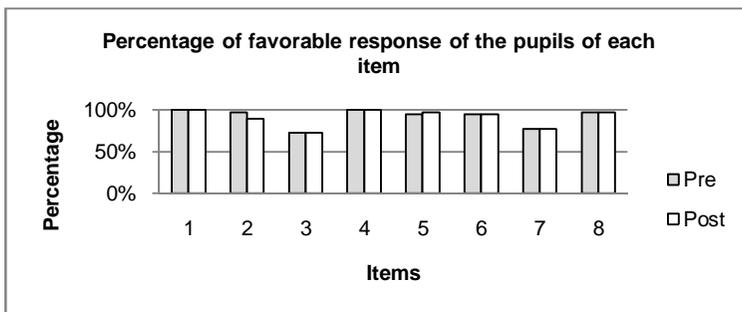


Figure 1. Percentage of favorable responses of the pupils for each item on pupils' interest in Mathematics.

Effect of Cooperative Learning Strategies on Teaching Practice Performance

The rating scores for my teaching practice performance in Observation 1 and Observation 2 are shown in Table 9.

Table 9.

The Rating Scores of Observation 1 and Observation 2

Component	Aspects	Rating of Observation	
		1	2
Implement- ation	1 Introduction	5.0	5.0
	2 Lesson Development	4.5	5.0
	3 Classroom Management	5.0	5.0
	4 Communication	5.0	4.5
	5 Learning Quality	4.0	5.0
	6 Closure	4.5	5.0
	7 Achievement of Learning Objectives	4.0	5.0
	8 Integration of Moral Values	4.0	4.0
Mean		4.5	4.8

Note: 1 – very weak; 2 – weak; 3 – average; 4 – good; 5 – excellent

The mean score had increased from 4.5 marks (Observation 1) to 4.8 marks (Observation 2) which showed that my teaching practice performance was not negatively affected by my intervention in using cooperative learning strategies in my Mathematics lesson.

REFLECTION

After I had implemented “Numbered Heads Together” and “Think-Pair-Share” in my teaching practice, I found that the pupils enjoyed working in small groups with their group members to complete a task, communicate ideas, help each other in learning in order to achieve the same goal and therefore promote a community atmosphere.

In this study, these strategies were practical to be used to teach Mathematics Curriculum since both of these strategies helped me to create an enjoyable, meaningful, useful and challenging environment for teaching and learning in my third Practicum. Through the application of these strategies, the pupils were required to communicate in order to share ideas and clarify their understanding of Mathematics. By providing opportunity to the pupils to learn from their peers, they were able to access knowledge or skills and information independently according to their pace. The pupils not only learned to solve problems but also opened up their mind to accept Mathematics as a powerful tool in today's world.

Besides that, these strategies also helped to develop the pupils to become individuals who are physically, emotionally, spiritually, intellectually, socially balanced and harmonious as stated in the National Philosophy of Education. Good moral values were also cultivated when pupils worked and learned in groups. Pupils working in mixed-ability groups did not stifle their individual initiative but prepare the pupils to develop social skills, encourage cooperation and work ethic needed for the future. All the pupils were given equal opportunity to participate in the learning process where they were responsible to give contributions to their own groups.

Throughout this action research, I have gone through a process of planning, observing, collecting data, analyzing, interpreting, evaluating, making reflection and writing report. Implementing this action research gave me a chance to really look at my own teaching in a structured manner. This allowed me as a teacher trainee to grow and gain more confidence to become a “full

phase” teacher in future. I believed that I am capable to teach effectively by applying the teaching skills that I have learnt from this study in my future teaching career.

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THE USE OF COOPERATIVE LEARNING TO PROMOTE PUPILS' LEARNING AND INTEREST IN PRIMARY FIVE MATHEMATICS

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ABSTRAK

Penyelidikan tindakan ini bertujuan menilai keberkesanan penggunaan pembelajaran koperatif dalam meningkatkan pembelajaran dan minat murid Tahun 5 untuk mempelajari Matematik. Ia juga bertujuan menilai kesan menjalankan penyelidikan tindakan terhadap amalan mengajar saya. Responden dalam kajian ini terdiri daripada 19 orang murid dari Tahun 5A yang kurang berminat untuk belajar Matematik. 'Numbered Heads Together' dan 'Team Pair Solo' merupakan kaedah-kaedah pembelajaran koperatif yang saya aplikasikan dalam penyelidikan tindakan ini. Data tentang pembelajaran murid dalam Matematik dikumpulkan melalui tiga ujian topikal Matematik manakala data tentang minat murid dalam belajar Matematik dikumpulkan melalui Soal Selidik Minat Murid. Selain itu, data tentang amalan mengajar saya dikumpulkan melalui Borang Penilaian Praktik Mengajar. Data ini dianalisis menggunakan min dan sishan piawai. Peningkatan dalam min menunjukkan bahawa pembelajaran murid dan minat murid dalam belajar Matematik telah dipertingkatkan melalui pembelajaran koperatif. Di samping itu, pelaksanaan penyelidikan tindakan ini telah mempengaruhi secara positif amalan mengajar saya.

Kata kunci: Pembelajaran koperatif, 'Numbered Heads Together', 'Team Pair Solo', pembelajaran murid, minat murid, amalan mengajar

ABSTRACT

This study was carried out to investigate the effectiveness of using cooperative learning in enhancing

Primary Five pupils' learning and interest in learning Mathematics. I also investigated the effect of doing action research on my teaching practice performance. The respondents consisted of 19 pupils from Year 5A who had low interest in learning Mathematics. 'Numbered Heads Together' and 'Team Pair Solo' were the cooperative learning approaches that I applied in this research. The data of pupils' learning in Mathematics was collected using three Mathematics topical tests while the data of students' interest in learning Mathematics was collected using Student's Interest Questionnaire. Moreover, the data of my teaching practice performance was collected using Teaching Practice Appraisal Form. The data was analysed using mean and standard deviation. The increased in mean of the data indicated that the pupils' learning and interest in learning Mathematics had been promoted through cooperative learning. In addition, doing action research had positive effect on my teaching practice performance.

Keywords: Cooperative learning, 'Numbered Heads Together', 'Team Pair Solo', pupils' learning, pupils' interest, teaching practice performance

INTRODUCTION

Context of the Study

As a trainee, I underwent practicum at different primary schools last year. Teacher-centered traditional teaching method was my choice of teaching during my practicum. This was because I was exposed to this method since young and have gotten used to it. During practicum, I did demonstration and explanation from the beginning till the end of the lesson. Thus, the pupils had gradually relied on the teacher to decide what, when, and how to learn (Zakaria & Iksan, 2007). In other words, the pupils played the role of passive spectators while I acted as an active performer who was trying to deliver knowledge to them. At the end of the lesson, I found that some pupils showed no interest in learning Mathematics. Besides, their attention span was extremely short in class.

Furthermore, I sometimes failed to express the Mathematics concept in a simpler way and thus, some weak pupils could not understand and were unable to catch up with the lesson. Even though I had tried using colorful and attractive teaching aids with the aim to make them 'visualize' the Mathematics concept, it was of no help. Nonetheless, some weak pupils could understand their friends' teaching as they used simple language in explaining the concepts.

In addition, the smart pupils would always dominate all the tasks while the rest of the group members could only sit there quietly and do nothing during group activities. The pupils did not take turns in completing the tasks even though I have repeatedly told them to share the responsibilities. Some smart pupils would only direct other group members to complete certain easy task and they never accept other pupils' ideas. In fact, they have indirectly affected other pupils' self-esteem and decreased their friends' motivation in learning Mathematics.

Focus of the Study

The focus of the study is on pupils' learning and interest in learning Mathematics. Besides, I focused on my teaching practice performance. I wish to promote pupils' learning and interest in learning Mathematics through the application of cooperative learning in Mathematics lessons. Furthermore, I wish to investigate the effect of doing action research on my teaching practice performance.

During my third practicum at SK LK, Kuching, I had been assigned to teach Year 5A Mathematics class. It was a small class with mixed ability pupils. In order to complete this action research, I carried out an initial survey of cooperative learning on the pupils of Year 5A by observing their behaviour during the lesson. From my observation, I found that some pupils showed no interest in learning Mathematics. They were busy talking or playing with their friends during my teaching. They paid no attention to my teaching. They would only focus on my teaching for a short while and then continued with their own activity.

In addition, I found that the scenario of pupils' learning in Mathematics was actually not that bad, but somehow there was room for improvement. This was shown in the pupils'

performance in Mathematics topical test as pupils' result was a strong evidence to reflect on pupils' learning. After analysing the pupils' result of Mathematics Topical Test 1 (Whole Number), I found that a total of three pupils were scoring 40 marks and below. On the other hand, the number of pupils who scored between 40 and 80 marks and those who scored higher than 80 marks was the same with eight pupils each. For me, some pupils performed badly in the topical test might due to the reason that they did not learn Mathematics properly.

Besides, I interviewed my mentor to determine the suitability of cooperative learning to be carried out in Year 5A. I asked my mentor if the pupils of Year 5A enjoyed doing group work. She replied that "... most of them like to participate. Maybe a few pupils don't like...". My mentor also gave me a positive answer when I asked her whether cooperative learning would work in the class. "... as you can see, if they are asked to do presentation in front of the class, they will work together..." my mentor answered. From the interview, I knew that cooperative learning would be suitable to be carried out in Year 5A.

I carried out an initial survey on Year 5A pupils' interest in learning Mathematics by using Student's Interest Questionnaire which consisted of four items as shown in Table 1. Pupils' interest is measured using a four-point Likert scale ranging from one to four, which indicates from strongly disagree to strongly agree. The pupils then responded to each statement by choosing one of the responses in the Likert scale. Table 1 represents the result of Student's Interest Questionnaire of Year 5A.

Table 1.
Result of Student's Interest Questionnaire of Year 5A

Item	Scale				Mean
	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	
1. I like to learn Mathematics.	0	1	3	13	3.71
2. I like to do Mathematics exercises.	2	5	8	2	2.59
3. I love to attend Mathematics class.	0	0	7	10	3.59
4. Mathematics is interesting.	0	0	4	13	3.76

Table 1 shows that majority of the pupils find Mathematics interesting with a mean score of 3.76, followed by pupils who like to learn Mathematics with a mean score of 3.71. The mean score for Item 3 was 3.59 indicating that most of them like to attend mathematics class. However seven students admitted that they have no interest in doing Mathematics exercises. Although pupils' interest in learning Mathematics was quite high, it could still be improved, especially in their liking to do Mathematics exercises.

Based on the scenario, the focus of this study was improving pupils' learning and interest in learning Mathematics through the application of cooperative learning. According to Johnson, Johnson and Holubec (1994), cooperative learning is "the instructional use of small groups so that students work together to maximize their own and each other's learning" (p.13). Kagan (1999) mentioned that over 500 research studies back the conclusion that cooperative learning produces gains across all content areas, all grade levels, and among all types of students. Apart from that, the nature of the cooperative learning activities can stimulate and sustain students' interest in learning since it encourages positive attitudes toward learning (Slavin, 1991 as cited in Lang & Evens, 2006). Given these reasons, I believed that cooperative learning could resolve the issue of learning and interest in my Mathematics class.

I also wished to see if carrying out action research would affect my teaching practice performance as rated and evaluated by my supervisors. Hence, I was very concern about the possibility that by doing action research, my teaching practice performance might be affected. It was therefore important for me to also investigate whether carrying out this action research would bring negative effects to my teaching practice performance.

Objectives of the Study

The objectives of the study were to improve pupils' learning and interest in learning Mathematics among Year 5A pupils through the application of cooperative learning approaches as well as to investigate the effect of carrying out action research on my teaching practice performance as assessed by my supervisor.

Research Questions

This study was carried out to answer the following research questions.

- Is cooperative learning effective in improving pupils' learning in Mathematics?
- Is cooperative learning effective in improving pupils' interest in learning Mathematics?
- What is the effect of carrying out action research on my teaching practice performance?

ACTION PLAN

'Numbered Heads Together'

The purpose of 'Numbered Heads Together' is to promote discussion and both individual and group accountability. When I executed 'Numbered Heads Together', it was integrated in the lesson as group activity in the lesson. Each member was given numbers of 1, 2, 3 and 4. Questions were posed to all the groups. The groups would then discuss and work together to answer the questions. After that, I would call out a number like 2 and each number of 2 of the groups was asked to solve the problem on the blackboard. The group that could answer the question correctly would get a "smiley face" from me. At the end of the activity, the group with the most number of "smiley faces" would be the winner of the activity. In order to win the activity, the smart pupils had to teach the weak pupils in answering the question so that all group members could answer the questions correctly. Simultaneously, the conceptual knowledge of smart pupils would be further developed as they learn better when they explain the Mathematics concepts to their friends.

'Team Pair Solo'

Kagan (1994) mentioned that the cooperative learning approach of 'Team Pair Solo' was designed to motivate students to tackle and succeed at problems which initially were beyond their ability. It was based on a simple notion of mediated learning. Students could do more things with help (mediation) than they could do alone. For this activity, I prepared three types of exercises for the pupils. Hence, they would solve the problems firstly, in team, then in pair, and lastly on their own. The marks for the exercises would be recorded. The group with the highest total marks would

be the winner of the activity. By allowing the pupils to work on problems they could not do alone first as a team and then with a partner, they progressed to a point that they could do it alone. Through the method of peer teaching, pupils were able to understand the concepts of Mathematics better and learn better.

Grouping

Pupils' mathematics ability and emotional structure were my considerations in grouping. After analyzing the pupils' result in topical test and sociogram of Year 5A, I grouped the pupils into five heterogeneous groups. Hence, the pupils with different levels could help each other during the activity. Simultaneously, they would be satisfied with their group members.

Implementation Plan

I carried out cooperative learning for approximately 15 to 20 minutes as group activity in my lessons. Hence, cooperative learning was carried out without affecting my lessons. Furthermore, I only chose one cooperative learning approach to be carried out each time beginning from week six to week 13. Normally, I executed 'Numbered Heads Together' or 'Team Pair Solo' once or twice in a week. However, the suitability of cooperative learning approach with my topic of teaching was considered in planning the lesson.

I also administered Mathematics Topical Test on "Fractions" and "Decimals" on 11 March 2010 and 29 April 2010 respectively. The tests were marked and recorded in order to collect data on pupils' learning of Mathematics. Moreover, I collected data about pupils' interest in learning Mathematics by using Student's Interest Questionnaire over time. I administered the questionnaire to the pupils on 25 February 2010 and 23 April 2010 respectively. The data of Student's Interest Questionnaire Time 1 and Time 2 was then calculated.

Last but not least, my supervisor assessed my teaching practice by using the Teaching Practice Appraisal Form. My teaching practice was observed by my supervisor three times, that was, on 23 February 2010, 6 April 2010 and 22 April 2010 respectively.

METHODOLOGY

Target Participants

The target participants of my study were the pupils Year 5A at SK LK, Kuching. They were all together 19 pupils with eight boys and 11 girls. Table 2 illustrates the participants' Mathematics Topical Test 1 Result and Socio-economic Status.

Table 2.

Year 5A Mathematics Topical Test 1 Result and Socio-economic Status

	Mark (%)			Socio-economic Status		
	< 40	41 - 79	> 80	Low	Middle	High
Male	2 (10.5%)	4 (21.1%)	2 (10.5%)	0 (0%)	7 (36.8%)	1 (5.3%)
Female	1 (5.3%)	4 (21.1%)	6 (31.6%)	3 (15.8%)	6 (31.6%)	2 (10.5%)
Total	3 (15.8%)	8 (42.2%)	8 (42.2%)	3 (15.8%)	13 (68.4%)	3 (15.8%)

Data Collection

To answer my first research question, I collected data of test score based on three topical tests. The topics of the tests were "Whole Numbers", "Fractions" and "Decimals". Table 3 shows the topical test specification table for the three topical tests.

Table 3.

Topical Tests Specification Table

Topical Tests	Skill Levels				Total
	Knowledge	Understanding	Application	Analysis	
Topical Test 1	8 (26.7%)	14 (46.7%)	7 (23.3%)	1 (3.3%)	30 (100%)
Topical Test 2	7 (35%)	9 (45%)	3 (15%)	1 (5%)	20 (100%)
Topical Test 3	6 (30%)	10 (50%)	3 (15%)	1 (5%)	20 (100%)

The test scores of students were recorded and analysed using mean and standard deviation over time.

To answer my second research question, I collected the data of students' interest in learning Mathematics by using Student's Interest Questionnaire. There are four items in the questionnaire as shown in Table 1. Pupils' interest was measured using a four-point Likert scale ranging from 1 to 4, which indicates "strongly disagree" to "strongly agree". They had to answer the questionnaire by choosing the degree of agreement to the

statement. Again, the data was analysed using mean and standard deviation over time.

To answer my third research question, I collected data on my teaching practice performance by using the Teaching Practice Appraisal Form which was assessed by my supervisor. Eight aspects of teaching performance in this appraisal instrument, which consists of set induction, teaching steps, classroom management, communication, quality of learning, closure, achievement of learning outcome and application of moral values were assessed. Rating is based on a four-point Likert-type scale ranging from 1 (very weak) to 5 (excellent). The data was analysed by comparing the mean and standard deviation of ratings over time.

RESULTS AND FINDINGS

Effect of Cooperative Learning on Pupils' Learning in Mathematics

The test score of pupils was analyzed using mean and standard deviation over time. The maximum score for the test was set at 100 percent (%). Figure 1 shows the comparison of means between Topical Test 1, 2 and 3 while Figure 2 displays the comparison of standard deviations between Topical Test 1, 2 and 3.

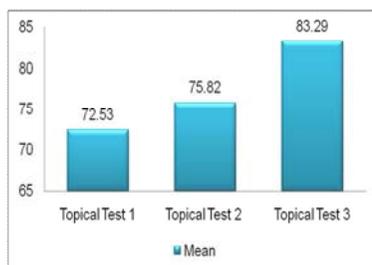


Figure 1. Comparison of Means between Topical Test 1, 2 & 3.

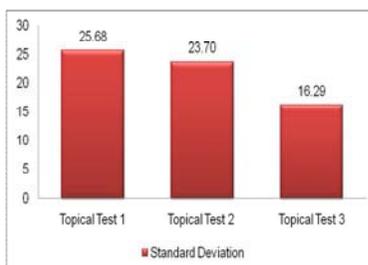


Figure 2. Comparison of Standard Deviations between Topical Test 1, 2, 3.

Figure 1 shows the mean score has increased from 72.53 (Topical Test 1) to 83.29 (Topical Test 3). In other words, the mean of test has increased by 10.76 marks from Topical Test 1 to Test 3. The increase in mean indicated that the performances of pupils have increased over time. Effandi (2003) also found

that cooperative group instruction showed significantly better results in Mathematics achievement and problem solving skills.

Based on Figure 2, the standard deviation of test scores decreased from 25.68 (Topical Test 1) to 16.29 (Topical Test 3). This shows that the gap of pupils' performances has narrowed. Again, this indicates that cooperative learning not only helped to promote pupils' learning, but also decreased the differences in performance between individuals.

Effect of Cooperative Learning on Pupils' Interest in Learning Mathematics

The data of pupils' interest was analyzed using mean and standard deviation over time. Table 4 illustrates the means and standard deviations by item for Questionnaire Time 1 and Time 2.

Table 4.

Means and Standard Deviations by Item for Questionnaire Time 1 and Time 2

Items	Questionnaire Time 1		Questionnaire Time 2	
	Mean	Standard Deviation	Mean	Standard Deviation
1. I like to learn Mathematics.	3.71	0.59	3.71	0.47
2. I like to do Mathematics exercises.	2.59	0.87	3.21	0.97
3. I love to attend Mathematics class.	3.59	0.51	3.79	0.43
4. Mathematics is interesting.	3.76	0.44	3.86	0.36
Total	13.65	2.41	14.57	2.23

Table 4 shows that the mean of Item 1 was maintained at 3.71 while the means for Item 2, Item 3 and Item 4 have increased over time. This indicates that pupils' interest in learning Mathematics has been enhanced. On the other hand, the standard deviations for Item 1, Item 3 and Item 4 decreased from Questionnaire Time 1 to Time 2 with the minimum standard deviation of 0.08.

However, the standard deviation for Item 2 has increased from 0.87 (Time 1) to 0.97 (Time 2). The increase of mean and standard deviation shows that the gap of interest between pupils in doing Mathematics exercises is wider, although the pupils' rating towards Item 2 has increased. It is possible that there were some pupils who like to do exercises set by me while some pupils like to do the exercises found in textbook. On the day I

administered Questionnaire Time 2 to the pupils, I asked the pupils to do the exercise set by me. Hence, the pupils who liked to do the exercise set by me rated high for Item 2 and vice versa.

Slavin (1991) stated that the nature of the cooperative learning activities can stimulate and sustain students' interest in learning since it encourages positive attitudes toward learning (as cited in Lang & Evens, 2006). Since there is an increase in mean and decrease in standard deviation for the items in the questionnaire, I would like to conclude that cooperative learning has slightly improved pupils' interest in learning and narrowed the gap of interest among the pupils.

Effect of Doing Action Research on My Teaching Practice Performance

The rating scale for Teaching Practice Appraisal Form ranged from 1 (very weak) to 5 (excellent). Table 5 displays the results of the three teaching practice observations based on the eight aspects.

Table 5.
Supervisor's Rating of My Teaching Practice by Item for The Three Observations

No.	Items	Time 1	Time 2	Time 3
1.	Set Induction	4	5	5
2.	Lesson Development	5	5	5
3.	Classroom Management	4	4	5
4.	Communication	5	5	5
5.	Learning Quality	4	5	5
6.	Closure	4	5	5
7.	Achievement of Learning Outcome	5	5	5
8.	Application of Moral Value	4	4	4
Total Rating Score		35	38	39
Mean		4.38	4.75	4.88
Standard Deviation		0.52	0.46	0.35

From Table 5, it clearly shows that the scores for lesson development, communication and achievement of learning outcome were maintained at the rating of 5 while the score for application of moral value was maintained at the rating of 4. However, the rating for set induction, classroom management, learning quality and closure has increased from the rating of 4 to the rating of 5.

Moreover, the mean score of my teaching practice has increased from 4.38 (Observation Time 1) to 4.88 (Observation Time 3).

Besides, the standard deviation of my teaching practice has decreased from 0.52 (Observation Time 1) to 0.35 (Observation Time 2). Sparks and Simmons (1989) mentioned that action research enables educators to be encouraged and developed in terms of skills to become more reflective practitioners, more methodological problem solvers, and more thoughtful decision makers (as cited in Brown, 2002). Therefore, action research is suitable to be used by teachers who wish to improve their own teaching practices. The continuous increase of mean and decline of standard deviation were good signs to show that doing action research brought positive instead of negative effect to my teaching practice.

REFLECTION AND FURTHER ACTION

Reflection

First of all, I found the social skill of pupils has improved. During cooperative learning, pupils were given more chances to communicate with each other in discussing problems. Thus, the pupils who seldom talked in class before this would now take the initiative to talk and joke with their friends.

In addition, cooperative learning was contextually practical in the school context. It was found to be suitable in primary school. It could be integrated easily in class as group activity. By integrating the element of games and inter-group competition, pupils could learn, work and play together during the lesson.

Moreover, democratic value could be instilled in pupils' mind through cooperative learning. When formal cooperative groups were formed, the pupils were allowed to choose their own group members through sociometric analysis. This action gave them the idea of democracy and it also indicated that I was not autocratic in arranging everything for the pupils. Besides, I sought pupils' opinion whether they were happy with their group members. Freedom was given to them in deciding their group members and the group's name.

Furthermore, after doing this action research, I have different perception regarding the teaching profession. I realize that the responsibility of teachers is not limited only in delivering knowledge to the pupils and making sure that they obtain good grade in examination. Teachers also play an important role in

shaping the pupils socially, intellectually and emotionally. Pupils should be well-equipped with these skills before entering into the challenging world.

Lastly, I realize that there is no perfect and effective teaching strategy that suits all types of pupils. Every teaching strategy has its own strengths and weaknesses. Hence, I could not say that cooperative learning is the best teaching strategy while traditional teaching method should not be used anymore. It depends on different situations in different classes. Due to individual differences, teachers should be wise in choosing suitable teaching strategy for the pupils. Modification on teaching strategy according to situation and pupils is necessary too.

Further Action

For further action, I would survey the effect of cooperative learning in pupils' participation in learning Mathematics. According to Kagan (1994), equal participation is promoted through cooperative learning. Pupils are more positive about each other when they learn cooperatively compared to learning individually or competitively, regardless of differences in ability, ethnic background or handicap (Johnson & Johnson, 1994). The improvement of active participation would also increase motivation, learning, retention, and commitment of pupils. Therefore, I would collect data on pupils' participation in learning Mathematics by audio-taping the Mathematics lesson. Besides, I would prepare a checklist and ask other teachers to rate on pupils' participation for me.

Lastly, I would like to execute the cooperative learning approaches of "Showdown" and "Think Pair Share" in my next action research. The reason I choose these approaches is that individual thinking comes first before pair or group thinking. Hence, pupils would be independent in solving problem instead of waiting for other person's solution.

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USING COOPERATIVE LEARNING TO IMPROVE PRIMARY FOUR PUPILS' LEARNING, INTEREST AND PARTICIPATION IN MATHEMATICS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk menilai sejauhmanakah penggunaan pembelajaran koperatif menambah baik pembelajaran, minat dan penglibatan murid dalam Matematik. Responden dalam kajian ini terdiri daripada 42 orang murid Tahun 4. Data dikumpulkan melalui ujian-ujian topikal, soal selidik, temu bual, maklum balas murid terhadap pengajaran dan pemerhatian bilik darjah. Hasil analisis data mendapati bahawa keputusan ujian-ujian topikal menunjukkan pembelajaran koperatif mencatatkan pencapaian yang meningkatkan pembelajaran murid dalam Matematik. Soal selidik dan maklum balas murid menunjukkan peningkatan minat dalam Matematik. Temu bual yang dijalankan secara tidak formal dengan 3 orang murid yang dipilih juga menunjukkan pandangan yang positif terhadap penggunaan pembelajaran koperatif. Pemerhatian bilik darjah dan maklum balas murid menunjukkan peningkatan murid-murid melibatkan diri dalam aktiviti pengajaran dan pembelajaran. Keputusan kajian menunjukkan bahawa penggunaan pembelajaran koperatif dapat menambah baik pembelajaran, minat dan penglibatan murid dalam Matematik.

Kata kunci: Pembelajaran koperatif, pembelajaran, minat, penglibatan pengajaran pembelajaran Matematik

ABSTRACT

The purpose of this study was to determine the effect of cooperative learning in improving pupils' learning, interest and participation in Mathematics. The respondents consisted of 42 Primary Four pupils. The

data for this study was collected using topical tests, questionnaire, interview, pupils' feedback questionnaire on lessons and classroom observation. The results of topical tests showed that using cooperative learning can improve pupils' learning in Mathematics. The results of questionnaires and pupils' feedback questionnaire showed the pupils' interest in Mathematics had increased. Interviews carried out informally with 3 selected pupils had shown positive opinions on using cooperative learning. Classroom observation and pupils' feedback questionnaire indicated the increase of pupils' participation in teaching and learning activities. The results of this study showed that cooperative learning can improve pupils' learning, interest and participation in Mathematics.

Keywords: Cooperative learning, learning, interest, participation in Mathematics teaching and learning

INTRODUCTION

Context of the Study

I am a trainee teacher from Institut Pendidikan Guru (IPG) kampus Batu Lintang, enrolled in the *Ijazah Sarjana Muda Perguruan* (PISMP) programme, majoring in Mathematics. This study was carried out in a primary school in Kuching. The school is co-education and multi-ethnic. I had been given the opportunity to teach the 4B class, which has 42 mixed-ability pupils in the class.

I carried out this action research because of my previous experience with the problem of getting pupils to learn in groups in improving their interest, participation in teaching and learning activities as well as learning in Mathematics. During the previous practicum at one of the primary schools in Kuching, I had taught Primary 5 Mathematics. I confronted problems such as pupils showed less interest in Mathematics, they seldom took part in my teaching and learning activities, and their Mathematics' performance was just moderate. These problems still occurred in the class that I was assigned to teach during the final practicum.

These constant variables of pupils' learning, interest and participation are interrelated. Pupils' learning is related to the results of Mathematics achievement. When pupils take part in the activity, they will enjoy completing the task. While completing the task, the talented pupils will guide the weaker pupils in completing the task. In Biott's study (as cited in Croll & Hastings, 1996, p. 46), he argues that the stigma of failure, particularly for slow learning pupils, can be reduced by working cooperatively together. This is because the talented pupils can use their own language to teach the weaker pupils to improve their understanding. Nonetheless, during the second practicum experience, it did not turn out to be a positive way of learning in my Mathematics lessons.

Focus of the Study

In this study, I used cooperative learning strategy to improve pupils' interest, participation, and their learning in Mathematics. Slavin (1995) states that cooperative learning refers to a variety of teaching methods in which students work in small groups to help one another learn academic content. When pupils work in small groups, it involves all group members to participate and complete the task directly. Each group member has to play his or her own role. They need to help each other in order to complete the task given. The involvement of all group members in the activity can show the increment of pupils' participation in the lesson.

Table 1.
Pupils' Gender and Test Scores

Gender	Test Scores				Total
	≤ 40	41 – 60	61 – 80	≥ 81	
Male	5	9	5	2	21
Female	5	9	4	3	21
Total	10	18	9	5	42

As shown in Table 1, there were 21 male and 21 female pupils in the class. Those who scored less than 40 percent (%) are categorized as low achievers. Average achievers were those who scored between 41% and 80%. Those who scored more than 80% were categorized as high achievers. Among the male pupils, two of them were high achievers, 14 were average achievers and five were low achievers. Among the female pupils, three pupils were high achievers, 13 were average achievers

and five were low achievers. From this data, I concluded that most of them did not understand the basic concept and skills in Mathematics. Only a few pupils could master them.

I also gave each pupil a questionnaire before I implemented my action plan. This questionnaire was designed to obtain pupils' perception of learning mathematics. I found out that 85.37 % of the pupils like Mathematics, 31.71% felt that Mathematics is easy to learn and 26.83% were bored during Mathematics lesson.

The data from the initial survey I had collected showed that some of them had low understanding in Mathematics and had little interest in Mathematics. Besides, the pupils' participation in the class was quite low. These problems needed to be solved and thus alternative method has to be utilized in order to enable the pupils to enjoy their learning in class.

Objectives of the Study

The objectives of this study were:

- to improve pupils' learning in my Mathematics class;
- to stimulate and sustain pupils' interest in Mathematics; and
- to increase pupils' participation in my Mathematics class.

Research Questions

The research questions in this study were:

- Can the use of cooperative learning improve pupils' learning in my Mathematics class?
- Can pupils' interest in learning Mathematics be improved through cooperative learning strategy?
- Can pupils' participation in my Mathematics class be increased through cooperative learning strategy?

THE ACTION PLAN

The steps that I incorporated were as follow.

- (i) Group the pupils into heterogeneous groups of 6. The heterogeneous groups are made up of high, average, and low achievers, both sexes, and of different ethnic groups.
- (ii) Emphasize the important terms of Mathematics in every lesson.
- (iii) Carry out the group activity by using cooperative learning strategy after the explanation and demonstration aspect of

teaching are given.

- (iv) Obtain regular feedback from the pupils by using a short questionnaire after each group activity is carried out.
- (v) Improve or revise the strategy to ensure that the cooperative learning strategy is useful and can help the pupils to increase their participation, interest, and improve their performance in Mathematics.

“Show Down” strategy was chosen to be carried out in my class because of its suitability. This strategy involves all pupils to complete the task in groups in which each group is presented with a mathematical problem. Each member of the group is then required to find the solution individually. Next, all members in each group are requested to present their solutions. The group members need to discuss among themselves to decide on the best and the most correct solution. I called out to each group to present the solution to the class. This strategy can increase pupils’ learning, interest and participation in Mathematics. When they cooperate and discuss the solution together, it shows the pupils’ participation in the lesson. When pupils’ participation increases, their interest increases as well. This is because the pupils enjoy and feel fun when completing the task given. Therefore, this action research is beneficial and can help pupils to improve their learning in Mathematics, increase pupils’ interest in Mathematics, and pupils’ participation during teaching and learning activities.

Cooperative Learning

According to Noor and Sazelli (2008), cooperative learning is a group instructional method that makes students learn and teach. Cooperative learning is a way of learning to share ideas or knowledge together. Pupils need to sit in heterogeneous groups of ability, gender, and race. Pupils in each group will need to cooperate with one another by helping or guiding each other in completing a certain task.

Cooperative learning differs from group work. Cooperative learning can be completed as a group work but group work cannot be completed as a cooperative learning. Woolfolk (2007) points out that group work is simply referring to several students working together – they may or may not be cooperating. Teacher divides the class into several groups without choosing the ability

or level of pupils. They are required to complete the task without the help of each other. So, the pupils may not learn any new knowledge or still maintain the same level. It cannot fulfill the concept of cooperative learning.

For cooperative learning, teacher needs to divide the class into several groups. Groups formed must be heterogeneous such that they include aspects of ability, genders, and race (Noor & Sazelli, 2008). Through these heterogeneous groups, they can share their knowledge together and ensure that all the pupils are participating in the cooperative learning activities. Therefore, the intelligent pupils can always help the poor performance pupils in order to complete the task together. As a result, it can help the poor achievement pupils to improve their learning in Mathematics.

In Johnson's study (as cited in Noraini, 2006, p. 32), cooperative learning is characterized as a group working to accomplish shared goals and it is used by teachers to maximize their learning. They share their problem and discuss the topics that they do not understand. Through cooperative learning, pupils can construct their own understanding of the concepts and it can maximize their learning.

Johnson and Johnson (1987) pointed out that the importance of cooperative learning goes beyond maximizing outcomes such as achievement, positive attitudes toward subject areas, and the ability to think critically. Therefore, it is believed that cooperative learning can increase pupils' participation, interest, and improves their performance in Mathematics.

Vezzuto (2005) stated that cooperative learning can be as simple as pairing up two students to discuss a piece of learning. It means that cooperative learning cannot be used on a pupil alone. Piaget discovered that cooperative learning is an important factor in development (Noraini, 2006). Cooperative learning, in which pupils are required to work in groups to accomplish shared goal has proven to be a useful instructional tool to promote improvement in achievement. High, average, and low achievers share equal benefits of cooperative learning. In addition, cooperative learning can help pupils to promote educational emphases like critical thinking, higher order thinking,

and problem solving. As a result, cooperative learning can help them to construct their own mathematics knowledge in the classroom. Indirectly, it can increase pupils' interest in learning Mathematics.

METHODOLOGY

The participants of this study consisted of 42 pupils from 4B class at School A. There were 21 boys and 21 girls in this class.

Table 2.

Research Questions, Constant Variables, Data Collection Methods, and Sources of Data

Research Questions	Constant Variables	Methods	Sources
Can the use of cooperative learning improve pupils' learning in my Mathematics class?	Pupils' learning	- Test (topical test)	Pupils
Can pupils' interests in learning Mathematics be improved through cooperative learning strategy?	Pupils' interest	- Questionnaire I - Interview - Feedback Questionnaire	Pupils
Can pupils' participation in my Mathematics class be increased through cooperative learning strategy?	Pupils' participation	-Classroom Observation	Mentor

Data Analysis and Interpretation

Both qualitative and quantitative methods were employed to analyze the data. Class observation and interview with pupils were the two main qualitative methods used to obtain qualitative data while quantitative data was acquired through quantitative methods of topical test, questionnaire, and pupils' feedback questionnaire.

Pupils' learning

Three topical tests were given to the pupils. Each test was conducted after I had taught the topic concerned. The marks for each topical test were recorded. The means and standard deviations of the marks were later calculated. Table 3 presents the means and standard deviations of the marks for the three topical tests.

Table 3.

Mean Score and Standard Deviation of the Three Topical Tests

	Test 1	Test 2	Test 3
Mean score	70.79	85.43	91.64
Standard deviation	16.68	10.57	9.34

As for Table 3, the increasing value of the means from 70.79 in Test 1 to 85.43 in Test 2 and 91.64 in Test 3 clearly indicated that the amount of pupils' learning has increased. Besides, there was a gradual decrease of the standard deviation from 16.68 in Test 1 to 10.57 in Test 2 and 9.34 in Test 3. This showed that the pupils' ability in terms of performance in the tests has become more consistent, which was a good indication of my success in narrowing the level of ability gap between the good and the poor pupils over time.

Pupils' Interest

The data on pupils' interest was collected by using Questionnaire I of pre and post-questionnaires, feedback questionnaire, as well as conducting interview with pupils. These methods were able to elicit feedback from the pupils on the lessons conducted. From the questionnaires analyzed, it was shown that many pupils developed a liking for Mathematics when "Show Down" strategy was employed in the lessons. Figure 1 illustrates the results of the questionnaires in the form of bar graphs.

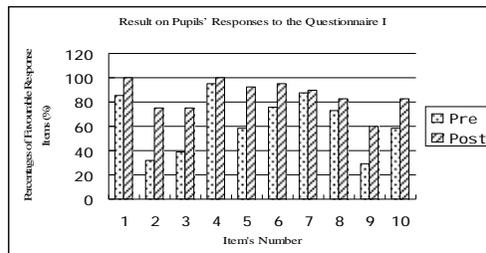


Figure 1. Result on pupils' responses to Questionnaire I.

According to Figure 1, the percentages of each item increased from pre-questionnaire to post-questionnaire. This showed that the pupils' interest in learning Mathematics has increased positively. All of the items recorded an increase between 2

percent (%) to 44%. Figure 1 shows clearly the percentages of favorable responses on pupils' interest in Mathematics for each item.

The data on pupils' interest was also obtained via pupils' feedback questionnaire which was distributed at the end of each lesson. This questionnaire consists of seven items related to pupils' reaction to the lesson. Items 1 to 4 are about pupils' interest towards the lesson while items 5 to 7 are about pupils' participation in the lesson.

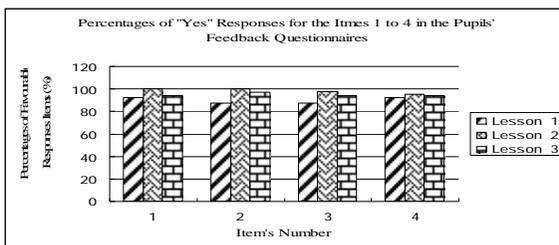


Figure 2. Percentages of "Yes" responses for Items 1 to 4 in the pupils' Feedback Questionnaires.

According to Figure 2, there is a same pattern of increasing percentages of "Yes" response for each item from Lesson 1 to Lesson 2. However, each item shows a decreasing percentage of "Yes" response from Lesson 2 to Lesson 3 but still at a higher level than for Lesson 1. Thus, Figure 2 shows clearly the result of the pupils' interest in Mathematics based on their feedback on the lessons.

Lastly, interviews were carried out informally with three selected pupils. The data elicited from the interview shows that the pupils enjoyed themselves and had fun during my practicum. They liked the group activities in Mathematics lessons, which were developed through cooperative learning strategy. The pupils were satisfied when they could complete the tasks given by the teacher. Based on the information that I had gathered through the interview, I can conclude that cooperative learning strategy can improve pupils' interest in Mathematics.

Pupils' participation

Observation checklist, mentor's comments and pupils' feedback questionnaire were utilized to gather data regarding pupils'

participation in Mathematics lessons. My mentor would observe my class each time I employed the “Show Down” strategy in the lessons.

Table 4.
 Mentor's Response to the Observation Checklist

Item	Aspects of cooperative learning	Content criteria	L1*	L2*	L3*	Frequency counts
2	Pupils' participation	Most pupils participate actively		✓	✓	2
		Some pupils participate actively	✓			1
		Pupils barely participate in the activity				0

Note: * L1: Lesson 1; L2: Lesson 2; L3: Lesson 3

Based on the mentor's response on Aspect 2 as shown in Table 4, there were only some pupils who participated in the activity in Lesson 1. Nonetheless, there were improvement on the pupils' participation in Lesson 2 and 3 in which most of the pupils participated in the activities conducted.

Based on the mentor's comments on the three lessons, it could be concluded that my mentor was satisfied with the cooperative learning activities conducted in my lessons. He or she agreed that cooperative learning strategy could indeed improve the pupils' participation in the teaching and learning activity after a period time towards the end of my practicum.

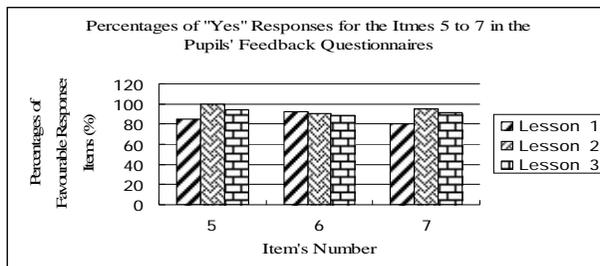


Figure 3. Percentages of “Yes” responses for Items 5 to 7 in the pupils' Feedback Questionnaires.

According to Figure 3, same pattern of increase in percentages of “Yes” response for items 5 to 7 from Lesson 1 to Lesson 2. However, each item shows a decrease in percentage of “Yes” response from Lesson 2 to Lesson 3. Thus, Figure 3 shows clearly the result of the pupils’ participation in the activity based on their feedback on the lessons.

Reflection on the Findings

The data of pupils’ learning were collected by using the marks of topical tests. Mean scores and standard deviations of the tests were used to measure the pupils’ performance in Mathematics. The mean scores showed promising increase for the three tests while the standard deviations decreased. These proved that the pupils’ performance had increased after cooperative learning was incorporated in the lessons. According to Paul (2004), group work enhances scholarly achievement. Pupils learn in groups could improve their performance by exchanging knowledge and learn together without choosing their friends.

After a thorough analysis on the data of the pupils’ interest in learning Mathematics, it can be concluded that the pupils like to learn Mathematics by using cooperative learning strategy. They liked me to employ this strategy in Mathematics lessons. At the beginning, some of them were bored during the lessons until the extent of disliking Mathematics. Few of the lessons had group activities, but the tasks given were quite easy and not challenging. However, when I carried out the cooperative learning strategy by using “Show Down” technique, they felt excited with the tasks given. This was because the tasks were challenging and needed cooperation with the group members.

The percentage of “Yes” response for each item in the pupils’ feedback questionnaires increased from Lesson 1 to Lesson 2 because of the cooperative learning strategy that was incorporated in the group activities instead of carrying out group activities without cooperative learning strategy. Pupils enjoyed and had fun while completing the task. Nonetheless, there was a decrease in the percentage of “Yes” response for each item in Lesson 3 because the class attendance was not full as there were 34 pupils only.

Besides, cooperative learning is successful in increasing pupils' interest in learning Mathematics. The triangulation of data, which was made up of questionnaires, interviews with pupils, and pupils' feedback on lessons showed the result of increasing pupils' interest in Mathematics.

Throughout the three-month practicum, I discovered that the pupils' participation in the group activities had also increased. Classroom observation was a good method to obtain the result of pupils' participation. As for my mentor, he or she observed my group activities by using observation checklist and comments. My mentor agreed that cooperative learning could increase the pupils' participation in the activities. This was because every group members got to play their own role in order to complete the task given. Nevertheless, my mentor commented that I should improve on my class time management as there was insufficient of time to carry out group activity using the "Show Down" technique. She suggested that I prepared all the materials properly before starting the activity. But it was only by using the "Show Down" technique that I could finally make all the pupils to participate in my teaching and learning activity.

The feedback questionnaire regarding the pupils' participation also showed that all the pupils were involved in the teaching and learning activities. The pupils did not take part in the teaching and learning activities at the beginning of the practicum because the task in the group activity could be completed alone. But when I used cooperative learning strategy in the lessons, it aroused the pupils' to participate actively in the activity. They liked to complete the task and shared their ideas together. The feedback questionnaire shows the improvement of pupils' participation in Mathematics lesson. This proves that cooperative learning is effective and successful in improving pupils' participation in teaching and learning activities. The triangulation of the data was made up of classroom observation and pupils' feedback questionnaire in order to show the result of the increment of the pupils' participation.

To conclude based on the data collected and thorough analysis of the data, it is undeniable that pupils' learning, interest, and participation in Mathematics can be successfully improved, which will then lead to the improvement of their achievement in

the subject. Cooperative learning is indeed an efficient teaching and learning strategy to be utilised in the lessons.

REFLECTION

In this study, I was contented because the cooperative learning strategy had answered my research questions. I had learnt that “Show Down” strategy is able to improve pupils’ learning, interest, and participation in Mathematics. Pupils showed their interests and participated actively in the group activities when “Show Down” strategy was employed in the lessons.

The “Show Down” strategy can really improve the pupils’ learning, interest, and participation in Mathematics. Through this activity, the better pupils can guide the weaker pupils to find the correct solution. Indirectly, the weaker ones can learn new knowledge and construct their own understanding through the mistakes that they have made. Besides, this activity can also create a climate of team spirit in the class, “I win if the team wins” attitude. Each member of a team is responsible not only for learning what is taught but also for helping his teammates learn, thus creating an atmosphere of achievement. In conclusion, it can definitely improve the pupils’ learning in Mathematics.

Next, pupils can also learnt universal values like justice and fairness through the cooperative learning activities. These moral values can help the pupils to develop positive attitudes towards educators and classmates. In addition, it will encourage pupils to treat their group members equally and not to look down on the weaker pupils. Therefore, the aim of mathematics curriculum can be achieved by inculcating positive attitudes towards an appreciation of mathematics as an important and powerful tool in everyday life.

This action reseach has left positive implications in my professional practice. As a teacher, I have learned that one has to change the process of teaching and learning to adapt to the pupils’ level of academic through this action research. I, for instance have changed my teaching strategy by focusing more on pupils-centred activities than teacher-centred ones. Moreover, moral values like responsibility and commitment can also be inculcated through team work, self-assessment, peer assessment, and my personal learning experience. So, here

knowledge sharing is imparted to improve the quality of education. Therefore, this research helps me to think and reflect on my works while enhancing my professional practice as a teacher.

The findings of this study have some implications on the teaching and learning activities in schools as well. The findings suggested that the use of cooperative learning in the classroom can promote the development of positive attitude among the pupils in the class. Besides, it can be successfully practiced in all the primary and secondary schools in Malaysia. In addition, cooperative learning can also be applied in less interesting subjects such as English, History, and Geography. Cooperative learning is a type of pupil-centered learning. This classroom teaching method acknowledges pupil's voice as central to the learning experience for every learner. Thus, it is focused on the pupil's needs, abilities, interests, and learning styles with the teacher as a facilitator of learning. This can make a lesson becomes more interesting and fun. Furthermore, the needs of the National Education Philosophy can also be fulfilled.

This study is useful and beneficial to the school teachers in general as it can help the teachers to improve pupils' learning, interest, and participation in the classroom. The three research questions are related to each other. If the pupils are interested in a subject, they will participate in the teaching and learning activity such as answering the teacher's questions, providing some constructive ideas, and also guiding the slower pupils to complete their tasks. When they are participating actively in the teaching and learning activity, they learn and construct their own understanding indirectly at that time. As a result, it can improve their achievements in the subject relevantly.

This study is also very helpful to the school teachers who are facing the same problems in teaching Mathematics. The purpose of this research is to investigate the effectiveness of a teaching pedagogy – the cooperative learning strategy. Teachers can study this teaching approach in my action research as a reference and find the most suitable teaching pedagogy to develop pupils' Mathematics' concepts in their classroom easily. Besides, this study has discussed a lot of problems that a teacher will face when practicing cooperative learning strategy in

their classroom. I believe that this study can help the teachers to become more confident when teaching their pupils using the cooperative learning strategy in the classroom. Therefore, this study can serve as a guideline to the teachers when utilizing the cooperative learning strategy in the class.

In this study, it also helps me to build up my confidence as I have believed that the cooperative learning strategy can improve pupils' learning, interest, and participation in Mathematics. The result of this study has proven that the cooperative learning strategy can improve pupils' learning, interest, and participation in Mathematics. Not only that, I have realized that using different types of group activity will implicate different effects on the pupils' learning, interest, and participation in Mathematics.

However, there are some weaknesses in my research too. When conducting group activity via the "Show Down" strategy, I could not manage the classroom instruction well. This would give a negative impact of the strategy on the pupils. This situation had occurred in my third practicum when I first introduced the "Show Down" strategy in my class. The pupils were confused and did not carry out the activity based on the instruction given to complete the task. After experiencing this first-hand, now I strongly agree that classroom instruction is a very important factor in determining the success of a cooperative learning activity to meet its learning purpose.

Time management is another weakness found in my study. I was short of time to carry out the "Show Down" strategy in my group activity. More often than not, I failed to execute my lesson plan on time; for example, all the groups actually needed to solve 5 questions but only 4 questions were managed to be answered. For the purpose of this study, I estimated around 5 minutes for them to solve one question. But still it was insufficient for them to solve the question within the limit time. The pupils seemed to need longer time to find the solution. So I always needed to wait and ensure all the pupils had found the solution before I asked them to show their answer. As a result, we spent quite a lot of time on one question until we were lacking time to discuss all the questions that I had planned.

For my next cycle of action, I will use other types of cooperative learning strategy to prove that cooperative learning strategy can improve pupils' learning, interest, and participation in Mathematics and also improve my weaknesses in this study. I plan to employ "Numbered Head Together" strategy as my next cooperative learning strategy in my future action research. This strategy promotes discussion and both individual and groups accountability.

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THE USE OF COOPERATIVE LEARNING METHOD IN TEACHING PRIMARY TWO MATHEMATICS

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ABSTRAK

Penyelidikan tindakan ini dijalankan bertujuan untuk menerapkan pembelajaran koperatif dalam proses pengajaran dan pembelajaran Matematik. Saya perlu meninjau sejauhmanakah pembelajaran koperatif dapat membantu dalam meningkatkan minat serta pembelajaran murid-murid dalam Matematik. Saya juga meneroka kesan penyelidikan tindakan terhadap pelaksanaan amalan mengajar saya. Responden dalam kajian ini terdiri daripada 20 orang murid Tahun 2M, SK LK. Data dikumpulkan melalui soal selidik, ujian pra dan ujian pasca, serta borang amalan mengajar. Hasil analisis data mendapati pembelajaran koperatif berkesan dalam meningkatkan minat murid-murid dalam pembelajaran Matematik. Selain itu, pemerhatian oleh pensyarah mendapati amalan mengajar saya juga menunjukkan peningkatan dari segi min sebanyak 0.8.

Kata kunci: Pembelajaran koperatif, "Mix and Match", "Numbered Heads Together", min, sisihan piawai

ABSTRACT

The purpose of the study was to incorporate cooperative learning into my Mathematics teaching and learning process. I needed to find out how far cooperative learning help in improving pupils' learning and interest in learning Mathematics. At the same time, I also wanted to investigate the effect of carrying out action research on my teaching practice performance. The respondents consisted of 20 pupils from Year 2M, SK LK. The data for this study was collected using questionnaire, pre-test and post-test, and teaching practice appraisal form. The results of the study showed that the use of cooperative learning was able to improve the pupils' learning in my

Mathematics class. Besides, my lecturer's observation on my teaching practice performance also showed some improvement with the increased of mean by 0.8.

Keywords: Cooperative learning, "Mix and Match", "Numbered Heads Together", mean, standard deviation

INTRODUCTION

Context

During my first practicum at SK SKH and second practicum at SK TU, I noticed that all the pupils from both schools were not very much exposed to group activity. When given the group activity, I found that the pupils with good results would dominate the activity. The smart pupils always completed all the tasks alone while the other group members just sat in their group without giving any contribution to the group. At the same time, I also noticed several smart pupils who were very competitive in class. Pupils perceived that they could obtain their goals if and only if the other pupils in the class failed to obtain their goals (Johnson & Johnson, 1994). Therefore, the pupils would compete among themselves to be the winner of class.

Besides, I also found that many of the pupils were unable to concentrate and pay attention during the teaching and learning process. They would start to talk with their friends or disturb the others from paying attention. Some of them seated at the back of the class even day dreamed or did their own work. I believed that if the pupils do not have any interest in learning Mathematics, they would be unlikely to pay attention or participate actively in the lesson. This would cause the pupils to be unable to perform well in any given test or assessment.

Focus

For my study, I decided to incorporate cooperative learning during my teaching and learning process in Mathematics. I tried to improve the pupils' learning and interest in learning Mathematics. Besides, I also wanted to find out the effect of carrying out action research on my teaching performance. For the third practicum, I taught Year 2 at SK LK, which comprised of 26 pupils. Since there were six remedial pupils among them, I only involved 20 pupils of the class. This was because the remedial pupils would attend remedial class during my lessons.

During the implementation of cooperative learning in my teaching and learning practice of Year 2 class, I found that the main challenge for this study was that the Year 2 pupils were not exposed to cooperative learning. I chose the techniques that would suit the pupils' abilities and learning development. I found out that there are a lot of techniques in cooperative learning, such as, "Think-Pair-Share", "Mix and Match", "Four Corners", "Team Pair Solo", "Jigsaw", and "Numbered Heads Together". So, I decided to use "Mix and Match" and "Numbered Heads Together" as my teaching and learning techniques to enable me to carry out my research.

Research Objectives

The objectives of the study were:

- to improve pupils' interest in Mathematics class,
- to improve pupils' learning in Mathematics class, and
- to determine how far the action research will affect my teaching practice performance.

Research Questions

The research questions of the study were:

- Can the use of cooperative learning improve the pupils' interest in my Mathematics class?
- Can the use of cooperative learning improve the pupils' learning in my Mathematics class?
- What is the effect of carry out action research on my teaching practice performance?

ACTION PLAN

To begin my action research, I observed the surrounding and learning environment of the school as well as the classroom so that I would be familiar with the school and classroom. I also gathered some information about the pupils' background, name, and Mathematics academic results. These would help me to better understand my pupils.

According to Johnson and Johnson (1994), placing pupils in groups and telling them to work together does not in itself result in cooperative efforts. To structure lessons so pupils do in fact work cooperatively with each other requires an understanding of the components that make cooperation work (p 21).

Since my topic of research was on cooperative learning, I tried to carry out group activity using cooperative learning once or two times in a week, depending on the learning outcomes of my lesson. Since there are so many techniques in cooperative learning, I only chose two of them to be practiced in my class. "Mix and Match" and "Numbered Heads Together" are two of these techniques that I found easy to handle and suitable with the standard of my pupils.

According to Kagan (1996), pupils mix and then find partners with the matching card for the "Mix and Match" approach. So, the technique of "Mix and Match" is a set of cards created with "matching" information or item. Since there were 20 pupils in my class, I prepared 10 cards with concepts and 10 other cards with examples that match the 10 concepts. So, each pupil was given one card. When I called out "Mix", the pupils began to walk around the classroom, trading cards continuously until I called out "Match". When the word "Match" was called out, the pupils looked at the card in their hands, turned the cards to face their peers, and began walking around the classroom looking for the match to their cards. Once the pupils find their match, they stayed with them side by side, holding their cards for all to see (Kagan, n.d.).

For the technique of "Numbered Heads Together", a team of four pupils was established. Since there were 20 pupils in my class, I divided the pupils into five groups according to the academic achievement, which I named "Apple", "Banana", "Lemon", "Orange", and "Papaya". Each member from every group was given number 1, 2, 3 and 4. Questions were posed to the groups. Then, the whole group worked together to answer the questions. They also needed to make sure that all members would verbally answer the question. When I called out a number, for example 2, each pupil with the number 2 would give the answer.

According to Vygotsky (1978), the zone of proximal development is the difference between what a student can do alone and what he/she can do with supportive collaboration or cooperative activities in group (as cited in Belbase, 1997). It means that all learning must take place in cooperative settings. I am of opinion that cooperative learning is able to offer a systematic, student-

centered approach to instruction without putting anyone into a pedagogical strait jacket.

METHODOLOGY

Target Group and Participants

The target of this study consisted of 20 pupils from Year 2M class at SK LK. There were 6 boys and 14 girls in this class. I obtained the pupils' Year 1 results from my mentor. I obtained only 19 pupils' results as one pupil was transferred to SK LK this year. The result was based on their final year examination and is shown in Table 1.

Table 1.

The Previous Academic Performance of Pupils, (n=19)

Achievement	Low	Average	High
No. of Pupils	5	7	7

Table 1 shows seven pupils were rated as high achievers, seven pupils as average pupils while the other five were considered as low achievers. They were considered as mixed ability pupils. Thus, as their teacher, I designed different types of reinforcement or learning assessment based on the pupils' abilities. Besides, I collected information regarding the occupation of the pupils' guardian from the attendance book. I divided the socio economic status (SES) of the pupils based on the guardians' occupation and is shown in Table 2.

Table 2.

The Socio Economic Status (SES) of Pupils, (n=20)

Level of SES	Low	Average	High
No. of Pupils	6	6	8

Table 2 shows that eight pupils were categorized in the high level of SES, six pupils in the average level of SES, and the other six pupils in the low level of SES. For the high level of SES, the occupation of the pupils' guardian comprised of businessmen, marketing executives, contractors, and engineers who have high salaries and better living environment. For the average level of SES, the occupation of the pupils' guardian consisted of teachers, officers, clerks and supervisors. For the low level of SES, the pupils' guardian consisted of shop helpers, laborers, free lancers or chefs with low salary.

Data Collection Method

There were three methods that I used for collecting data in this study. Questionnaire, pre-test and post-test, and classroom observation were used to obtain the necessary data as shown in Table 3.

Table 3.

Data, Method and Sources

Data	Method	Sources
Pupils' interest	Questionnaire	Pupils
Pupils' learning	Pre-test, Post-Test	Pupils
Teaching Practice Performance	Teaching practice appraisal (PR1)	Mentor Lectures

Questionnaire

Pupils were asked to answer four simple questions given in the questionnaire to assess the interest of pupils in learning Mathematics. The questions are "I like to learn Mathematics", "I like to do Mathematics exercises", "I love to attend Mathematics class" and "Mathematics is interesting." The pupils were required to circle the given opinion which consisted of "strongly agree", "agree", "disagree", and "strongly disagree".

Pre-test and Post Test

To assess the learning of the pupils, I had prepared a pre-test and post-test according to the topics in Year 2 Mathematics. The pre-test was used to measure the level of pupils' in learning Mathematics before the use of cooperative learning method in my Mathematics class. I used the pre-test as mid-term examination in order to follow the semester plan of the school. Furthermore, the post-test was used to measure the level of pupils' learning of Mathematics after the use of cooperative learning method based on my action plan. I used the topical test for my post-test in order to follow the syllabus.

Teaching Practice Appraisal Form (PR1)

Classroom observations were done while the Mathematics lessons were carried out by my mentor and lecturer using the teaching practice appraisal form or PR1. My mentor and lecturer assessed my teaching practice performance based on the given components. I only used component B, which is related to implementation, as one of my source of data.

RESULTS AND FINDINGS

Effect of Cooperative Learning on Pupils' Interest

Questionnaire was used to answer the first research question, which was about the use of cooperative learning to improve the pupils' interest in my Mathematics class. I had administered the questionnaire three times to get a valid and reliable data. Table 4 and Figure 1 show the analysis of the data collected.

Table 4.

The Means of items by Questionnaire

No.	Item	Mean of Questionnaire		
		Time 1	Time 2	Time 3
1	I like to learn Mathematics.	3.85	3.75	3.55
2	I like to do Mathematics exercises.	3.50	3.45	3.30
3	I love to attend Mathematics class.	3.05	3.25	3.20
4	Mathematics is interesting.	3.70	3.40	3.50
	Mean	3.53	3.46	3.39

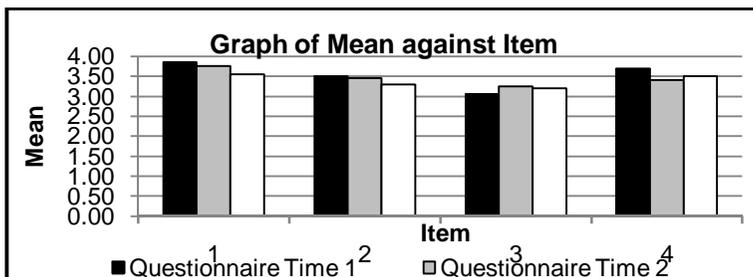


Figure 1. Comparison between means of questionnaire by item.

Table 4 and Figure 1 display the comparison of means by item for questionnaire Time 1, questionnaire Time 2, and questionnaire Time 3. The mean of the first item decreased from 3.85 to 3.55. The mean of the second item also decreased from 3.50 to 3.30. For item 3, the mean increased from 3.05 to 3.20. For item 4, the mean decreased from 3.70 to 3.50. The results in Figure 1 clearly indicated the interest of pupils in learning Mathematics slightly decreased.

As a conclusion, the results showed that the use of cooperative learning to improve the pupils' interest was not effective. Table 1 shows that the mean of the questionnaire slightly decreased from questionnaire Time 1 to questionnaire Time 3.

Effect of Cooperative Learning on Pupils' Learning

Secondly, I had collected data using pre-test and post-test to answer the second research question, which was about the use of cooperative learning to improve the pupils' learning in my Mathematics class.

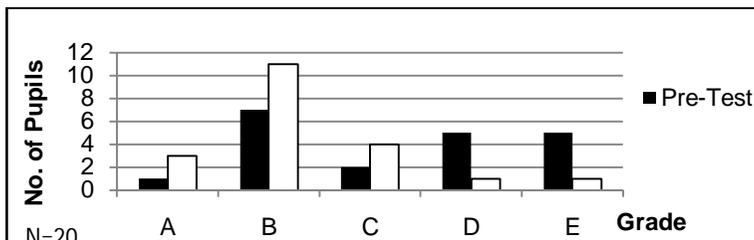


Figure 2. Comparison of grade among the pupils.

Figure 2 shows the comparison of grade between pre-test and post-test. The number of pupils for Grade A, B and C from pre-test to post-test increased whereas the number of pupils for Grade D and E decreased from pre-test to post-test.

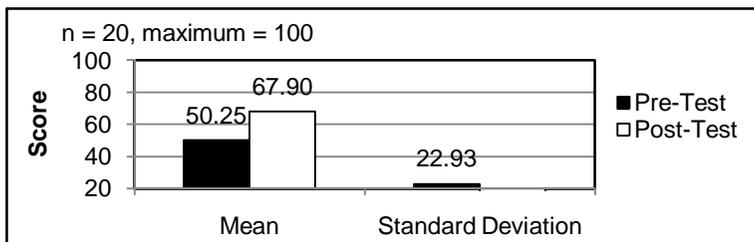


Figure 3. Comparison of mean and standard deviation (pre-test and post-test).

Figure 3 displays the comparison of means and standard deviation between pre-test and post-test. The mean increased from 52.60 marks for the pre-test to 67.90 marks for the post-test with a difference of 15.30 marks. Besides, the standard deviation decreased from 18.04 marks (pre-test) to 15.12 (post-test) with a difference of 2.92 marks. The results clearly indicated the improvement of pupils' learning during the use of cooperative learning in my teaching and learning process.

As a conclusion, the results showed that the use of cooperative learning to improve the pupils' learning was effective. Both

Figure 2 and Figure 3 illustrated that the pupils showed improvement in the post-test.

Effect of Action Research on My Teaching Practice Performance

I also collected data using the teaching practice appraisal form (PR1) to answer the third research question which was about the effect of carry out action research on my teaching practice performance. Observations were done by my mentor and lecturer according the given elements. There were seven aspects in the PR1 to be observed by the lecturer and mentor. Table 5 shows the analysis of the observations.

Table 5.

The Total Scores, Mean and Standard Deviation by Aspect

No. Aspect	Observation by lecturer		Observation by mentor	
	Pre	Post	Pre	Post
1 Set Induction	4	4	4	5
2 Teaching Development	4	5	4	5
3 Classroom management	3	4	3	4
4 Communication	4	5	4	4
5 Learning Quality	4	5	4	5
6 Closure	4	4	4	4
7 Achievement of learning outcome	5	4	4	4
8 Application of value	4	5	5	4
Total	32	36	32	35
Mean	4.00	4.50	4.00	4.38
Standard Deviation	0.53	0.53	0.53	0.52

Table 5 presents the total scores, means and standard deviations from the observations using PR1. The maximum score for each aspect is 5. The total scores given by my lecturer increased from 32 (pre-observation) to 36 (post-observation). The total scores given by my mentor also increased from 32 (pre-observation) to 35 (post-observation).

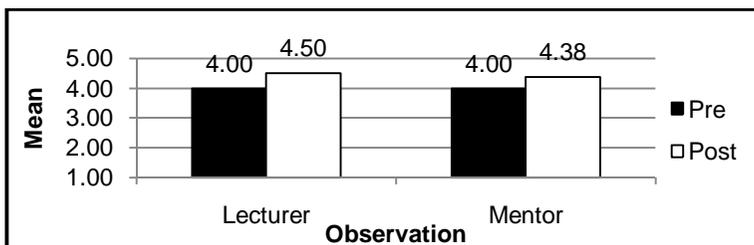


Figure 4. Comparison of means against observation.

Figure 4 displays the means of observation by my lecturer and mentor. For the observation by my lecturer, the mean increased from 4.00 (pre-observation) to 4.50 (post-observation). Besides, for the observation by my mentor, the mean increased from 4.00 (pre-observation) to 4.38 (post-observation). The results showed that the teaching practice performance improved slightly from the pre-observation to the post-observation.

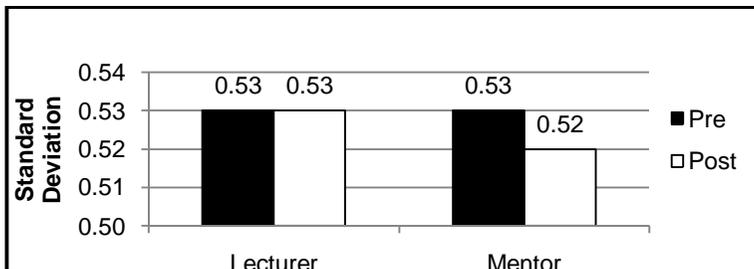


Figure 5. Comparison of standard deviations against observation between lecturer and mentor.

Figure 5 presents the standard deviations of observations by my lecturer and mentor. There was no difference in the standard deviation (0.53) of observation by lecturer. For the observation by my mentor, the standard deviation decreased from 0.53 (pre-observation) to 0.52 (post-observation). The results showed that the difference of score was valid and reliable when action research was carried out since the standard deviation was almost the same.

As a conclusion, the action research was able to improve my teaching practice performance since there was improvement of mean as shown in Table 5 and Figure 4.

REFLECTION AND FURTHER ACTION

Reflection on the Findings

The first research question for this action research was. "Can the use of cooperative learning improve the pupils' interest in my Mathematics class?" To answer the research question, I collected data using the same questionnaire three times at different period of time. The results showed that the pupils' interest decreased after cooperative learning was carried out a few times. The pupils only showed interest when cooperative

learning was firstly introduced. After carrying out the same method many times, the pupils became bored and refused to be involved in the cooperative learning activity.

Another reason for the failure of cooperative learning to improve my pupils' interest was the participants who were Year 2 pupils. The pupils at this stage are still very young and need physical, emotional, spiritual and social development. They are more selfish and unable to work with others. The application of cooperative learning which is more challenging for them caused them to lose interest in learning.

During the implementation of cooperative learning in my teaching and learning process, the pupils learned from each other. They got the chance to discuss and share knowledge with each other. According to Johnson and Johnson (1994), pupils expect to interact with other pupils, share ideas and materials, and hold each other accountable for their learning. The pupils learned and got support from their friends. So, the pupils were able to learn since they were involved actively during the cooperative learning activities. As a result, the learning of the pupils improved.

As for the improvement of my teaching practice performance, it was due to the process of gathering information from references, such as, journal, article and books. I was able to plan my teaching and learning process well and in an organized way to achieve my teaching and learning objectives. As a result, good and well planned lessons were produced that enabled me to improve on my teaching practice performance.

Further Action

For the next action research cycle, I planned to carry out the cooperative learning structures with Year 4 or 5 participants. I found it difficult to carry out cooperative learning among the young children especially among the Year 2 pupils. The pupils were unable to cooperate with each other since they preferred to complete the given task individually.

It was also difficult to find suitable cooperative learning structure for the pupils to practice as most of cooperative learning structures, such as, "Round Robin", "Brainstorming", "Jigsaw" and "Think-Pair-Share", need a lot of discussions among the group members and higher thinking skills. So, cooperative

learning was found to be more suitable to be practiced among Year 4 and 5 pupils.

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USE OF FINGER METHOD IN LEARNING MULTIPLICATION AMONG PRIMARY THREE PUPILS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk mencari satu kaedah efektif bagi menambah baik kemahiran mendarab murid-murid. Daripada kajian yang dijalankan, satu kaedah efektif yang dikenali sebagai "mendarab dengan kaedah jari" telah dikenal pasti. Dengan menjalankan penyelidikan tindakan ini, saya telah melaksanakan kaedah mendarab dengan menggunakan jari kepada murid-murid saya untuk mengenal pasti sama ada kaedah ini berkesan untuk murid-murid kelas saya. Saya telah menggunakan pelbagai cara untuk mengumpul data semasa saya menjalankan penyelidikan tindakan ini. Murid-murid yang menunjukkan penambahbaikan dalam keputusan mereka merumuskan keberkesanan kaedah saya. Saya juga memastikan mereka mempunyai minat tinggi dalam mempelajari Matematik dan justeru meningkatkan keberkesanan pengajaran saya dalam kelas.

Kata kunci: Kemahiran mendarab, mendarab dengan kaedah jari, keputusan murid, minat murid, keberkesanan pengajaran

ABSTRACT

The purpose of this study was to find an effective way to improve the pupils' multiplication skills. I found an effective way to teach multiplication to pupils in primary school. The method is known as finger method. By doing this research, I could implement the finger multiplication method to teach the pupils about multiplication. I implemented this finger multiplication method to teach them and see whether it was effective to help them master the multiplication skills. After teaching them the finger multiplication, they should be able to master the

basic multiplication skills. I have used various ways to collect data in this research. Pupils who obtained high marks and showed improvement implied that this finger multiplication was effective to them. I also ensured that this strategy increase my pupils' interest in learning Mathematics and improve the effectiveness of my teaching.

Keywords: Multiplication strategy, finger multiplication, pupils' performance, pupils' interest, teaching performance

INTRODUCTION

Context of the Study

I thoroughly enjoyed my first and second practicum experiences. For the first practicum, I taught at SK SJ in Kuching. I also had my second practicum at SK SL, Sri Aman. My love for working with children became stronger after these two sessions of practicum, through watching the students' progression in their learning and how important the role of a teacher is in a child's life as well as in their education. And through these practicum, I had identified my pupils weaknesses in learning multiplication.

"Learning the arithmetic facts in the first four grades can be pretty hard work for some students" (Hanlon, 2006). During my practicum in these two schools, I had experienced this problem when teaching my pupils multiplication in the class. Half of the pupils in Year 3 class could not even memorize the multiplication table. Besides, they also had a hard time when solving the multiplication questions. If the pupils are not taught properly, they will be unable to master the multiplication skill and will face a lot of problem in future when dealing with multiplication problems.

Pupils won't have interest in learning mathematics because they felt that mathematics were difficult and not fun. "This often leads to frustration, low self-esteem, lack of confidence and loss of interest in Mathematics. Something must be wrong and something must be done" (Leung & Yeung, n.d.). This is true because some of the pupils in my class who were not interested in my Mathematics class were very weak in mathematics. They won't pay attention in class and as a result, they failed the exam.

From the previous experiences in two different practicum schools, I clearly identified that most of the pupils were having problems in learning multiplication. Was it because the pupils were not comfortable with the methods used by the teacher? Was it too boring to memorize the multiplication table without any rhyme or actions? These were the questions that were in my mind and led me to do an action research by implementing the new method in learning multiplication skill. This method is called "Finger Multiplication".

Focus of Study

My third practicum from 1st February until 30th of April was at SK SJ. I taught Primary 3N Mathematics subject. Most of the pupils in 3N were good in their studies, but I encountered a problem whereby pupils in this class were quite poor in multiplication. They didn't face any problem when I taught them addition and subtraction. But when I taught multiplication, I found that they faced lot of problems in solving multiplication questions. When I asked them to recite the multiplication table, they could only recite the multiplication of 1, 2, 3, 4 and 5, whereas for the multiplication table of 6, 7, 8 and 9, they had difficulties in memorizing them. Only some of them could memorize all the multiplication table. I decided to focus my action research on "Finger Multiplication" method to improve Primary 3N pupils' multiplication skills, and thus enhanced their learning by using "Finger Multiplication" method.

Rational of Study

- By using finger method in teaching and learning multiplication, my pupils can show their improvement in multiplication skill and memorize the multiplication table.
- Finger method can be fun to pupils because pupils need to implement it by using their own fingers. They will also not be bored.

Research Questions

- Can finger multiplication method improve the pupils' mastery of multiplication table?
- Can finger multiplication method raise the pupils' interest in learning mathematics?

- Can finger multiplication method improve my teaching practice?

PROPOSED ACTION AND LITERATURE REVIEW

Action Plan

During the first week of practicum, I discussed with my mentor, Hajah SR and the Head of Mathematics Panitia, Madam SMP about my action research topic. I did my initial survey the following week. I also collected my pupils' background data from the class teacher. Besides that, I collected their previous examination marks. I also administered a pre-test to my 3N pupils to test their understanding on multiplication. After that, I chose 20 pupils who have problems and difficulties in solving the multiplication questions. The week after that, I analyzed the pre-test data in the form of tables and graphs. In the second last week of the practicum, I gave a post-test to test the pupils understanding and also to identify and analyze whether the finger method helped them in learning multiplication or not. I also analyzed the post-test data in the form of tables and graphs.

Rational for the Action Plan

Pre-test and post-test were the tools that I used to compare the result of my pupils before and after I implemented this finger method in learning multiplication. This was to find out whether finger multiplication helped pupils in mastering multiplication time table. I also video recorded the process of teaching and learning using finger method. My mentor and lecturer were also asked to give rating on my teaching. This rating scale was used to analyze whether finger multiplication help in improving my teaching practice.

Review of Literature

I located materials for my literature review about using finger method in teaching mathematics (multiplication) that had been used in classroom settings. I was able to read many articles related to my research topic. "Teaching does not occur until learning does" (Patterson, 1999). How could we say that we have taught children the multiplication table until we are sure that they have really learnt it? In Hong Kong, school children were taught the multiplication table in Primary Two. However, the

majority of students in Primary Three, Four or even Five would still make silly mistakes in simple multiplication as they have trouble with the multiplication table. This often leads to frustration, low self-esteem, lack of confidence and loss of interest in Mathematics. Something must be wrong and something must be done. Why do children find it so difficult to learn the multiplication table well while they are able to learn computer games fast? Are they fearful of the multiplication table? Is it because of the boring traditional method of memorizing the table column by column? Can teachers make the learning of the multiplication table more interesting and easier?

From the materials obtained, it was said that counting on the fingers is not the same as multiplying, but Leonardo of Pisa wrote, "multiplication with the fingers must be practiced constantly, so that the mind like the hands becomes more adept at adding and multiplying various numbers (in Menninger, n.d., p 218). Furthermore,

One of great things about this finger method is that the same basic method can be used without the fingers. Using the fingers is just a way to start learning it. As soon as a child can do it, you can immediately wean them off the finger method. Remember, manipulative are for learning, not for using forever. (Foley, 2008)

This method is good to be used to those beginners in learning multiplication, or to those who are very weak in memorizing multiplication facts. They can use their fingers to multiply if they are taught to do so, instead of memorizing the multiplication facts, which is very difficult for them.

METHODOLOGY

Target Group and Participants

The participants of this study consisted of 20 pupils from 3N class at SK SJ. There were 8 boys and 12 girls in this class. A pre-test on multiplication was used to find the pupils' level of understanding in this study. The pre-test contained a total of 45 questions. I had design the test based on Time Table 1 until Time Table 9. Upon analysis of the data, I found that 20 of the pupils were very weak in multiplication. I chose them as my

target group in this study so that I could help them in memorizing the multiplication table through finger method.

Data Collection

Table 1 shows the data collection method that I used in this research.

Table 1.
Data collection method

Research Question	Data	Method	Source
Can finger multiplication method improve the pupils' mastery of multiplication tables?	Test Scores	<ul style="list-style-type: none">• Pre-Test• Post-Test	<ul style="list-style-type: none">• Pupils
Can finger multiplication method raise the pupils' interest in learning mathematics?	Pupils' interest	<ul style="list-style-type: none">• Pre - Likert scale• Post - Likert scale	<ul style="list-style-type: none">• Pupils
Can finger multiplication method improve my teaching practice?	Rating score	<ul style="list-style-type: none">• Rating (Observation)	<ul style="list-style-type: none">• Mentor• Lecturer

To answer my first research question, that was, "Can finger multiplication method improve pupils' mastery of multiplication table?", the data I collected was test scores from Pre and Post test. The pupils were the source of data for this method. For the second question, that was, "Can finger multiplication method raise the pupils' interest in learning mathematics?", questionnaires on my pupils' interests (scores based on Likert scale) were used before and after the implementation of the finger multiplication method. For the third research question, that was, "Can finger multiplication method improve my teaching practice?", rating scores from my mentor and lecturer were collected.

Data Analysis and Interpretation

Pupils' performances

To analyze my pupils' performances, I had administered a Pre-test to them before I implemented the finger multiplication in my Mathematics lesson. After that, I administered a Post-test after I implemented the finger multiplication method. I used the same questions for my Pre and Post-test so that I could compare the

results before and after I have implemented finger multiplication in my Mathematics lesson. After analyzing the data, I presented the data in the form of graph such as shown in Figure 1.

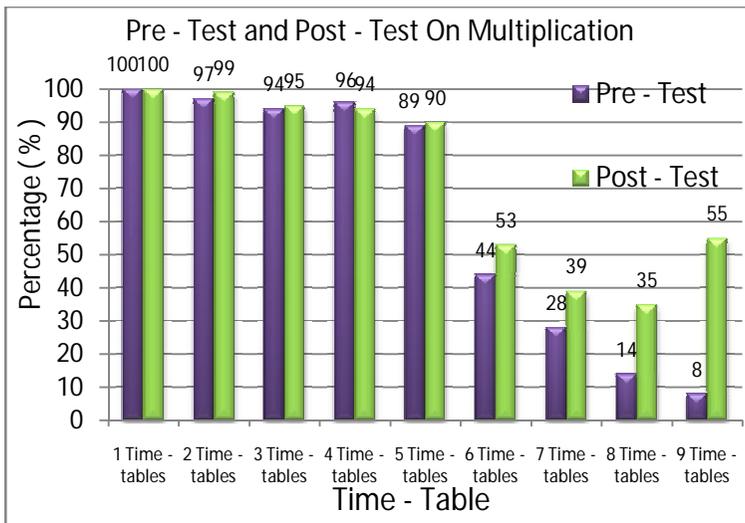


Figure 1. Pre-test and Post-test on multiplication.

The graph shows that the pupils have shown improvement in all the multiplication table except multiplication table of 4. The pupils could score well in multiplication table of 1, 2, 3, 4 and 5 because these multiplication tables were easier if compared to multiplication tables of 6, 7, 8 and 9. All the results showed an improvement after I implemented the finger method. Thus, the pupils' performances have improved.

Pupils' Interests

To analyze the pupils' interests in learning multiplication and mathematics, I had used questionnaires which were administered before and after the implementation of figure method in class. The pupils' interests were measured by calculating the mean. There were eight items in the questionnaire. I then presented the analyzed data in the form of graph as shown in Figure 2.

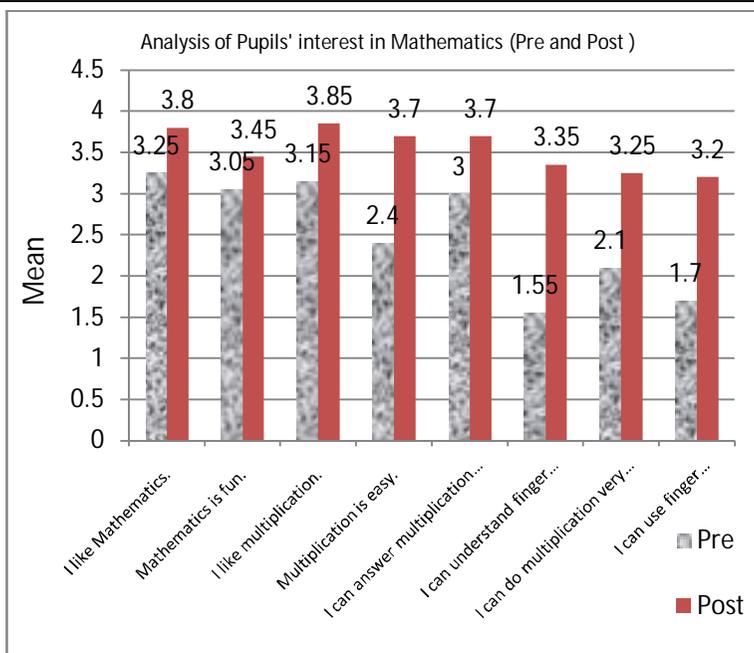


Figure 2. Pupils' interests in Mathematics.

The graph shows improvement in all the eight items and conclusion could be made that the finger multiplication method increased the pupils' interests in Mathematics.

Teaching Performance

To measure my performance in my own teaching practice, I had used the PR1 forms based on rating scores used by my lecturer and mentor. The maximum rating score is 40. I then interpreted the data and presented them in the form of graph such as shown in Figure 3.

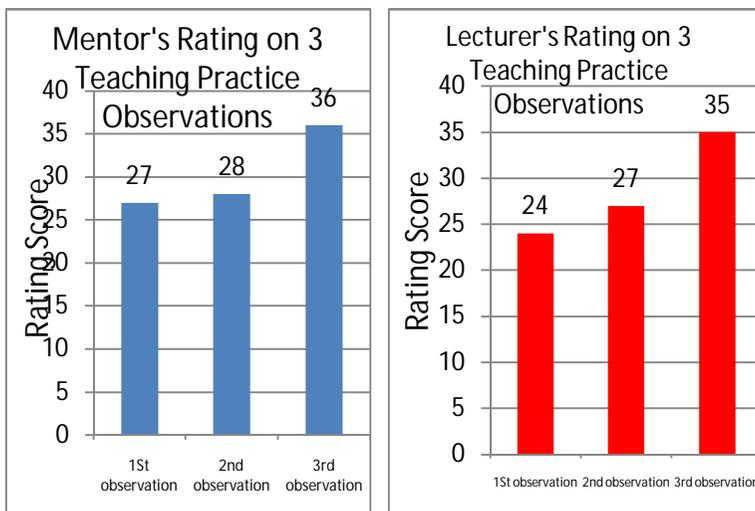


Figure 3. Mentor's and lecturer's rating on teaching practice.

The graphs show that my teaching practice scores that were rated by my mentor and lecturer increased consistently. This showed that finger multiplication helped me in my teaching practices.

REFLECTION AND FUTURE ACTION

Reflection

The first aspect of the reflection is technical efficiency which refers to the effect of action in solving the problem/issue. After I had implemented this finger method in multiplication, I found that it was very effective. Most of the pupils showed improvement in solving the multiplication test. Besides, there was also improvement shown in my teaching practice. So I could say that this method was very effective for my pupils and I.

Besides that, I also found that this method is practical enough. This method didn't take a lot of time to implement it in my classroom. I only needed 5 to 10 minutes before I start my lesson to teach my pupils this method. It didn't waste my time but helped me save a lot of time and made my lessons smooth. As for the cost involved, this method didn't involve any cost. The

pupils just need to use their fingers to do the finger multiplication. This method also helped to achieve the lesson objectives whereby the pupils were assisted to understand the concept of multiplication and memorize the multiplication table.

The second aspect is contextual practicality which refers to the practicality and suitability of the action in the school context and related problems. After implementing this action research, I found that finger method is very suitable for the context of the school. I found that most of the pupils in this school cannot memorize the multiplication table. By implementing this method in school, the pupils could memorize the multiplication table and furthermore solved the multiplication questions easily. As for the pupils, this method helped my pupils solve the multiplication questions and made them have more interests in learning mathematics. By implementing this method, I improved my teaching practice in class other than helping my pupils used effective method in learning mathematics.

The last aspect is critical consideration which refers to questions of justice, fairness and correctness in terms of universal values that the school seeks to impart to pupils. I found that the method that I used could achieve the goal of the National Philosophy of Malaysian Education. By practicing this finger method, the pupils used their own body parts, that is, their fingers to practice and memorize better the multiplication table. Besides that, they have a clear mind that multiplication is easy and put more effort in learning mathematics. By practicing this method in class, the pupils also learn universal values, such as, being more confident and independent in solving the multiplication problems. Besides that, they also learnt how to cooperate with their friends in learning this method. The pupils helped each other in learning mathematics.

As for myself, I grew professionally. By implementing this method, I found it a very effective method in helping my pupils learn multiplication. Besides that, this action research also helped me in improving my teaching practice. It has an impact in terms of the relationship between my teaching practice and my learners.

Future Action

After reflecting on this action research, I had planned for my future action which is the next cycle for this research. For the next cycle of my action research, I would like to emphasize on problem solving method in multiplication. The pupils can apply the finger method in solving simple multiplication question. So, I would like to do the research on problem solving method to help them understand deeper the concept of multiplication and solve the related problems easily.

For future action, I would like to focus on the Polya's problem solving method. There are four steps in this problem solving method, that is, understand the problem, devise the plan, carry out the plan and review. For this method, I would teach my pupils in solving the problem solving questions step by step by following these four steps. Besides that, to make sure that they remember the multiplication table, I would also keep asking them to practice their finger method so that they won't have any problem in solving multiplication problems.

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USING COOPERATIVE LEARNING STRATEGY IN A PRIMARY TWO MATHEMATICS CLASS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk meningkatkan pembelajaran dan minat murid-murid dalam subjek Matematik. Penyelidikan ini juga dilaksanakan untuk mengkaji kesan pelaksanaan penyelidikan tindakan menggunakan strategi pembelajaran koperatif dalam pengajaran saya. Peserta kajian ini terdiri daripada 21 orang murid Tahun 2H. Data dikumpulkan melalui ujian topikal, soal selidik dan pemerhatian dengan menggunakan senarai semak yang mengandungi lapan aspek. Hasil analisis data mendapati bahawa pembelajaran murid-murid menunjukkan peningkatan markah purata sebanyak 15.40 manakala tahap minat murid turut ditingkatkan sebanyak 20%. Aspek pengajaran saya telah menunjukkan kemajuan dalam lima aspek. Keputusan kajian menunjukkan bahawa pelaksanaan strategi pembelajaran koperatif mempunyai kesan dalam membantu murid-murid dari segi meningkatkan pembelajaran dan minat mereka terhadap subjek Matematik di samping menunjukkan implikasi dalam kemahiran mengajar saya.

Kata kunci: Pembelajaran koperatif, 'Numbered Heads Together', 'Mix and Match', pembelajaran, tahap minat, kemahiran mengajar

ABSTRACT

The purpose of this study was to increase pupils' learning and interest in the subject of Mathematics through the use of selected cooperative learning strategies. This study was also implemented to determine the effects of carrying out action research by using the selected cooperative learning strategies on my

teaching practice. The participants of this study were 21 pupils from Year 2H. The data for this study was collected by using topical tests, questionnaires and observations using checklist which comprised of 8 items. The results indicated that pupils' learning had showed improvement by mean score of 15.40. Besides that, pupil's interest also increased by 20%. From the aspect of teaching practice, I had shown improvement in five of the eight aspects. The results of the study showed that implementing action research by using cooperative learning strategies increased pupils' learning and interests as well as my teaching practice.

Keywords: Cooperative learning, "Numbered Heads Together", "Mix and Match", learning, interest, teaching practice

INTRODUCTION

Context of the Study

During the third semester of my training as a pre-service teacher, my friends and I had chosen SKSKH to complete our Phase 3 Practicum. I had planned to carry out my research in Primary 2H in this school. My intention was to improve my own teaching in the aspects of implementing cooperative learning strategies as well as to increase my pupils' learning and interests in learning mathematics.

There were about 35 teachers and 18 classes at SKSKH. Based on my observation, the Chinese medium pupils are more active in learning. According to the year-end performances of the pupils, the academic achievement of the Malay medium pupils has decreased for the last two years. Undeniably, the performance in Mathematics subject was seen to have decreased too.

I was assigned to teach Primary 2 pupils Mathematics. There were 23 pupils in the class. Seven pupils, who were attending remedial class at that time, were quite poor in their command of English language. I had tried using simple English while teaching but they did not pay attention at all. Thus, cooperative learning strategies were my focus to curb these problems.

Focus of the Study

My main focus of this study was to increase the pupils' interests and learning in Mathematics as well as to improve my teaching practice in implementing cooperative learning by using two selected cooperative learning strategies which are "Numbered Heads Together" and "Mix and Match".

In "Numbered Heads Together", pupils were divided into small groups of three to four pupils. In every group, each and every pupil was assigned a number. Based on the task given, they needed to discuss the problems among themselves. When they were ready with their answers, I would call out a number. Pupils with that number of every group were to show their answers. Group performance was based on individual contribution in the group.

"Mix and Match" was an easier strategy to be implemented in a lesson, especially for Level One pupils. I distributed different picture cards and number cards (materials) to the pupils randomly. Then, the pupils were required to find their partners of the card that they held.

I had obtained the pupils' feedback regarding their interests in learning Mathematics by using questionnaire. Analysis of the feedback is as shown in Table 1 and Table 2

Table 1.

Frequency Counts & Percentages of the Subject that Pupils Liked Most based on Item 3 in Questionnaire

Item 3	Bahasa Malaysia	Mathematics	Science	Pendidikan Jasmani dan Kesihatan
What subject do you LIKE most?	13 (54.17%)	6 (25%)	3 (12.50%)	2 (8.33%)

Note: Percentage is in parenthesis

Table 2.

Frequency Counts & Percentages of Yes & No Responses based on Item 2 and 4 in Questionnaire

Item 2 and 4	Yes	No
Do you like to go to school?	18 (75%)	6 (25%)
Do you like to work in group?	19 (79%)	5 (21%)

From Table 1, only 25 percent (%) of the pupils preferred Mathematics compared to other subjects. Table 2 shows 75% of the pupils like to go to school while 79% of them like to work in groups. Thus, there was a need for me to do this research concerning the issue to increase the pupils' interest in learning Mathematics and creating chances for them to work in groups.

Objectives of the Study

Basically, the objectives of my action research study were:

- to increase pupils' learning in Mathematics by using cooperative learning strategies of "Numbered Heads Together" and "Mix and Match" in Mathematics lessons,
- to increase pupils' interests in learning Mathematics by using cooperative learning strategies, and
- to discover the effect of carrying out action research in my teaching practice performance as assessed by my supervisor.

Research Questions

In relation to the objectives, my research questions were:

- Will the use of cooperative learning strategies of "Numbered Heads Together" and "Mix and Match" in Mathematics increase pupils' learning in Mathematics lessons?
- Will the use of cooperative learning strategies increase pupils' interest in learning Mathematics?
- Will carrying out action research affect my teaching practice performance?

ACTION PLAN AND REVIEW OF LITERATURE

Action Plan

During the first two weeks in the school, I did an initial survey. I had collected data on pupils' feedback on their interests towards Mathematics by using questionnaire. Furthermore, interviews were also carried out to collect data about teacher's feedback on the use of cooperative learning in Mathematics lessons.

Initially, I implemented "Numbered Heads Together" in my lesson. The pupils were placed into six heterogeneous groups of three or four. In each group, there were one high-achiever, two average pupils and one remedial pupil. As for the strategy of

“Mix and Match”, pupils found their partners randomly in order to solve the task given by the teacher. After that, they were needed to share their answers in front of the class.

Cooperative learning strategies were inculcated in group work activities. In this part of the lesson, pupils were divided into their own groups. After simple instructions were given to the pupils, materials and tasks would be delivered to each group. The pupils needed to work cooperatively to obtain the solution of the problem. Each group would present their findings after discussions.

Besides that, observations had also been carried out by my mentor during the implementation of cooperative learning strategies. Questionnaires were given to the pupils to collect responses from them. Topical tests were given after each Mathematics topic was taught. This was to ensure that the amount of learning of the pupils occurred based on the topics that I had taught.

Action research is very useful to a researcher. It can either improve oneself in certain area or even bring advantages to the country or nation. For a teacher, he or she would be able to improve his/ her own teaching practice by doing research. According to Slavin (2006), the main purpose of a research is to improve teaching and learning (as cited in Stephen, 2006).

As a teacher, teaching practice simply means the way that a teacher teaches or delivers the knowledge in a lesson. It is important for a teacher to equip himself with the correct teaching practice or skills. Action research can enhance the quality of the teacher and the knowledge of the subject in depth. My teaching practices were assessed by my mentor. Thus, I would like to know the effect of implementing action research in my teaching practice as assessed by my mentor.

Noor Shah Saad and Sazelli Abdul Ghani (2008) defined that cooperative learning is a group instructional method that makes students learn and teach. Students work together in small groups on academic tasks. Undeniably, the most important aspect in cooperative learning is about cooperation. All the students need

to participate in the group activity actively. All of them are responsible for their own and the other group members' learning. Cooperative learning acts as one of the classroom management strategies. Students are actively engaged during this learning as it enhances their interests and motivation in a lesson. During the learning process, students are given challenging tasks to be solved.

According to Kort (1992), pupils in a group will interact with each other, share ideas and information and also make decisions about their findings to the whole class (as cited in Kolawole, 2007). Children at young age love to do activities. Once they are exposed to new cooperative learning activities, they will feel excited. Interaction occurs in the group as they will discuss the solution of the task. Both better and weaker pupils will benefit along the process as they learn from each other.

Cooperative learning do have some effects on student' learning, especially their academic performance. According to Slavin (1983), success of cooperative team learning techniques has been evident in positive outcomes such as enhanced academic achievement, increased self-esteem, and improved interpersonal relationships (as cited in Powell, Bordolio, & Ryan, 2007).

Other study also found the use of cooperative learning strategies could increase math achievement. This may improve the likelihood of children being able to reason mathematically in the real world situations. Effandi and Zanaton (2003) found that "cooperative group instruction showed significantly better results in mathematics achievement."

Bettenhausen (2002) mentioned that the teacher's role in cooperative learning generally includes specifying objectives, grouping students, explaining tasks, monitoring group work, and evaluating achievement and cooperation (as cited in Ding, Li, Piccolo, & Kulm, 2007). A teacher acts as a classroom manager during the process of group-work monitoring. This is because he or she will monitor the progress of the groups and indirectly intervenes to provide assistance whenever necessary.

Along the process of implementing cooperative activities, a teacher must also inculcate the moral values of cooperation,

tolerance and helping each other. While solving the task, a lot of discussions need to be done to reach for the final goal of the task. Group's performance is calculated based on each individual's achievement in that particular group. All the group members need to work towards the same goal. The high-achiever in each group needs to teach the rest of the members to grasp and understand the mathematical concept. Directly or indirectly, the pupils will learn to be a helpful person as they learn in a lesson.

METHODOLOGY

Target Group and Participants of the Study

The target group of this study consisted of 21 pupils from 2H class at SKSKH, Kuching. There were 11 boys and 10 girls in this class. They were 8 years old. As for their academic performance in the subject of Mathematics, seven pupils were considered as high-achievers while the rest of the pupils were only at average level. There were seven remedial pupils who were really weak in the subject of Mathematics.

Data Collection

In this study, different methods were used to collect three types of data based on three research questions. Table 3 describes the data collection in this study.

Table 3.

Data Collection in the Study

Research Question	Data	Method	Sources
Will the use of cooperative learning strategies of Numbered Heads Together and Mix and Match in Mathematics increase pupils' learning in Mathematics lessons?	Pupils' learning	- Topical tests	- Pupils
Will the use of cooperative learning strategies increase pupils' interest in learning Mathematics?	Pupils' interest	- Questionnaire	- Pupils
Will carrying out action research affect my teaching practice performance?	Feedback of the effect of action research in my teaching practice performance	- Observation checklist (PR1 form) - Mentors' comments	- Teacher

I had used topical tests to collect data on pupils' learning. I had administered four topical tests to the pupils after teaching them each topic. The first topical test was carried out before they were exposed to the cooperative learning strategies. Ten questions were set to test the pupils' understanding of the topic. In order to ensure the validity of the test, every learning outcome that is stated in the Mathematics Curriculum Specifications for Primary Two was tested.

A questionnaire was designed to collect data on pupils' interest in Mathematics. The questionnaire consists of five items with the responses of "Yes" or "No". The items were, whether they like the subject of Mathematics, whether they like to do Mathematics homework or whether they look forward to Mathematics lesson. The following item was whether they will do something related to Mathematics during their free time. The last item "Do you feel bored when learning Mathematics?", a negative question, was used to increase the reliability of the instrument.

In order to collect data on the effect of carrying out action research in my teaching practice, I had used PR1 form. PR1 form is an evaluation instrument that is normally used by lecturers and mentors to observe and rate teacher trainees' teaching practice performances.

In this context of study, I only made use of second part, which is evaluating the teaching practice of a teacher trainee. There are eight criteria stated in this part which are set induction, development of lesson plan, classroom management, communication, the quality of the lesson, closure, achievement of learning outcome(s) and the application of moral values. For each item, the scale rating ranges from one to five. One is the lowest rate while five is the highest rate.

Apart from that, I had also used my mentor's comments to evaluate my own teaching practice performance. These comments in the PR1 form were used to support the rating scale used. Thus, I would be able to know the aspects that I had improved as well as the aspects that I should keep on improving.

Data Analysis

This research comprised two kinds of data, namely qualitative and quantitative. Table 4 briefly summarizes the types of data analysis used.

Table 4.
Data Analysis in the Study

Data	Types of Data	Analysis
Pupils' learning	Quantitative Data	• Topical tests
Pupils' interest	Quantitative Data	• Questionnaire
Feedback of the effect of action research in my teaching practice performance	Qualitative Data	• Observation • Mentor's comments

For the data of pupils' learning, tests were carried out to measure the mathematics performance of the pupils before and after cooperative learning activities. Statistics were used to analyze the data collected by using mean and standard deviation to describe my findings. Mean is the measurement of pupils' performance averagely. Standard deviation is the measurement of dispersion of the observed data from the mean.

For the pupils' interest, statistics were used to collect data. Questionnaires had been carried out three times to measure the favorable responses of the pupils towards learning Mathematics. The questionnaires were administered during second week, fifth week and ninth week. Frequency was used to describe my findings.

The feedback of the effect of carrying out action research in my teaching practice performance is collected in the form of qualitative data. I had used observations by mentor and her comments. Observations had been done with the aid of PR1, which was analyzed by using rating scales from one to five.

RESULTS AND FINDINGS

Effect of Cooperative Learning Strategies on Pupils' Learning

In this study, I had administered four tests to the pupils during the third week, fifth week, seventh week and ninth week of my phase three practicum. The tests were about the topic of

Numbers to 1000, Addition, Subtraction and Multiplication. Table 5 displays the sum, mean and standard deviation of the scores for Test 1, Test 2, Test 3 and Test 4 of the pupils in 2H.

Table 5.
Sum, Mean and Standard Deviation of Pupils' Scores

	Test 1 (N = 21)	Test 2 (N = 20)	Test 3 (N = 15)	Test 4 (N = 18)
Sum	1380	1060	930	1460
Mean	65.71	53.00	62.00	81.11
Standard Deviation	32.80	28.86	27.83	24.23

From Table 5, the mean score for Test 1 is 65.71. The mean score increased to 81.11 in Test 4. Thus, the use of selected cooperative learning strategies had improved pupils' learning slightly. As for the standard deviation, Table 5 shows the result of 32.80 for Test 1 decreased to 24.23 in Test 4. Therefore, the individual difference among the pupils had decreased at the end of this research. The pupils were more homogeneous.

Effect of Cooperative Learning Strategies on Pupils' Interests

I had administered questionnaire three times to collect data on this aspect that is second week, fifth week and ninth week. The questionnaire that I had designed comprised of five items. The first four items were positive items while the last item was a negative item. For the first four items, one mark was allocated for the response "Yes" while zero mark was allocated for the response "No". Conversely, for the last item, zero mark was assigned for the response "Yes" while one mark was assigned for the response of "No". The frequency of the pupils' total favorable response by item for Time 1, Time 2 and Time 3 was graphically presented in Figure 2.

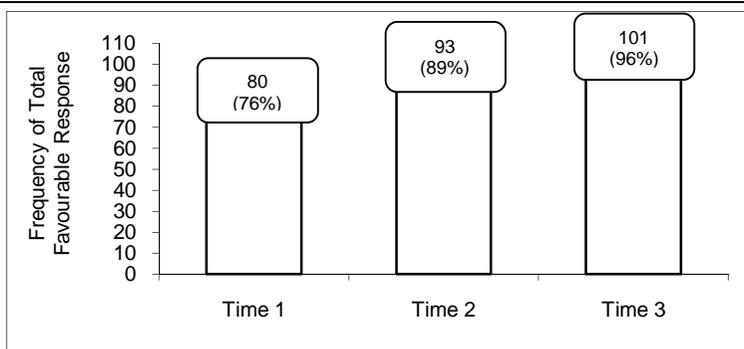


Figure 1. Graph of Total Frequency of Favourable Response in Time 1, Time 2 and Time 3 (N = 21).

From Figure 1, we can clearly see that the frequency of total favorable response of the pupils increased from Time 1 to Time 2 and Time 3. There were 101 responses (96%) in Time 3 compared to Time 2 or Time 1. Thus, this showed that the use of “Numbered Heads Together” and “Mix and Match” did increase the pupils’ interest in learning Mathematics.

Effect of Action Research on My Teaching Practice Performance

For this aspect, I had used PR1 form as an instrument to evaluate my teaching practice performance by using the selected cooperative learning strategies. This form was used by my mentor to evaluate my teaching practice during the second week, fifth week and ninth week. Table 6 represents my mentor’s rating of my teaching practice for three observations.

Table 6.

Mentor’s Rating of Teaching Practice for 3 Observations

Item	Observation		
	1 st	2 nd	3 rd
Set Induction	4	4	5
Teaching Development	3	4	5
Classroom Management	3	3	5
Communication	3	4	5
Lesson’s Quality	3	4	5
Closure	3	3	5
Achievement of Learning Outcome(s)	4	4	4
Integration of Moral Value(s)	3	4	5

Note: Indicators of each rating scale

Level 1: Need to improve in a lot of aspects; Level 2: Need to improve in some of the aspects

Level 3: Average performance; Level 4: Good in many aspects; Level 5: Excellent in many aspects

From Table 6, it can be seen that I had improved my teaching practice in the aspects of set induction, teaching development, classroom management, communication, lesson's quality, closure and integration of moral values. Only the aspect of achievement of learning outcome remained the same rating for all the observations.

My mentor also provided feedback that the use of selected cooperative learning strategies brought some positive effects on my teaching practice in the aspects of set induction, teaching development, closure, achievement of the learning outcomes as well as integration of moral values.

REFLECTION AND FURTHER ACTION

Evaluation and Reflection

As far as I am concerned, the selected cooperative learning strategies could help me in curbing the problems that I had encountered in this study. I had improved my teaching practice in several aspects, such as, set induction, teaching development, closure, achievement of the learning outcomes and integration of moral values. Although the findings did not reveal marked significance of the problems occurred, positive implications still existed.

In this study, it was discovered that cooperative learning strategies provided equal learning opportunities to each pupil. The utmost thing in cooperative learning was about team work. Each and every pupil contributed to the success of the group's achievement through learning and guiding from each other. The better pupils would lend a hand by guiding the weaker pupils.

Nonetheless, there is no perfect strategy in this world. Although the strategy might be effective, it does have its own weaknesses too. Implementing cooperative learning strategies needs to have careful planning. A teacher acts as an instructor to guide the pupils along the process. He or she also needs to give precise and clear instructions so that young children understand what the teacher wants them to accomplish.

I believe that learning should be done in a lively and active classroom atmosphere. Young children need to be exposed to

different types of learning strategies to develop their potentials. Even the Ministry Education of Malaysia encourages every teacher to use different teaching approach in teaching. All the curriculum specifications for every subject in primary school also outline the importance of this.

Suggestion for Further Action Research

From this study, I discovered that there were two aspects of teaching and learning with opportunity of improvement, which were classroom management and communication. Thus, these two aspects would be my focus for further research. I would like to try another two strategies which suit Level 1 pupils. The strategies are "Three-minute review" and "Showdown".

These two strategies require the teacher to have good classroom management and communication skills. The teacher needs to control the class well before the strategies are actually implemented. Clear and precise instructions and rules need to be delivered to the pupils at the beginning so that they are acknowledged of the content of the strategies. Moreover, these strategies also provide a lot of opportunity for the learners to learn more and participate in the activity actively.

In short, doing research not only brought benefits to the pupils but also to the teacher himself. Cooperative learning strategy was indeed a good and worthwhile strategy to be implemented by school teachers. This helped to improve the pupils' learning and their interest in their study. Through the effort of doing action research, a teacher also could improve his own professional practice. Needless to say, learning is a lifelong process.

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THE USE OF COOPERATIVE LEARNING TO ENHANCE YEAR FOUR PUPILS' LEARNING AND INTEREST IN MATHEMATICS

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ABSTRAK

Kajian ini dijalankan untuk menilai sejauhmanakah keberkesanan penggunaan pembelajaran koperatif dalam meningkatkan pembelajaran dan minat murid-murid dalam subjek Matematik untuk Tahun Empat di samping untuk menambahbaikkan praktik mengajar saya. Responden kajian ini terdiri daripada 41 orang murid dari Tahun 4B di sebuah sekolah rendah di Kuching. Data dikumpulkan melalui ujian pra dan pasca, soal selidik serta pemerhatian. Hasil analisis data mendapati bahawa bagi pembelajaran murid-murid, sisihan piawai ujian telah menurun sebanyak 20%. Melalui soal selidik, pembelajaran koperatif telah mendapat respon yang baik dengan nyatanya. Pembelajaran koperatif tidak mendatangkan kesan negatif terhadap praktik mengajar saya. Keputusan kajian menunjukkan bahawa pembelajaran koperatif berkesan dalam membantu murid-murid untuk meningkatkan pembelajaran dan minat mereka dalam Matematik. Implikasi daripada kajian ini ialah penggunaan pembelajaran koperatif berlainan jenis yang berterusan dalam pengajaran Matematik.

Kata kunci: Pembelajaran koperatif, "Numbered Heads Together", "Think-Pair-Share", "Roam the Room", pembelajaran Matematik murid

ABSTRACT

This study investigated to what extent the use of cooperative learning in enhancing Year 4 pupils' learning and interest in learning Mathematics and my teaching

practice. The respondent of this study consisted of 41 pupils from Year 4B class in a primary school. The data was collected through pre- and post-tests, pre- and post-questionnaire and observation. The results showed standard deviation has decreased by 20% for pupils' learning Mathematics. For pupils' interest, favorable response of post-questionnaire has increased if compared to pre-questionnaire. My teaching practice performance was not negatively affected by the implementation of cooperative learning. Hence, cooperative learning is an effective strategy in enhancing pupils' learning and interest in Mathematics. The implication of the study supports a need for the ongoing practice of implementing different cooperative learning strategies in teaching Mathematics.

Keywords: Cooperative learning, "Numbered Heads Together", "Think-Pair-Share", "Roam the Room", pupils' Mathematics learning

INTRODUCTION

Context of the Study

Reflecting back to my primary school days, most of my teachers often gave drills to us to master the mathematics skills. To be frank, I myself hardly know the reasons of the existence of certain mathematics concept. After so many years, I think most of the teachers still use this drilling strategy in teaching Mathematics. Observation in my teaching practice proves me right when I observed that most of the teachers were giving drills and practices as the best way to make pupils learn Mathematics. They believe that practice makes perfect. These teachers were actually applying Thorndike's Law of Exercise which states that by frequently practicing the skill, the connection between stimulus and response is strengthened (Dave, 2007). Hence, for me, this kind of teaching practice is similar to rote learning and more likely lead to boredom frustration and inadequate knowledge of Mathematics among the pupils. Pupils easily lose their interest in learning Mathematics if they do not participate actively in Mathematics lesson.

Apart from that, I have found that most of the teachers nowadays still use the direct instruction. For this, I admit that I myself also often use direct instruction in teaching Mathematics during practicum. To me, direct instruction works well as the pupils only memorize the ways to get the answers in doing Mathematics questions and they can score well. However, Lazarowitz, Hertz-Lazarowitz and Baird (as cited in Dikici & Yavuzer, 2006) commented that this instruction only gives advantages to those hardworking pupils. It also encourages the pupils to study by their own and learn in competitive way, and most importantly, it does not contribute to the academic and social development of the pupils in the class. Overall, teaching is not an easy job. I believe that every action that teachers have taken must be planned thoughtfully so that the actions would really help in pupils' learning in Mathematics in the classroom.

Focus of the Study

My study focused on the use of cooperative learning in enhancing pupils' learning and interest in Mathematics among the pupils from 4B class at SK SM. Meanwhile, I discovered that the scenarios in 4B class in this school had given me the opportunity to carry out cooperative learning in Mathematics lesson. One of the scenarios was the use of drilling and practicing methodology in teaching Mathematics by the teachers. From my observation, I noticed that 4B pupils were asked by their Mathematics teacher to buy three Mathematics exercise books to do their drill and practice. For me, giving drill and practice to the pupils actually was quite a useful method in learning Mathematics. However, applying this method too much brought impact on pupils' interest in learning Mathematics. Bush (as cited in Bernero, 2000) reported that pupils in grades 6-12 "disliked mathematics and were bored with 'repetitive assignments which require them to solve a series of very similar problems'". Moreover, they would not have a full understanding of the topic at all. Besides, I discovered that pupils' lack of interest was due to the teaching method used by the teacher in class. From my observation, almost every teacher in SK. St. Mary liked to apply the traditional teaching method which was direct instruction in class.

In order to ensure the above stated scenarios really existed in SK SM, I had carried out an initial survey in 4B class. Firstly, I interviewed my mentor, Madam A, who was a Mathematics teacher for 4B class. According to her, although 4B class was a good class, there were still few of them weak in Mathematics. Besides, I analyzed the test score of Mathematics February Monthly Test for 4B class which was administered on the first week of my practicum by my mentor. I used this test result as my pre-test's result for this study.

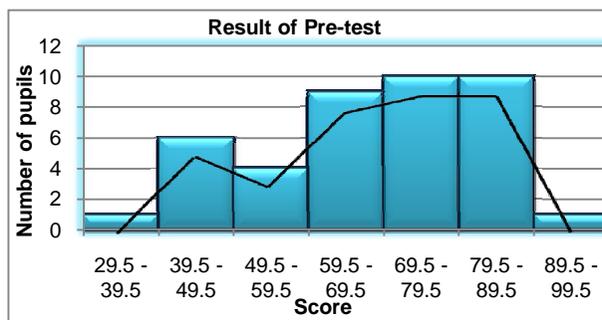


Figure 1. Result of Pre-test.

From Figure 1, we could see that the distribution of the marks is widely spread. This indicated that there were great individual differences among the pupils in terms of their performance. Consequently, these findings showed that 4B pupils had quite low interest in learning Mathematics and their result of Mathematics test was not satisfactory.

Objectives

The objectives of my action research study were:

- to enhance pupils' learning in Mathematics subject,
- to enhance pupils' interest in learning Mathematics, and
- to investigate if the intervention I used in my action research would have any effect on my teaching practice performance.

Research Questions

In relation to the objectives, my research questions were as the following.

- Can the use of cooperative learning strategies help to improve pupils' learning in Mathematics?
- Can cooperative learning strategies increase pupils' interest in learning Mathematics?
- Does carrying out cooperative learning affect my teaching practice performance?

ACTION PLAN

Based on the findings from the initial survey, I decided to incorporate three cooperative learning strategies such as "Numbered Heads Together", "Roam the Room" and "Think-Pair-Share" in helping the pupils to learn Mathematics in a fun way so as to enhance pupils' interest and learning in Mathematics.

From 22 March 2010 until 2 April 2010, I incorporated "Numbered Heads Together" in one of my Mathematics lesson. After teaching, I asked pupils to move into their own group. Then, I asked each one of the group member to select one number from one to four. After giving instructions, I distributed the task to each group. All group members must work together to answer the questions and make sure that every one of their group members knew how to get the answer correctly. After 15 minutes, I called out a number. The pupil who had selected that number in every group would come to the front and bring their pencil. Then, I gave each one of them the same worksheet and asked them to write the answer on the worksheet. The rationale of implementing "Numbered Heads Together" was to "hold each student accountable for learning the material" ("Numbered Heads Together", n.d.).

From 5 April 2010 until 16 April 2010, I integrated another new cooperative learning strategy called "Roam the Room" in one of my Mathematics lesson. After giving instructions, I blew the whistle. One of the members of each group was allowed to move freely to any group to get some idea from their discussion silently. No discussion was allowed between the particular pupils

with the other group members. After two minutes, I blew the whistle again. This particular pupil had to go back to her own group to brief the group on what the others were doing. The rationale of incorporating this strategy was to let the pupils learn from each other and enhance their retention and attention in class because the neurological research (as cited in Jacobine, n.d.) discovered “the release of dopamine, the chemical neurotransmitter in the brain which is responsible for attention, memory storage, and comprehension, is enhanced when individuals are playing”.

From 19 April 2010 until 30 April 2010, I integrated “Think-Pair-Share” in one of my Mathematics lesson. After teaching, I posed a question and ask the pupils to think silently for two minutes. Then, I asked the pupils to pair up with their friend sitting next to them and exchange their thoughts. After that, I asked any pair to stand up and share their answer to the whole class. The rationale of integrating this cooperative learning strategy was to give opportunity for all pupils to share their thinking with their partner; this, in turn, “increase their sense of involvement in classroom learning” (“What is Think, Pair, Share?” 2009).

METHODOLOGY

Target Group and Participants

The target group for this study was 41 pupils from class 4B Level 2 at SK SM, Kuching. All of them were girls, aged 10 years old. The profile of the pupils in terms of their ability in Mathematics is shown in Table 1.

Table 1.
Profile of 4B Class

	Low	Average	High	Total
Number of pupils	1	29	11	41
Percentage (%)	2.44	70.73	26.83	100

This rating was done based on their February Mathematics monthly test result. The main reason I chose 4B class as my target group for this study was the issues of concern that I had addressed in the context of this study matched with the situation in 4B class. Besides, I discovered that pupils from 4B class were

not exposed to cooperative learning before. Moreover, most of the pupils in this class liked to answer the questions very fast and submit their work straightaway. These pupils are just like an answering machine which had gone through many drills and practice of the ways to answer mathematics questions.

Data Collection

For this study, I had collected three types of data which were data on pupils' learning, data on pupils' interest and data on teaching practice performance to answer my research questions. For the first research question, I collected the data on pupils' learning in Mathematics through monthly tests. Mathematics February Monthly Test was my pre-test because the pupils had not been exposed to cooperative learning strategies before while Mathematics April Monthly Test was my post-test which was administered after the implementation of cooperative learning strategies in 4B class. Although coverage of the topic in pre-test was not exactly the same as in post-test, the tests were taken to measure to what extent the learning of the topic tested had occurred among the pupils and how much they had learnt in the topic tested that was taught. The items in pre-test and post-test were in the form of objective and subjective questions.

I collected the data on pupils' interest in learning Mathematics to answer my second research question through a questionnaire. I administered the pre-questionnaire before the implementation of cooperative learning strategies on 11 February 2010 while the post-questionnaire was administered after the implementation of cooperative learning strategies on 23 April 2010. The purpose of administering this pre- and post-questionnaire was to measure whether the interest of the pupils in the learning of Mathematics had been improved after the implementation of cooperative learning strategies. The pre- and post-questionnaire consisted of eight structured questions which required two responses such as Yes or No. The same items were used for pre-and-post questionnaire.

For the third research question, I collected the data on my teaching practice performance through classroom observation from my lecturer, Madam B. This was done with two

observations from my lecturer which was on 2 March 2010 and 30 March 2010 during my Mathematics lesson. The focus of these two observations was to see whether the use of cooperative learning strategies would affect my teaching practice performance. I used the data from the first observation as my pre-observation of no implementation of cooperative learning strategies while the data from the second observation was used as post-observation of the implementation of cooperative learning strategies. The items in these two observations were introduction, development of the lesson, classroom management, communication, learning quality, closure, achievement of learning outcomes and integration of moral values. They were ranked from 1 to 5 where 1 was rated as very weak, 2 was rated as weak, 3 was rated as average, 4 was rated as good and 5 was rated as excellent.

Data Analysis

I analyzed three types of data which were data on pupils' learning, data on pupils' interest and data on my teaching practice performance. The following Table 2 shows the overall picture of research questions, types of data and techniques of analysis.

Table 2.

Research Questions, Types of Data and Techniques of Analysis

Research questions	Types of Data	Method	Techniques of Analysis
Can the use of cooperative learning strategies help to improve pupils' learning in Mathematics?	Pupils' learning in Mathematics	Test (pre-test and post-test; supported by pupils' feedback on cooperative learning)	Comparison of statistics mean and standard deviation of pre-and-post
Can cooperative learning strategies increase pupils' interest in learning Mathematics?	Pupils' interest in learning Mathematics	Questionnaire (supported by pupils' feedback on cooperative learning)	Use frequency count and find the percentage of each favorable items
Does carrying out cooperative learning affect my teaching practice performance?	My teaching practice performance	Classroom observation ratings	Comparison of statistics mean and standard deviation of pre-and-post

RESULTS AND FINDINGS

Effect of Cooperative Learning Strategies on Pupils' Learning

For pupils' learning, I compared the mean score and standard deviation of pre-test and post-test. It is presented graphically in Figure 2 and Figure 3.

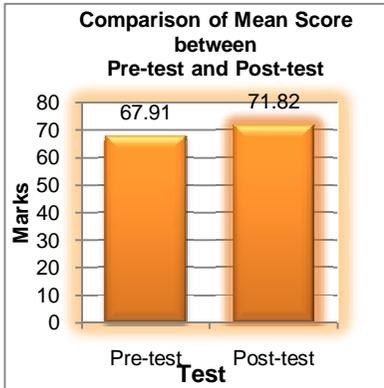


Figure 2. Comparison of Mean Score between Pre-test and Post-test.

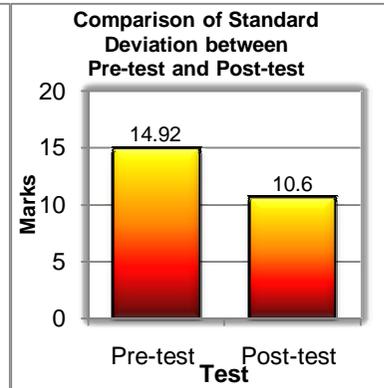


Figure 3. Comparison of Standard Deviation between Pre-test and Post-test.

From Figure 2, it is very obvious that the mean score has increased from 67.91 to 71.82 by 5.4%. The increase of the mean score showed that pupils' performance in Mathematics learning has improved. Besides, we can see that the standard deviation has decreased from 14.92 to 10.60 by 29%. The decrease of standard deviation indicated that pupils' learning has improved after the implementation of cooperative learning strategies. Based on the pupils' feedback, it was obvious that pupils did learn something from cooperative learning activities. Overall, the findings from the test scores and from pupils' feedback indicated that pupils' performance in learning of Mathematics has improved greatly. According to Springer, Stanne, and Donovan (as cited in Yamarik, 2007), "various forms of small-group learning are effective in promoting academic achievement, more favorable attitudes toward learning..." My

data is in agreement with that. With this, the findings had answered my first research question.

Effect of Cooperative Learning Strategies on Pupils' Interest

For pupils' interest, I summarized the pupils' favorable responses on each item in pre-and post-questionnaire and presented them graphically in the following Figure 4. As for negative items, I had reversed the responses so that the graph of favorable responses could be plotted.

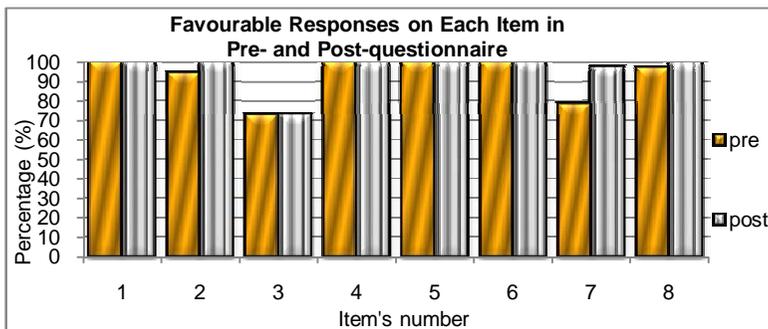


Figure 4. Favorable Responses on Each Item in Pre- and Post-questionnaire.

From Figure 4, we can see that there were only four changes on the percentage of favorable response such as percentage for Item 2, Item 3, Item 7 and Item 8. The percentage of favorable response for the other items still remained the same as 100%. Based on the pupils' feedback, cooperative learning strategy like "Numbered Heads Together" had aroused their interest in learning Mathematics. Overall, the findings from the result of the pre- and post-questionnaire and from the pupils' feedback have shown the pupils' interest has been increased after using cooperative learning strategies in Mathematics lesson. Kulick and Kulick (as cited in Green, n.d.) noted that through cooperative learning, pupils' retention of information and interest in the subject matter improves. My data is totally in agreement with Kulick and Kulick. With this, my findings had answered my second research question.

Effect of Cooperative Learning Strategies on Teaching Practice Performance

I had also collected the data on my teaching practice performance so as to see whether the use of cooperative learning strategies would bring any impact on my teaching practice performance. Table 3 displays the result for my first and second observation of my teaching performance.

Table 3.
Lecturer's Classroom Observation Ratings of My Teaching Practice Performance

No.	Aspect of Teaching Practice Performance	Rating	
		First observation	Second observation
1.	Introduction	5	4
2.	Development of the lesson	4	5
3.	Classroom management	4.5	5
4.	Communication	5	5
5.	Learning quality	4.5	4
6.	Closure	4	5
7.	Achievement of learning outcomes	4	5
8.	Integration of moral values	4	4
Overall score:		35	37
Mean:		4.375	4.625
Standard deviation:		0.443	0.518

From Table 3, there has been improvement in some aspects of my teaching performance such as development of the lesson, classroom management, closure and achievement of learning outcomes. Overall, my teaching practice performance was not negatively affected by my action in implementing cooperative learning strategies in Mathematics lesson. This was because I did not get any negative scores in both of my observations. With this, my third research question on whether my intervention of action would affect my teaching practice had been answered.

REFLECTION AND FUTURE ACTION

Reflection

Although cooperative learning strategies that I had implemented in this study had their own merits and demerits in terms of efficiency, the strategy that I liked the most was "Numbered

Heads Together". This strategy was quite efficient in improving pupils' learning and pupils' interest in learning Mathematics because it requires all the group members to learn the material given and be prepared with the answer as they never knew which number would be called by teacher. This encouraged learning among themselves as each one of them was "accountable for learning the material" ("Numbered Heads Together", n.d.).

As for "Roam the Room", pupils were so excited to get the ideas from the discussion of other team and share what they had learnt to their own group after roaming. As for "Think-Pair-Share", it was an effective strategy for giving those "quiet" ones in the class to engage in the learning and speak out their opinions. By giving them chances to participate to speak out their points of view, it could surely arouse their interest in learning Mathematics.

In terms of practicality, these three cooperative learning strategies were practical to be used for teaching Malaysian Mathematics Curriculum as one of Mathematics curriculum's objectives had stated that learning of Mathematics involved an understanding of the underlying mathematical thinking and general strategies communicating mathematically. Cooperative learning strategies like "Numbered Heads Together" and "Think-Pair-Share" did involve the pupils to think and communicate mathematically among themselves. To my expectations, cooperative learning did help in integrating the universal values such as fairness, justice and democracy among the pupils. This was because grouping all the pupils with different races in one group help to promote the values of fairness and justice whereby each one of the group members learnt to be fair with their group members and give each one of the members the chances to speak out their views. All these values were the values that not only the school sought to impart to pupils but also our Prime Minister, Datuk Seri Najib Tun Razak who advocated the concept of 1Malaysia, not to forget our curriculum goal as well in seeking to impart universal values to the pupils.

Through this action research, I discovered that initially I was still stuck with the old-fashioned teaching style. This action research helped me to examine my own teaching practice performance through the technique of research. From this spiral of research, I realized that I had to have an on-going analysis of my own teaching practice in order to make myself grow in my teaching profession. In fact, I believed, it was quite difficult not only to me but also the other teachers that we got chances to attend any professional development course nowadays. However, conducting action research highlighting on implementing new learned practices could bridge the professional development into actual practice. With this, Johnson (1993) had advocated action research as a professional development strategy. I also realized that we as a teacher have to seek for improvement all the time and change from time to time for pupils' and our own sake. Furthermore, teachers like us are no longer the ultimate source of information. In fact, we act as a guide and facilitator to encourage pupils to discover their own knowledge.

Future Action

Due to time constraints, I could only implement three cooperative learning strategies in my Mathematics lesson. Hence, one of my plans for future study is to implement the other cooperative learning strategies in the learning of Mathematics such as "Jigsaw", "Teams-Games-Tournaments", "Student Teams Achievement Division", "Three-step Interview" and "Round Robin". This is because I believed different cooperative learning strategies have different ways of exciting pupils to learn and discover new knowledge.

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THE USE OF COOPERATIVE LEARNING STRATEGIES IN TEACHING PRIMARY FOUR MATHEMATICS

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ABSTRAK

Objektif kajian ini adalah untuk mengkaji minat dan pembelajaran murid Tahun 4A dalam subjek Matematik dengan penggunaan kaedah pembelajaran kooperatif. Kaedah ini mampu menentukan sejauh mana ianya dapat mempamerkan kualiti pemahaman yang lebih tinggi dalam Matematik. Kajian ini juga bertujuan untuk meningkatkan amalan pengajaran saya dengan pengaplikasian kaedah pembelajaran kooperatif. Peninjauan awal dan soal selidik minat dijalankan untuk menilai minat murid. Pengumpulan markah ujian turut dijalankan dari masa ke masa untuk menilai purata dan sisihan piawai skor pencapaian murid yang digunakan untuk menilai pembelajaran murid. Latihan pengajaran turut dinilai melalui borang Penilaian Praktikum PR1, dengan skala dan komen daripada guru pembimbing dan pensyarah. Semua data dianalisis secara statistik.

Kata kunci: Kaedah pembelajaran kooperatif, min, sisihan piawai, soal selidik murid

ABSTRACT

The purpose of this research was to explore pupils' interest and learning in Mathematics among Year 4A pupils with the use of cooperative learning method instead of traditional method. This study also served to determine how far cooperative learning method helps in promoting higher quality of understanding of Mathematics. Besides, this research was carried out to improve my own teaching practice through the method of Cooperative Learning. Initial surveys and questionnaires

had been carried out to assess pupils' interest other than collecting test scores over time with comparison of mean and standard deviation. My teaching practices were assessed by using the PR1 forms, which were rated and commented by my mentor and lecturer. All the data were analyzed statistically.

Keywords: Cooperative Learning (CL) method, mean, standard deviation, pupils' questionnaires

INTRODUCTION

Context and Background of the Study

Globalization brings Mathematics education nowadays to a more challenging era. Modernization and progress in educational technology transform education curriculum in school. According to Chin Fha (1990), the transition from KLSR involves the overhauling of the entire teaching and learning situation extending from syllabus to the techniques of teaching. Numerous weaknesses in KLSR have been identified. The traditional rote learning method has been identified as one of the causes for low achievement in Mathematics.

In my previous practicum, I was assigned to teach Year 4U Mathematics class. The class size was big, with 42 pupils. I planned and carried out a lot of group activities for my teaching and learning processes. To arrange the group, I planned it according to the class size and divided all groups equally into groups of four or five. Thus, before starting the group activity, I asked the pupils to sit in their groups of four or five.

Besides, I set different tasks for them and instructed them to complete the tasks together. Tasks were set differently and creatively according to different topics taught. Group worksheets were collected and exchanged with other groups in order to mark the answers and identify the winner of the group. Overall, the pupils for each group were able to complete the entire task given for the group activities. I thought that grouping the pupils into homogeneous group for group activity in Mathematics class would make the learning session run smoother and faster

because pupils' level of achievements were similar and they would have learned from each other during group discussion. Thus, time would not be wasted in teaching a topic. To my belief, it is important for us as Mathematics teacher to finish in time the syllabus provided so that no important topic as categorized in the text book would be missed. But, I kept reflecting on the group activities processes - whether the activities were interesting and meaningful enough for the pupils? Could the group activity motivate the pupils to learn? Was it helpful in their learning? All these questions appeared when I saw some problems during the group activities.

First of all, my method of grouping students' arrangement was not very efficient. This was because I let the pupils get into groups according to their choice but I ignored an important criterion which was analyzing the pupils' level of achievement. Thus, the ability of the groups was distributed unevenly. As a result, only the groups with better pupils were eager to learn while the weaker groups were not. Furthermore, the homogeneous way of group formation affected the class as well. This was because when I carried out the group activities, only the smarter group gave the most responses. The clever pupils also tend to look down on the weak pupils. Thus, the weak pupils became isolated. Other than that, groups with mix-abilities were also not fully cooperating during the group activity. Some members of the group tried to solve the questions on their own while the rest of the group members just waited for the answers.

Slavin (1990) (as cited in Glatthorn & Coble, 1993) noted that learning in group is generally more effective than traditional method of instruction and it improves pupils' achievement when the cooperative group have both group goals and individual accountability. This learning differs from the traditional instruction. Pupils in the traditional instruction mostly work by themselves in their time or just listen to teacher. It gives less opportunity to interact with their peers. I totally ignored these problems and continued my group activities during my previous practicum as I thought nothing could be done about it. I have

thought about cooperative learning but I thought it was not workable for primary school pupils.

Focus and Issue of Concern

For my third Practicum, I was assigned to teach Mathematics and English in Year 4A at SK LS, Kuching. My class was considered the worst class in terms of discipline and the weakest in terms of academic achievement. I was to have lots of patience with them. I actually faced similar situation during my previous practicum. Nevertheless, I found this class interesting and challenging as it urged me to think of the best way to gain their interest and participation in my Mathematics lesson apart from increasing their level of understanding and learning.

During the practicum, I had carried out my action research on the use of group learning strategies in teaching primary school Mathematics. I had the inspiration to do so as I realized the fact that pupils have to learn or gain knowledge by working together, not doing individually. Besides, it was a win-win plan as weaker pupils could learn better through the explanation and guidance provided by the brighter pupils during CL. At the same time, brighter pupils could understand better and would have a retentive memory of what they have taught to their group members.

There were several weaknesses that I found in this class. First, was about the pupils' academic learning level in class. As I have been informed earlier, the majority of my pupils were weak especially in the subject of Mathematics. Many of them even failed in their previous tests. Second, was the pupils' interest. The class comprised of naughty pupils and could not pay full attention. So, the school had arranged them to be taught by my mentor, who was the school's most strict teacher. Thus, they have to pay attention to learn and participate in the lesson even though the traditional teaching method was used.

From these issues of concern, I realized that the pupils were not having the opportunities to learn actively in class. From the starting lesson till the bell rang, all of them would only sit on their

own seat without movement. Besides, the pupils would just copy their friend's answers to settle the homework problem and to submit their homework. In short, they only followed the rules of 'submitting homework' without doing on their own and this discouraged the development of thinking skills. As a result, the pupils learn nothing.

Thus, I have tried to use CL strategies to cope with this problem. The processes in the activities were analyzed. Those aspects concerned were the setting of the classroom, the learning atmosphere, difficulties of the tasks, pupils' interest, group cooperativeness, test result and the smoothness or flow of the activities. Then, I modified the activities and practiced with them so that they would be familiar with the activities. Two types of activities carried out were "Numbered Heads Together" (NHT) and "Showdown 1, 2, 3".

The first reason I chose these two activities was because these activities were easier to be carried out, save time, practicable and the class would be under control. The second reason was because of the important process of gaining the pupils' interest, participation and learning in cooperative group activities. The third reason was because this research would be of use to the school as this strategy was seldom integrated into the teaching and learning process in this school even though it is known as an effective teaching strategy. The fourth reason I chose CL strategy was that it was easy to control. The fifth reason of conducting CL strategy was promoting collaboration among pupils. The sixth reason was CL strategy would promote learning because these experiences engaged pupils in an interactive approach to processing information, resulting in greater retention of subject matter, improved attitudes toward learning, and enhanced interpersonal relations among group members.

Cooperative classrooms that I have set were classes where students group together to accomplish significant cooperative tasks given. Pupils were likely to attain higher levels of achievement, have increase time on task, able to build cross-ethnic friendships, experience enhanced self-esteem, able to

build life-long interaction and communication skills, and master the habits of mind to function as productive members of society. Therefore, the pupils in the classroom would work together and learnt from the concept of “sink or swim together” so that each group member’s efforts were required and indispensable for group success. So, more supportive relationship would be created among group members, with commitment.

During my first week of observation of this class, I was surprised to see that the pupils were arranged in non-ideal arrangement for group work. They were sitting individually instead of sitting in pairs or in groups. This arrangement is more suited to the exam seating arrangement. This arrangement serves to avoid the pupils from chatting too much during the teaching and learning session. I realized that this type of arrangement is very good in controlling the distracted voices of the pupils. However, interaction among the pupils would be limited. Thus, my lecturer suggested I rearrange the seating plan. After discussing and getting permission from the class teacher, I rearranged their seating arrangement after a month of my teaching.

After observation, I started to do an initial survey. First, I obtained the pupils’ previous test scores to know each pupil’s test performance. Next, the pupils’ family background was analyzed based on their socio economic status, besides having discussions with the class teacher and my mentor. Then, I started to carry out the CL activities in class that started from the second month of practicum. For the first month of practicum, I have tried out several CL activities. After that, I calculated their test results using statistical method, which was similar to the calculation carried out for the previous test results.

I started my first trial of CL, which was arranging the group heterogeneously. First, I determined the desired size of each group, which was four in a group. Secondly, I grouped the pupils heterogeneously according to their social skills by swapping the original group members with another group. Thirdly, I chose the brighter pupils to be the group leader so that they could guide the rest during cooperative group activities. Fourthly, incentive in

the form of a sticker was given to each member if he or she answered correctly the questions posed. They then totaled the marks and the final result would be determined at the end.

There were some limitations and obstacles that I faced that slowed down the process, such as, having some pupils who were dyslexic and slow learner, and some of them were problem creators. These were the problems I should settle first in order to ensure the CL activities could be carried out smoothly.

Objectives

The objectives of this study were stated as below.

- CL can increase pupils' test results in Mathematics.
- CL can increase pupils' interest and learning in Mathematics.
- Action research can improve my own teaching practice.

Research Questions

- Can CL activities improve pupils' interest in Mathematics?
- Can CL activities improve pupils' learning in Mathematics?
- Can we improve our teaching practice through action research?

ACTION PLAN AND REVIEW OF LITERATURE

Action Plan

From the first day of practicum, I have done an initial survey with a simple observation in the class of Year 4A. Besides, I have some discussion with the classroom teacher and mentor about the suitability of carrying out this research. Meanwhile, the pupils' previous test scores and pupils' socio economic status background were collected from my mentor.

Before I started any CL activities, I administered a pre-test for the pupils to test their understanding on the topic (Fraction) they have learnt. After I recorded the scores, I carried out my trial CL activities. This was important for me to decide whether to carry out my research or not. The CL activities in the form of NHT and "Showdown 1, 2, 3" were officially conducted in the month of March to April. For every CL teaching-learning process, I

prepared a short questionnaire for the pupils to fill in to get the data related to the pupils' interest. Personal reflections were also written in the last page of my lesson plan to analyze the pupils' behavior. Besides, my mentor also observed my teaching to give comments and ratings on my teaching and learning process.

REVIEW OF LITERATURE

CL promoted student involvement and engagement. Research showed that for true learning to occur, students must take responsibility for their own learning and not depend solely on the teacher. The use of CL supported this outcome and provides all students with public opportunities to make their thoughts visible to others by allowing them to talk about and consider their own ideas as well as those of others (Chin & Brown, 2000; Jones & Carter, 1998; Kagan, 1994; Wood, 1992).

The role of the teacher is very important in cooperative learning. To have effective CL groups, teachers must know their students well. Grouping of students can be a difficult process and must be decided with care. Teachers must consider the different learning skills, cultural background, personalities, and even gender when arranging cooperative groups. Much time is devoted to prepare the lesson for CL.

METHODOLOGY

Participants of the Study

The participants of my study consisted of 28 pupils (19 boys and 19 girls) from Year 4A at SK LS, Kuching.

Data Collection Method

Data collection is necessary in perceiving the effectiveness of CL in Primary four Mathematics class. In this research, I have used several methods to collect the data. Initial surveys, short questionnaires, and PR1 observation form on students' interest had been used to collect data on pupils' interest. This is followed by collecting the test scores over time in order to compare means and standard deviation related to pupils' learning. Teaching practices were also being assessed by using the PR1

forms, which were rated and commented by my mentor and lecturer. Table 1 is a summary of some methods of collecting primary data and the main methods used.

Table 1.
Research Question, Data, Method and Source

Research Questions	Data	Method	Source
Can Cooperative Learning activities improve pupils' interest in Mathematics?	Pupils' Interest	Questionnaire	Pupils
Can Cooperative Learning activities improve pupils' learning in Mathematics?	Pupils' Learning	Test score	Pupils
Can we improve our teaching practice through the action research?	Teaching Practices	Observers rating	Mentor

From Table 1, for the aspect of pupils' interest, I measured the interest using short questionnaires to get pupils responses. Besides, pre-test and post-test scores of pupils were also recorded to compare the pupils' learning progress. Lastly, the PR1 observation forms by my mentor were also used to measure my teaching practices performances.

RESULTS AND FINDINGS

Effect on Pupils' Learning

To identify pupils' level of learning, I analyzed pupils' test scores from pre-test and post-test that I had administered. Pre-test was administered in February, followed by post-test at the end of April. From the recorded scores of the two tests, mean scores and standard deviation are compared to measure the progress of pupils' learning. Table 2 shows the mean and standard deviation of pupils' test scores.

Table 2.
Mean and Standard Deviation of Pupils' Test Scores

Mean and Standard Deviation Pupils' Test Scores		
	Pre-Test	Post Test
Mean	32.50	38.86
Standard Deviation	23.69	22.14

From the Table 2, it is clearly seen that the mean score for Test 2 is higher than the mean score for Test 1. This indicates that the average score has increased by 6.36, which shows improvement

in the pupils' achievement. Besides, the standard deviation for pre-test is higher than the standard deviation for post-test. The standard deviation for pre-test is 23.69, which is 1.55 higher than the standard deviation of post-test. If compared to the standard deviation of pre-test, it is smaller, which explains that the scores are not spread out widely and it is near to the mean score, which shows that the pupils' scores do not diverse widely. Therefore, it can be said that the individual differences among the pupils has decreased.

Effect on Pupils' Interest

To compare pupils' interest, short questionnaires have been given to them to fill in. Thus, the data and result from two sets of questionnaire are selected to be compared. To interpret the data, means and standard deviation are calculated. Table 3 shows the result of mean and standard deviation of pupils' interest in Questionnaire1 and Questionnaire 2.

Table 3.
Mean and Standard Deviation of Pupils' Interest in Questionnaires

Comparison of Pupils' Interest		
	Questionnaire 1	Questionnaire 2
Mean	2.29	2.89
standard deviation	0.35	0.16

Effect on Teaching Practices

Teaching practices was assessed from the data collected from PR 1 observation scores by lecturer. Eight aspects were assessed in level scores, which is from the weakest level of 1 to the highest level of 5. Mean and standard deviation of two observation are shown in Table 4.

Table 4.
Mean and Standard Deviation of Teaching Performance

Data On Teaching Practices		
Aspect	Observation 1	Observation 2
Mean	3	4
Standard deviation	0.64	0.53

From Table 4, we can interpret that the means score has increased, which is from scores of 3 to scores of 4. Meanwhile,

the standard deviation has decreased, which is from 0.64 to 0.53. So, this finding answered my research questions. Thus, I can conclude that generally my teaching practice performances has slightly improved.

REFLECTION AND FUTURE ACTION

Technical Efficiency

By carrying out the CL activities, pupils became more active in learning because these activities promote positive interaction through group learning. Thus, pupils' interest in learning Mathematics increased indirectly as shown in the increase of 0.6 for overall mean score in pupils' interest.

Apart from that, it helped pupils to increase in academic achievement, which indicated positive result (+0.6) of mean score in pupils' learning. This is because in cooperative learning teams, low-achieving pupils have chances to contribute to their group and indirectly increase their understanding of knowledge by explaining them to others (Fetherstone, 1986). As a result, pupils' interest to learn Mathematics increased and the learning gap of pupils' achievements in this subject were reduced. They are more homogeneous in their performance level.

Contextual Practically

CL is a suitable technique to be used in teaching and learning process in class. It is also a technique that is easy to be implemented and cheap in cost. For example, the CL activities of 'NHT and 'Showdown 1, 2, 3' were easy to conduct as group activities as they only some papers and suitable instruction were needed.

Besides that, these activities are not only interesting and challenging, but also enhanced the pupils thinking and understanding of the subject better. Thus, another benefit of CL is that it encourages pupils to attend school due to their liking for the subject.

Critical Considerations

Justice in the implementation of action research has been highlighted in order to ensure that the CL activities can be carried out according to the rules provided. Throughout the activities, rules were being implemented even though sometimes the rules were not able to be followed thoroughly.

Meanwhile, fairness was being considered within the activities to ensure the pupils were comfortable and adapted to the activity even though each of them was from different background due to their SES. CL has also been shown to improve relationships among students from different ethnic backgrounds. Slavin (1991) stated that "CL methods sanctioned by the school embody the requirements of cooperative, equal status interaction between students of different ethnic backgrounds..."

Correctness in terms of values that the school seeks to impart to pupils was one of the important elements too. The process of CL was an effective technique that helps to foster mutual responsibility. Pupils had learnt to be more patient and more compassionate to each other.

Personal Learning and Reflection

From this action research, I found that CL actually brings a lot of benefits not only to the pupils' learning and interest, but also to my own learning, beliefs, and values of teaching. The first implication is that CL is an effective strategy that can be integrated during teaching and learning process in conducting activities with NHT, "Showdown 1, 2, 3", and "Round Robin".

Furthermore, I discovered that my beliefs of teaching, that is, knowledge must be taught and finished in the shortest period of time to let the pupils learn more and understand better are totally wrong. This is because pupils would not have the chance to understand the knowledge during group discussion. As a result, CL activities provided more space and chances for the pupils to learn together and even to exchange ideas to solve the question from the given task.

Thinking skills were also fully used so that they could think more creatively and critically, followed by the body movement of working together as a team, and the social interaction with each other in a group. These are the aims and values that are emphasized in the National Philosophy of Education, which highlighted the physical, emotional, spiritual, intellectual and social aspects of development.

Anyway, this technique might not be suitable to certain pupils as some of them preferred to do the tasks individually. However, in the long term, if the CL activities are carried out from time to time, pupils will hopefully be more active and willing to work together to solve the problems given in a group.

Another thing to ponder is that I should take time to observe and plan well the methodology in advance in order to face any possibility along the process of collecting data. If possible, learn wisely from the previous local researcher facing the challenges themselves. The utmost importance is referring a lot to the previous research related to this research.

Plan for Future Action

Since CL research has brought a lot of positive result to pupils' learning, pupils' interest, and my teaching practices, I can conclude that CL is a potentially effective teaching-learning strategy. In future, I would like to use other different techniques besides NHT and "Showdown 1, 2, 3" to make sure the class enjoy the group activities more. Team games such as "Teams-Games-Tournament" (TGT) and Slavin's "Student Teams and Achievement Divisions" (STAD) are the next activities that I plan to promote in future in relation to the use of CL in more challenging way.

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USING SONGS TO TEACH MULTIPLICATION IN PRIMARY FIVE CLASSROOM

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk meninjau kebolehan dan minat murid dalam kemahiran mendarab, keupayaan saya dalam mengajar sifir pendaraban melalui penggunaan lagu serta menilai respon murid terhadap penggunaan teknik ini. Tindakan yang digunakan ialah penggunaan lagu dalam pembelajaran mendarab. Responden dalam kajian ini terdiri daripada 16 orang murid dari tiga buah kelas Tahun 5 di sebuah sekolah rendah di Kuching. Data dikumpulkan melalui ujian pra dan ujian pasca untuk murid, borang-borang pemantauan yang diisi oleh rakan dan guru pembimbing, rakaman audio semasa menemu bual guru pembimbing serta soalan-soalan pasca intervensi untuk murid. Data kuantitatif seperti ujian pra, ujian pos dan soalan pos intervensi dianalisis dengan menggunakan statistik sebelum dibandingkan. Data kualitatif seperti dapatan pemantauan dan rakaman audio dianalisis dengan membuat perbandingan. Kajian menunjukkan penggunaan lagu dalam pengajaran sifir pendaraban dapat membantu meningkatkan keupayaan murid dalam mengingat sifir dan keupayaan saya dalam mengajar sifir. Minat murid boleh dipertingkatkan sekiranya alat bantu mengajar yang sesuai digunakan.

Kata kunci: "Unifix Cubes", "Magic Maths", soalan-soalan pos intervensi, pembelajaran berpusatkan murid, soundtrack, penggunaan lagu, mengingat sifir pendaraban, keupayaan mengajar sifir

ABSTRACT

The study was conducted to improve pupils' ability and interest in multiplication, improve my ability in teaching multiplication through using songs and evaluate pupils' responses toward this technique. The action was using songs in learning multiplication. The respondents were 16 pupils from three Primary Five classes. Data was collected through pre and post test for pupils, observation forms from peer and mentor evaluation, audio-recording of interview with mentor and post intervention questionnaire for pupils. Quantitative data such as pre test, post test and post intervention questionnaire were compared after statistical analysis. Qualitative data such as observation and audio-recording was compared to analyze the outcomes. The study showed that the use of songs in teaching multiplication help pupils to improve their multiplication memorization skill and improve my ability in teaching multiplication. The pupils' interest toward learning multiplication by using songs can be improved when suitable teaching aids are used.

Keywords: "Unifix Cubes", "Magic Maths", post intervention questionnaire, pupils-centered learning, soundtrack, using songs, remembering multiplication tables, multiplication table teaching ability

INTRODUCTION

Context

At Institut Pendidikan Guru Kampus Batu Lintang, I had learned about the methods of teaching multiplication. Besides, I also learned the theory of constructivism in teaching multiplication. In the classroom, the constructivist view of learning encourages students to use active techniques, such as, experiments and real-world problem solving using authentic data if possible, to create knowledge and practice that reflect on their understanding.

During my previous practicum at SK LK, I had followed my mentor's instruction to use traditional way of teaching multiplication. The implementation of that teaching strategy does not work as pupils could not remember the multiplication table when they were asked to recite the multiplication table.

The problem I faced during teaching and the idea of constructivism and methodology of teaching multiplication had aroused my thinking of using "Unifix Cubes". This would create multiplication learning environment that involves pupils' active learning through constructing their patterns in learning the multiplication facts themselves. However, after asking them to construct the multiplication patterns by themselves and having some of them recite the multiplication table, I found that my strategy did not work effectively as they still could not remember the multiplication tables. Thus, during the recent practicum, I decided to do an action research on the use of songs as an effective way to teach multiplication. I conducted this research on a group of weak pupils at SK SJ, a school that I was assigned to during the recent practicum.

The teachers used "Magic Maths" in teaching multiplication. This method is for helping pupils to remember the multiplication of 3, 4, 5, 6, 7, 8, and 9. I found this method is of interest to the pupils. The method is new to me and I had not discovered the idea about using "Magic Maths" for teaching multiplication. However, I found that this method did not work very effectively as there were pupils who could not remember the steps involved in constructing the "Magic Maths" table. Besides, if the pupils make any mistake in writing out the "Magic Math", they would not be able to get the correct answer when they use the table to solve multiplication problems.

The use of this method did not work effectively in helping the weak pupils to master the multiplication skill as they still need to remember the multiplication table and there is not much opportunity for them to understand the nature of multiplication such as "multiplication is the repeated addition". There is a gap in learning because if the pupils cannot remember the

multiplication table, then they will not be able to construct the magic table and thus unable to perform multiplication operations.

Thus, the pupils' learning difficulty in remembering multiplication table aroused my thinking about other methods in helping pupils to remember multiplication table. The methods concerned are drills, quizzes and remembering multiplication table through songs. Through comparison on the advantages of these methods, I found that teaching multiplication table through songs would be more effective in helping pupils remember the multiplication table.

Focus of the Study

Given the problems faced by the weaker pupils in remembering the multiplication table, I decided to use a technique that could possibly help them overcome this problem. This technique involves the use of songs to help them remember the multiplication table. I believed that using songs in teaching multiplication could contribute much in helping pupils to improve their multiplication skill as pupils could use their musical intelligence and rhythmic groupings of sound to help themselves in remembering the multiplication tables.

Moreover, this method of using songs to teach multiplication will be easier to implement as it can help SK SJ to fulfill their needs of having assistance in improving pupil's multiplication skill. This school faced the same problem as other schools as many pupils were unable to recite the multiplication tables. The teachers' beliefs about teaching multiplication table contradict with my belief about teaching multiplication. Thus, I decided to administer an initial survey through a short test.

After I had administered a test as my first initial survey to assess their use of "Magic Maths" method for multiplication of 3 to 9, I found that some of the pupils could not solve the problems correctly as they did some mistakes while writing out the steps for "Magic Maths" when practicing.

Besides, I also administered a questionnaire to the pupils as my second initial survey to determine the pupils' readiness and to what extent were they acceptable to my lessons. From the

second initial survey, I found that the majority of the pupils like to sing. All of them would like to learn multiplication. While 50 percent (%) of them believe that the use of songs in teaching multiplication would be interesting and most of them believe that this method would make the lessons enjoyable and meaningful. A total of 56% of the pupils believed that the use of songs in learning multiplication would help them to memorize the multiplication facts.

Gardner (1983) suggested that all people can learn, retain, and express information in a variety of ways. The use of music is one way that people can process information. Thus, I found that the use of songs would be effective in helping pupils memorize multiplication facts better and the lessons would be enjoyable and meaningful when I use the method.

Objectives

The objectives of my study were:

- to use songs to teach multiplication tables to improve pupils' ability to remember the multiplication table;
- to increase the pupils' interest to learn multiplication by using songs in teaching multiplication;
- to improve my teaching practice, skills in teaching multiplication by using songs; and
- to evaluate pupils' reaction to the use of songs in learning multiplication.

Research Questions

This study was done to answer the following questions.

- Can the use of songs in teaching the multiplication table help pupils to remember the multiplication tables?
- Can I increase the pupils' interest to learn multiplication by using song?
- Can I improve my teaching practice, skills in teaching multiplication by using songs?
- What is the pupils' reaction about the use of songs in learning multiplication?

ACTION PLAN

To establish the outcomes in my research objectives, I had conducted some actions such as carrying out the steps of teaching multiplication by using songs and evaluate the pupils' learning and interest towards learning multiplication, my teaching performance and the pupils' reaction to the use of songs in learning multiplication by using various instruments such as pre-test, observations, post intervention questionnaire and interview.

The steps of the teaching method involved displaying the song lyric for a particular multiplication table; guided the pupils to read the song lyric before guiding them to sing the song; asked the pupils to copy the song lyric; having the pupils to practice singing the song at home; administered a short test asking them to complete the questions within a time limit; evaluated the pupils' memorization skills of multiplication fact by randomly picking some pupils to sing the song; asked the other pupils to evaluate the memorization skill of their peers when the chosen pupils sang the song; have pupils comment on their peers' mistakes during singing. These steps were repeated until all the multiplication tables were taught.

Asking the pupils to copy the song lyrics gave them the opportunity to practice singing the songs during leisure. This helped them to improve their multiplication skills so that they can remember the multiplication facts effectively.

According to Brewer (1995), music can be used to help us remember learning experiences and information. Prigge (2002) suggested that the teacher must provide lessons in which the repetition of facts is frequent and creative. Through repetition in singing the same song, the pupils' memorization skill can increase as they can remember what they had learned from the previous lesson.

Then, I tried to identify the possible reasons why pupils were weak in multiplication. After that, I discussed with the teacher about the pupils' strengths and weaknesses. This involved the possible reasons why pupils are weak in multiplication, the teaching and learning activities that the teacher used for

teaching multiplication concepts. Through discussions with my teacher about my findings on pupils' learning ability, I could understand better about the culture of the school, how the teacher teaches the pupils so that I could understand the other factors that contributed to the problem.

In some lessons, I administered a short test by distributing worksheets and asking them to complete the questions within a time limit. According to Kilpatrick and Swafford (2002), formal assessments can help to track students' progress and identify areas in which they need help. Assessing the pupils' learning through pre test, short test and post test can help me to see their progress of learning, what they learnt, how they can apply what they have learn and which part they are unsure of or they have problems. The pre-test and post-test was important for me to analyze the pupils' learning progress and identify the possible factors that contribute to the problems and at the same time useful for me to plan alternatives to help the pupils improve their multiplication skill such as the type of teaching and learning activities, teaching aids and learning materials.

During the process of teaching multiplication, I asked my peer and teacher to observe the lesson. Then, I discussed with them about my teaching performance and the pupils' learning performance. Good (1988) provided a good description of observation.

Some of the major strengths of using classroom observation allow educators to do the following: (1) permit researchers to study the processes of education in naturalistic settings; (2) provide more detailed and precise evidence than other data sources; and (3) stimulate change and verify that the change occurred. The descriptions of instructional events that are provided by this method have also been found to lead to improved understanding and better models for improving teaching. One role of observational research is to describe what takes place in classrooms in order to delineate the complex practical issues that confront practitioners.

Thus, observation is an essential part of my study for improving my teaching practice as it would help me to improve the learning activities.

I provided pupils the opportunity to create the songs that they could use to remember multiplication facts. By asking pupils to create their own multiplication songs, I enhanced their creative thinking in learning multiplication and arts so they could enjoy themselves in learning multiplication. This was also an opportunity for them to communicate with their peers.

To determine the pupils' reactions to the use of the nine songs in teaching the multiplication facts, I distributed post intervention questionnaire to pupils. The questionnaire contained the evaluation aspects about how pupils view my teaching methods, the teaching aids used, the quality of the teaching and learning activities and their feeling about the lessons.

I interviewed my mentor to evaluate my teaching performance and the changes in the pupils' interest toward my lessons. Through the interviews, I found how I could help the pupils to improve their multiplication skill, gained ideas from the teacher about her own findings about the suitable ways that could be used to improve pupils' multiplication skill and interest. Through the findings from the discussion, I seek for new ways of helping the pupils or modify the teacher's ideas to become more effective in helping the pupils. After that, I did some analysis on the data that I obtained and reflected on my own teaching performance and the results of my action.

METHODOLOGY

Target Group and Participants

The participants of the study were 16 pupils, five females and eleven males. A total of six pupils were from 5Z, eight of them were from 5M and two of them were from 5N. Only five of them passed their previous Mathematics examination with marks in the range of 40 percent (%) and above. A total of four pupils were from low income families while the others were from medium income families. A total of seven pupils have both parents as working individuals.

Data Collection and Analysis

Table 1 shows the research questions, the data, the data collection methods and the source of data in this action research.

For each research question, the type of data and the method of data collection are indicated in the table.

Table 1.

Research questions, data, data collection method and source

Research Questions	Data Analysis Method	Data Collection Method	Source
1) "Can the use of songs in teaching the multiplication table help pupils to remember the multiplication table?"	Using statistic	Test: Pre-test, post-test	Pupils
2) "Can I increase the pupils' interest to learn multiplication by using song?"	Compare the data	Observation, interview	Peer, teacher
3) "Can I improve my teaching practice methods, skills and knowledge in teaching multiplication?"	Compare the data	Observation, interview	Teacher and peer
4) "What is the pupils' reaction about the use of songs in learning multiplication?"	Using statistic	Post Intervention Questionnaire	Pupils

REFLECTION ON FINDINGS

Can the Use of Songs in Teaching the Multiplication Table Help Pupils to Remember the Multiplication Table?

After teaching them to remember the multiplication tables, I found that many of them performed very well in the post-test, compared to their performance in first initial survey and pre-test. They performed lower score in remembering the multiplication tables of 7 and 9, but they performed best in remembering the multiplication table of 8. Majority of them performed better in memorizing multiplication facts after being involved in the lessons.

The result showed that the method of teaching multiplication by using songs had improved pupils' memorization of multiplication tables as the mean score achieved by pupils for multiplication of 2 to 9 during pre-test has increased during post-test. Meanwhile, the standard deviation during pre-test has decreased during post-test. This indicated that the pupils' difference between test

scores had decreased. Thus, this method is more suitable in the case of improving pupils' mastery of multiplication tables than through reciting multiplication table and Magic Maths.

Can I Increase the Pupils' Interest to Learn Multiplication by Using Song?

My mentor commented that I had tried my best in capturing the pupils' attention towards the learning activities. However, my mentor and peer found that some pupils seem uninterested in my lesson. It is caused by the lack of appropriate teaching aids for guiding pupils to learn and make the learning environment enjoyable.

She claimed that the pupils did not really put in effort to improve themselves when they were involved in the lesson of learning multiplication by using songs. From the comments given by my mentor, I found that I need to change the learning activities from asking pupils to sing the song to the learning activity whereas pupils construct song lyrics by putting the multiplication facts in the songs lyric of the song that they liked most. By using this method, I could increase the pupils' participation and motivate them towards self-learning in improving their weakness, rather than by using teacher-centered method which was boring to the pupils.

I found that my effort in preparing lesson would affect the pupils' interest toward learning multiplication. To overcome this problem, I could increase the pupils' interest towards learning multiplication by using song when the appropriate motivation, learning activity and instruments are involved. These findings were based on the transcript from audio-recording and observations.

How Can I Improve My Teaching Practice Methods, Skills and Knowledge in Teaching Multiplication?

From the observations and interview on my teaching with my peer and mentor, they claimed that I was good in terms of the lesson preparation as I put enough effort in preparing the lesson. However, during the interview, my mentor commented that I need to improve the type of teaching resources for the lesson.

From their comments, I found that I need to be aware of the resources for teaching that are available in the school. I should prepare these before I start my lesson so that I can prevent the pupils from losing their interest toward learning multiplication by using songs. Thus, I still need to improve my skill of preparation for the lesson.

What are the Pupils' Reaction about the Use of Songs in Learning Multiplication?

Through the analysis of the data on the post intervention questionnaire, I found that the method of using songs in teaching multiplication helped the pupils to remember the multiplication table better and made the lessons enjoyable. As a result, their Mathematics achievement showed improvement. They found that the method helped them to remember the facts, but this method is not the preferred learning style among the pupils as they do not display interest in my lesson. They found that the lesson would be meaningful when their interest in singing is fulfilled when the opportunity for them to create songs is expanded along the lessons.

Through the pupils' responses, I felt that the use of songs in teaching multiplication table could increase the pupils' interest toward learning multiplication if I provide more opportunities for pupils to conduct their own learning. I should provide more opportunity for them to create their own song lyrics by using the multiplication facts as the content for the lyrics and get them to practice by using their own learning style. Thus, I should provide group and individual works instead of just asking the pupils to learn individually.

EVALUATION AND REFLECTION/ SUGGESTION FOR NEXT CYCLE

Evaluation and Reflection

The teaching method of using songs helped pupils to improve their multiplication skill as it inculcated moral value, such as, spending time wisely when pupils are given chance to practice at home. Through modifying a song lyric into a lyric that integrates moral value statements and multiplication facts, teachers can

instill good value among the pupils as the pupils would learn to make use of the songs in learning. Thus, this method can serve as an innovative way for teacher to control pupils. Besides, this method served as another style of learning multiplication. Thus, pupils would have more choices of methods for learning multiplication rather than before.

The usage of songs to teach multiplication can be applied in many classrooms as it can be used as a tool of entertaining the pupils as prior learning can occur. This method can be used by teachers to help slow learners to improve their memorization of multiplication tables. Besides, this method can be a good tool to gain pupils' attention during set induction and handle the misbehaved pupils in a classroom.

This method can fulfill one of the aspects mentioned in the National Philosophy Education as it can fulfill one of the pupils' seven intelligences in learning, that is, musical intelligence. As the need of the pupils who are sensible to sound and rhythm is fulfilled, learning multiplication facts become more meaningful and enjoyable to them. This can make learning opportunities equal to every pupil.

Through the comments from my mentor and peer based on their observations on how the pupils' progress and interest in learning multiplication by using songs, I found my strengths and weaknesses in teaching multiplication through songs.

The design of various learning activities in teaching multiplication by using songs is also important as the same activities made the pupils bored during lessons. Thus, providing freedom for pupils to conduct their own learning is vital.

Suggestion for Next Cycle

I would like to continue my next cycle by integrating pupil-centered learning in teaching multiplication through songs as I found that my method of teaching during this study is more teacher-centered.

Besides, I should prepare the lesson carefully before conducting a lesson. I should prepare all the instruments and teaching aids

needed for my research before I implement my actions. Through early preparation, I can avoid problems, such as, lack of time or money to prepare the teaching aids. Thus, it can help me conduct the research smoothly and keep the pupils' interest towards learning multiplication by using songs.

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THE USE OF MULTI-ABILITY GROUP WORK TO INCREASE PUPILS' INTEREST AND LEARNING IN A PRIMARY FIVE MATHEMATICS CLASS

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ABSTRAK

Fokus kajian saya adalah untuk menyelesaikan masalah kekurangan minat murid dalam pembelajaran Matematik dan seterusnya meningkatkan prestasi pembelajaran mereka. Masalah kekurangan minat dalam pembelajaran Matematik telah mendatangkan kesan buruk dalam kelas saya di mana murid-murid mempunyai motivasi dan keyakinan yang kurang. Mereka enggan belajar dan tidak sedar akan kepentingan belajar Matematik. Dalam kajian saya, saya menggunakan teknik kumpulan pelbagai kebolehan untuk menyelesaikan masalah saya. Peserta kajian ini terdiri daripada 40 orang murid Tahun 5 di sebuah sekolah di mana saya menjalani praktikum fasa tiga. Saya mengumpulkan data secara kualitatif dan kuantitatif untuk mendapatkan keputusan. Saya mendapati bahawa kajian ini tidak dapat menolong saya dalam menyelesaikan masalah saya secara sepenuhnya. Oleh yang demikian, saya mencadangkan pembelajaran secara kooperatif pada kajian akan datang.

Kata kunci: Minat belajar, hasil pembelajaran, kumpulan pelbagai kebolehan, pengurusan bilik darjah, pembelajaran kooperatif

ABSTRACT

The focus of my study was on solving the problem of pupils' lack of interest and hence, improved their learning in mathematics in my class. The problem of students' interest in Mathematics had disrupted my teaching in class in the sense that pupils had low

motivation and low confidence. They did not have the eagerness to learn in the class and they could not see the meaning of learning mathematics. In this study, I used multi-ability group work in order to help me solved my problems. The participants for this study were 40 Primary 5 pupils in a school that I had my third phase practicum. I collected qualitative and quantitative data in my study. I found that this intervention could not really solve my problem. Hence, I suggested cooperative learning for my next research.

Keywords: Pupils' interest, learning outcomes, multi-ability group work, classroom management, cooperative learning

INTRODUCTION

Context

I had my practicum in two schools, which were SK OTS during Semester 5 and SK TU in semester 6 last year. I taught Year 4 pupils in both schools. The pupils in both schools were very weak in Mathematics. They could not master the skill well. I found out that their basic skills in Mathematics especially skills involving multiplication and division were very weak. They could not understand my lesson. The language barrier had also prevented them from mastering the Mathematics skill. As a result, they felt they were useless and had low self-esteem. They were not confident even though they answered correctly. Consequently, they did not hand in the homework. Besides, they became not interested in learning Mathematics. They felt bored in the class. For me, class control had been the main issue since the first practicum. Hence, through this study, I wanted to improve my classroom management skills by implementing mixed-ability group work in the class.

Focus

The focus of my study was on solving the problem of pupils' lack of interest and hence, to improve their learning of mathematics in my class. The problem of pupils' interest in mathematics had disrupted my teaching in class in a sense that pupils had low motivation and low confidence. They did not have the eagerness to learn in the class and they could not see the meaning of

learning Mathematics. Therefore, they began to feel bored and did not want to hand in their homework. As their teacher, I could not check on their daily progress. I did not know the level of their understanding. As a result, many of the pupils were left behind. Pupils who were able to master the skills continued to improve in their knowledge while pupils who were left behind continued to decrease in their learning of Mathematics.

In my opinion, group work could promote active learning among the students. Therefore, I decided to carry out group work in order to solve the problem concerned. Before carrying out this study, I did a survey on the preference of the pupils regarding group work before I implemented the group work. I found out that most of the students liked to have group work in their class. Some pupils wanted to have group work in the class with wrong motives while some hope to improve their learning through group work. There were also a number of pupils who did not like group work because they preferred to work alone.

Objectives

The objectives of the study were:

- to increase pupils' interest towards Mathematics;
- to improve pupils' learning outcome in Mathematics; and
- to improve my classroom management skill in Mathematics class.

Research Questions

The research questions were as follow.

- Can group work enhance pupils' interest in Mathematics?
- Can pupils' achievement in Mathematics be improved through group work?
- Can the use of the strategy help me improve my skills in managing discipline in class?

ACTION PLAN

According to Sullo (2007), each time we learn something new we are having fun. It is our playfulness and our sense of discovery that allows us to learn as much as we do. Glasser (1990) in Sullo (2007) stated that fun is the genetic payoff for learning.

Therefore, in this study, I focused on mixed ability grouping strategy.

After I had done an initial survey and reviewed some literature, I began to plan my action in detail. According to Fisher (1995), groups of four allow maximum communication between individuals. Therefore, in my study, each group had four members with one leader appointed by the pupils. Besides, I ensured that each group is made up of mixed-ability pupils. This was done by looking at their past results in Mathematics. Since my class was formed of mixed abilities pupils, I grouped them according to their seating arrangement. By doing this, I would be able to reduce the pupils' movement during group work. Then, I asked the students to name their groups according to the name of month. By this, I had 10 groups in the class. Since I had only limited time for this study, I retained the group for every lesson.

In order to make this study a success, I came out with an implementation schedule. Table 1 shows my implementation schedule for this study.

Table 1.
The weekly outline of the action plan

Time (Week)	Activities
1	Collected data about the students by giving questionnaire. Divided the students into groups of four.
2	Had an appointed leader in each group. Asked the students to name their group according to the name of the months. Observation by my mentor and lecturer using PR1 form.
4 – 5	Carried out group work. Observation by my mentor.
6	Giving Progressive Test 1 to the pupils
8-9	Carried out group work Observation by mentor and lecturer
10 - 11	Carried out group work. Observation by mentor.
12 - 13	Observation by my mentor and lecturer. Giving test to the pupils to examine their improvement in learning. Giving questionnaire to the pupils to know their interests in Mathematics and their opinion about group works.

METHODOLOGY

Participants

Last semester, I had my practicum at SK GR. The participants in this study were 40 pupils in my year 5 Mathematics class. There were 20 boys and 20 girls in this class. Some of the pupils in this class obtained good results academically. However, there were also some of them who always failed in their examination. Some of them were not consistent in their performance.

Most of the boys were very naughty and they liked to made noise in the class. They were also very lazy. They would give a lot of excuses for not handing in their homework. The girls were more behaved in the class. However, some of them were very lazy. Sometimes, they just simply did the homework given without thinking and carelessly. Some of them only liked to do their own things and did not pay attention to the teacher. Most of them liked to talk and play with their friends. During lessons, they kept talking even after being warned by the teacher. Some of them thought that Mathematic was useless to them and they felt bored during Mathematics lesson.

Most of my pupils were from good family background. Some of their parents were teachers, soldiers, businessmen and so on. Most of the parents were able to supply the needs of the pupils. Their parents sent them to and fro from school. They were not lack of any stationery needed.

Most of the pupils in my class were interested in Mathematics. They liked to have Mathematics. A few of them did not like Mathematics because they thought it was very difficult. Some of them liked Mathematics because of their parents. Besides, most of them liked to have group work in Mathematics class. Some of them preferred to work alone.

Data Collection

In order to answer the research questions, data was collected from various sources in relation to each of the research question. Table 2 shows the research questions, the data for each question, the method used to collect the data and the source from where the data was collected.

Table 2.
Methods and sources to collect the data

	Research Question	Data	Method	Source
1.	Can group work enhance pupils' interest in Mathematics?	Interest	Questionnaire	Students
2.	Can pupils' learning outcomes in Mathematics be improved through group work?	Learning outcomes	Test 1 and test 2	Teacher, students
3.	Can the use of the strategy help me improve my skills in managing discipline in class?	Class control	Observation, PR1 form and checklist	Mentor, lecturer

In order to collect the data of pupils' interest in Mathematics, I gave them a questionnaire to answer. This questionnaire consists of 4 items related to pupils' interest with two negative items. Pupils were required to give response "Yes" or "No" in this questionnaire. I also included one open question in the questionnaire to know the feeling of the pupils towards Mathematics. I was able to give the questionnaire only to 39 out of 40 pupils in the class due to one of the pupils being absent.

In order to know whether the pupils improve in the learning outcomes, I gave the pupils two tests to see their learning outcome. Test 1 was the mid-term Semester 1 examination. The test consisted of Paper 1 and Paper 2. Paper 1 contained 40 objective questions and Paper 2 contained 20 subjective questions. Test 1 was given to all the pupils in the class during March. For Test 2, I gave the test at the end of April to 39 pupils only. One was absent due to health problem. This test consisted of 20 objective questions and 10 subjective questions. The number of questions in Test 2 is half of Test 1. The tests also applied the cognitive level skill of Bloom's Taxonomy.

I used teaching practice appraisal form (PR1) as the main source to examine my improvement in my classroom control. PR1 form is a type of form used to check on the teaching practices of teacher trainees. There are four parts in the form. I focused on Part B, item c which is about classroom management. The rating scale ranged from 1 (very poor) to 5 (excellent). There are also

columns for the mentor and lecture to give their comments. The observations were done from time to time throughout my duration of practicum in the school. I analyzed the data by comparing the ratings given to me over the period by my mentor and lecturer. I used the scale in the form to analyze my skills. Then, I used the comments given in the form as a support to the data.

Data Analysis

To analysis each data, I used different methods. Table 3 shows the methods I used to analyse my data.

Table 3.

Methods to analysis data

	Research Question	Data	Analysis
1.	Can group work enhance pupils' interest in Mathematics?	Interest	Compare the percentage of each response for each item and bar graph
2.	Can pupils' learning outcomes in Mathematics be improved through group work?	Learning outcomes	Compare the mean and standard deviation for Test 1 and Test 2
3.	Can the use of the strategy help me improve my skills in managing discipline in class?	Class control	Compare the rating over period and line graph

RESULT AND FINDINGS

Can group work enhance pupils' interest in Mathematics?

Table 4 shows the distributions of pupils' pre and post responses to the items in the interest questionnaire.

Table 4.

Distribution of pupils' pre and post responses to the items in the interest questionnaire

No.	Item	Responses			
		Pre		Post	
		Yes	No	Yes	No
1	I think Mathematics is interesting.	38 (97%)	1 (3%)	38 (97%)	1 (3%)
2	I like to deal with numbers.	33 (87%)	5 (13%)	39 (100%)	0 (0%)
3	Mathematics is useless to me.	13 (34%)	25 (66%)	3 (8%)	36 (92%)
4	I feel bored in Mathematics class.	4 (10%)	35 (90%)	2 (5%)	37 (95%)

From Table 4, it is clearly shown that 97 percent (%) of the pupils were interested in Mathematics for the pre and post intervention. Only 3% of them were not interested in Mathematics even after the intervention. Besides, 87% of them liked to deal with numbers before intervention. After the group work was carried out in the class, the number of pupils who liked to deal with numbers increased to 100%. Then, about 34% of the pupils agreed that Mathematics was useless for them for pre intervention. However, only 8% of the pupils agreed that Mathematics was useless to them after the group work was carried out. Moreover, 10% of the pupils felt bored in Mathematics class before the group work was carried out in the class. However, the numbers of pupils decreased to 5% after the group work was carried out. Figure 1 shows the responses of the pupils before and after the intervention.

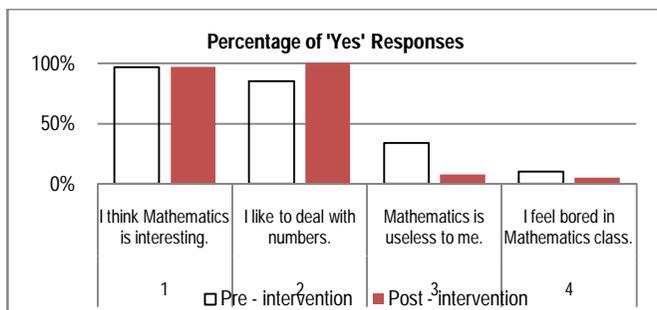


Figure 1. The comparison of percentage of "Yes" responses for pre and post intervention.

From the graph, we could conclude that the pupils' interest in Mathematics was slightly increased after the group work was introduced to them while most of them maintained their interest in Mathematics before and after the group work was introduced to them. Table 4 shows the responses of female and male pupils to each item for pre and post intervention.

Can pupils' achievement in Mathematics be improved through group work?

Pupils' achievement in Mathematics was compared using the mean score and standard deviation of Test 1 and Test 2. The mean and standard deviation for both tests are shown in Table 5.

Table 5.

Mean and standard deviation for Test 1 and Test 2

	Test 1 (n=40)	Test 2 (n=39)	Difference
Mean	49.85	51.95	2.1
Standard Deviation	20.6	21.65	1.05

From the table, the mean score for Test 1 and Test 2 were 49.85 and 51.95 respectively. The mean score for Test 2 increased faintly compared to test 1. The difference of the mean score for both tests was 2.1. Since the difference is small, I could not conclude that this intervention helped to improve pupils' learning in Mathematics. However, the standard deviation for Test 2 also showed a little increase compared to Test 1. The standard deviation for Test 1 and Test 2 were 20.6 and 21.65 respectively. Both tests showed a difference of 1.05 in the standard deviation. It meant that the difference among the pupils increased after the group work was carried out in the class. Table 6 presents the mean and standard deviation based on gender for Test 1 and Test 2.

Table 6.

Mean and standard deviation based on gender for Test 1 and Test 2

	Gender			
	Female		Male	
	Test 1	Test 2	Test 1	Test 2
Mean	47.5	51.95	52.2	51.95
Standard Deviation	21.42	23.67	20.01	20.17

From the table, it is shown that female pupils' achievement in Mathematics improved by comparing the mean for Test 1 (47.5) and Test 2 (51.95). The difference between both mean was 4.45. However, the achievements for male pupils decreased after the intervention. The mean scores for Test 1 and Test 2 for male pupils were 52.2 and 51.95 correspondingly. Both mean score differed by 0.25. The standard deviations for both female and male pupils increased after the intervention especially for female pupils. The standard deviation for female pupils for Test 1 and Test 2 were 21.42 and 23.67 respectively with the difference of 2.25. On the other hand, the standard deviations for male pupils for both tests were 20.01 and 20.17 with the difference of 0.16. This showed that the difference in achievement among girls

became bigger after the intervention while the boys still remained almost the same.

Can the use of the strategy help me improve my skills in managing discipline in class?

For my skill in managing the discipline in class, I used PR1 form for self evaluation. The rating scale for PR1 form ranges from 1 (very poor) to 5 (excellent). Table 7 shows the rating of my mentor over four observations.

Table 7.

Mentor's rating on classroom management skill

Date	11/2/2010	4/3/2010	23/3/2010	8/4/2010
Rating	4	3	5	5

From Table 7, it is clearly shown that I have improved in my skill related to managing the discipline in the class after the group work was carried out in the class. For the first observation, I was rated 4 by my mentor. However, my rating dropped to 3 for the second observation. This may be due to my pupils who were still new to the intervention. Besides, I was also new and lacked of skill as well as knowledge in carrying out group activities. I was then rated 5 by my mentor for the third and fourth observation. Figure 2 shows the rating of my mentor on my classroom management skill over four observations.

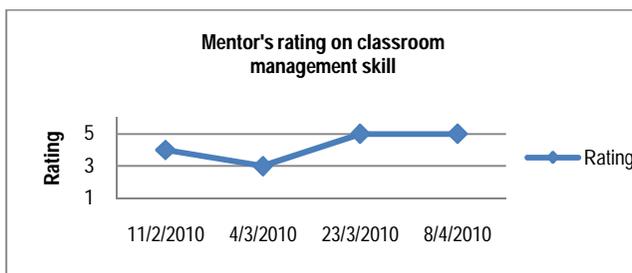


Figure 2. Mentor's rating on classroom management skill.

Besides my mentor, I was also observed by my lecturer using the PR1 form. Table 8 shows the rating by my lecturer on classroom management skill over three observations.

Table 8.
Lecturer's rating on classroom management skill

Date	9/2/2010	30/3/2010	27/4/2010
Score	4	3	5

From the table, I was rated 4 for my first observation but the rating decreased to 3 for my second observation. This was probably due to my pupils who were still new to the intervention. Besides, I was also new and lacked of skills in carrying out the activities. Therefore, the activity could not be carried out as planned. I was then rated 5 for the last observation. Figure 3 shows the rating of my lecturer on my classroom management skill over three observations.

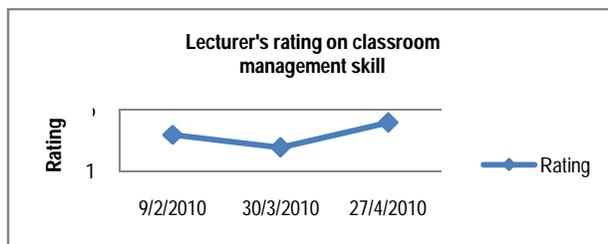


Figure 3. *Lecturer's rating on classroom management skill.*

CONCLUSION

Evaluation and Reflection

A successful mixed- ability group work is not an easy strategy to be implemented in the class. It requires the teacher to be skillful in conducting and directing the pupils to the task. Team work among the pupils also is one of the main issues to be considered in implementing the mixed-ability group work. Pupils may tend to drift off-task during the group work because they do not have the same motives. Therefore, it is important for teachers to help to inculcate the team spirit among the group members.

This intervention has its good and bad effect for the class. The pupils were motivated as they learned due to their eagerness to do the group work. They competed among each other and tried their best to win for their group. Each of the members would learn the value of responsibility and accountability as they worked more and more in group. Besides, the leadership skill

could also be imparted among the students. Pupils learn to make use of every resource they have and make their own decision. They were responsible to take up the challenges given. In addition, pupils could learn in relax and fun way using group work. They have discussion and arguing of thoughts. This encourages critical thinking among the pupils. It also helped the shy and quiet pupils to voice their ideas. Pupils who were shy to speak to the teacher would feel secure and safe to talk with their friends. They were encouraged to communicate with their peers in their effort to accomplish the tasks given.

Own Learning

I learn a lot through this research. This action helped me to become a better teacher in the sense that it helped me to consider the needs of the pupils. I could help the pupils who were left behind to be motivated to voice out their ideas through group work. Besides, the pupils were more comfortable to do the task with their friends. Group work encouraged argument within the groups and hence motivated the pupils to think for the action taken. It promoted rational and logical thinking among the pupils.

In addition, the group work helped me to understand the pupils better. Some of the pupils were lazy to think and were not able to communicate well with their friends. Group work helped me to identify those pupils as I monitored the groups. Not only that, different pupils have different learning styles. Some pupils like to work alone while others in groups. Group work indirectly helped me to identify the learning styles of my pupils.

Group work helped me to realize the importance of instructional language in the class. As a teacher, I need to make sure the language I use suit the level of the pupils. I have to use simple and short sentences to enable my pupils to understand my rules. By this, the pupils would know clearly my expectation and their goals.

Suggestion of Next Action Research

After I carried out the mixed-ability group work, I discovered that some pupils learned while others did not benefit from the intervention. This was probably because some of the pupils tend to depend on other group members to do all the tasks while they

were playing. Sometimes a group effort ends with one or two pupils doing the work of the entire group. Group work can be useful, but true cooperative learning requires much more than simply putting pupils in groups (Woolfolk, 2001). Therefore, in order to improve the pupil's learning in Mathematics as well as enhancing the awareness of their own responsibility, cooperative learning could be carried out.

Collaboration and cooperative learning have a long history in American education. Cooperative learning could help the participants to rehearse, elaborate and expand their knowledge. As group members question and explain, they have to organize their knowledge, make connections and review all processes that support information processing and memory. Besides, cooperative learning encourages social interaction among the pupils. Social interaction is important for learning because higher mental functions such as reasoning, comprehension and critical thinking originate in social interactions and are then internalized by individuals. Children can accomplish mental tasks with social support before they can do them alone. Thus, cooperative learning provides the social support and scaffolding that pupils need to move learning forward.

There are a lot of class activities using cooperative learning, for instance, "Jigsaw", "Think-Pair-Share", "Round Robin", "Brainstorming", "Numbered Heads Together" and so on. The teacher can always vary in using the different types of class activities to inculcate cooperative learning in the class. By this, pupils will be eager to learn due to different activities. They will be motivated to learn and be accountable to their own team. In conclusion, I will try Cooperative Learning in my next study.

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THE EFFECT OF FINGER METHOD IN IMPROVING PRIMARY FOUR PUPILS' MULTIPLICATION SKILLS

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ABSTRAK

Penyelidikan tindakan ini dijalankan untuk menilai sejauhmanakah keberkesanan "Finger Multiplication Method" dalam menyelesaikan masalah murid lemah dalam menguasai kemahiran mendarab. Responden dalam kajian ini terdiri daripada 15 orang murid dari Tahun 4N SK SJ yang dikenal pasti sungguh lemah dalam penguasaan kemahiran mendarab mereka. Data dikumpulkan melalui ujian pra dan ujian pasca. Hasil analisis data mendapati bahawa seramai 13 orang responden menunjukkan peningkatan markah yang ketara dalam ujian pasca berbanding ujian pra. Keputusan kajian menunjukkan bahawa "Finger Multiplication Method" sangat berkesan dalam membantu murid lemah memahami dan seterusnya menguasai kemahiran mendarab.

Kata kunci: Kaedah pendaraban dengan jari tangan, penguasaan, kemahiran mendarab, kesan, penyelesaian soalan pendaraban

ABSTRACT

The purpose of the study was to determine the extent to which "Finger Multiplication Method" could be effective in helping resolve the problem of pupils' poor mastery in their multiplication skills. The respondents consisted of 15 pupils from Year 4N of SK SJ who were very weak in their multiplication skills. The data for this study was collected using pre- and post-tests. The results showed that 13 pupils achieved significantly higher marks in the post-test as compared to the pre-test. The results of the study showed that the "Finger Multiplication Method" was

effective to a large extent in helping the pupils to master their multiplication skills.

Keywords: "Finger multiplication method", mastery, multiplication skills, effect, solving multiplication questions

INTRODUCTION

Context of the Study

"Learning the arithmetic facts in the first four grades can be pretty hard work for some students" (Hanlon, 2009). This is very true as I experienced this, especially in teaching the pupils to master multiplication skills. Year 4 pupils couldn't even multiply very basic multiplication. Teaching them when they are in Year 1 or 2 was really a very difficult job. If they are not taught properly, they will not master the multiplication skills.

"Teaching does not occur until learning does" (Patterson, 1999). Teachers in school had taught them multiplication by using diagrams, patterns, arrays, and standard written method. They think that the pupils had understood and mastered the multiplication skills. However, they did not realize that actually the pupils did not understand and master the multiplication table. This scenario could be seen in schools including the school that I had my practicum. The pupils were really weak in their multiplication.

According to Yeung and Leung (2008), "the majority of students in Primary three, four or even five would still make silly mistakes in simple multiplication or division as they have trouble with the multiplication table." During my first and second practicum, and even the recent practicum, I have come across pupils of Year 4 and 5 who could not solve simple multiplication questions, as they could not memorize the multiplication table well. Some of them could not memorize at all.

When the pupils are not able to solve simple multiplication, they feel uninterested to learn Mathematics anymore. They lost interest in learning Mathematics as they found Mathematics very difficult. "This often leads to frustration, low self-esteem, lack of confidence and loss of interest in Mathematics. Something must be wrong and something must be done" (Leung & Yeung, 2008).

For my first practicum until now, I have experienced the same scenario where there were pupils in my class who were not interested at all in learning Mathematics. I had tried to involve them during my teaching, but I think it was a failure for me to do what I wished.

Why do children find it so difficult to learn the multiplication table well while they can learn computer games so fast? Are they fearful of the multiplication table? Is it because of the boring traditional method of memorizing the table column by column? Can teachers make the learning of the multiplication table more interesting and easier? These questions came to my mind, and I think as a teacher, learning of the multiplication table should be made more fun, interesting, and easier so that the pupils can master the multiplication skills.

Hence, to enhance the pupil's learning, I believe that pupils should acquire the understanding about multiplication by using the learning atmosphere where they can enjoy and express what they have learned in creative ways and do not feel stressful to remember the facts. I am doing this research to improve on their multiplication skills. I have used an alternative way to teach multiplication to these target pupils, which is by using finger method.

Focus of the Study

My first and second practicum was carried out at SK ST and SK AA respectively. I did my third practicum at SK SJ. To my surprise, all the three schools have the same problem related to mastery of multiplication skills. There were 15 pupils of Year 4N facing the problem in their mastery of multiplication facts involving numbers, ranging from 6 to 9. Some of them simply could not recall and recite the multiplication tables, even for small numbers like 2 and 3.

Undeniably, different ways have been implemented by the Mathematics teachers to improve the pupils' mastery of multiplication skills. "Magic Maths" and "Lattice Method" were two ways that were being implemented to help the pupils in their multiplication. In "Magic Maths", they have to remember the steps to write down all the multiplication from 2 to 9. I agree that

it is easy to write multiplication tables for 3, 5, 8 and 9. They need to write all the multiplication facts before they do the multiplication. However, for me, it is a waste of time and energy. Besides, when they do multiplication, they need to refer to the written "Magic Maths". If they make a single mistake while writing, the whole multiplication will be wrong. For the lattice method, it is very useful to help them in multiplying numbers more than 2 digits. However, they cannot do that if they cannot recite multiplication facts.

I found that finger multiplication method is very useful and effective in helping the pupils, especially the weaker ones. Researchers have been saying that pupils learn best through doing, practicing, and experiencing it. I strongly agree with this as the pupils can learn best when they themselves experience it through their own participation. Besides, it is said that the pupils must have some realia to be seen where the realia can make them understand the concept easier. The realia is in concrete form and can be seen. Now, their own fingers are the most powerful "realia" and they can use it all the time. During my school days, reciting the timetable was the best way. Anyway, there is another better way to help us remember all those multiplication facts. It is interesting as the learner can play with their own fingers, and amazingly they can get the answers from their fingers. As the fingers are always with them all the time, they will have no problem in knowing all the basic multiplication facts.

I had carried out an initial survey to know the pupils' mastery Level of multiplication skills. I had given them a pre-test to know whether they could do the basic multiplication facts. There were 45 questions in the pre-test, which consisted of simple multiplication question ranging from time-table 1 until 9. Five questions were set for each time-table. I did this to find out which multiplication table that the pupils could not master. I found out that most of the pupils had difficulties in doing the questions of multiplication table 6, 7, 8, and 9. Some of them could not even master the multiplication table for 2, 3, and 4.

Objectives

The objectives of my study were:

- to improve pupils' multiplication skills,
- to increase the pupils' interest in learning multiplication by using finger method, and
- to improve my own teaching performance.

Research Questions

In relation to the objectives, my research questions were:

- Can the finger method improve the pupils' multiplication skills?
- Can the finger method raise the pupils' interest in learning multiplication?
- Will the use of finger multiplication method affect my teaching performance?

ACTION PLAN

During the first week of practicum, I had done my initial survey. I had collected my pupil's background from the class teacher. Besides that, I also collected their previous exam marks. I had given a pre-test to test my pupils' mastery of basic multiplication facts. After that, I had chosen 15 pupils who had problems in basic multiplication facts. I gave them the questionnaire to fill in. The week after that, I analyzed the data that I had collected from the pre-test into the form of table and graph. The following two weeks, I carried out the finger method to teach them multiplication. I asked my mentor to observe my teaching and assess my teaching performance based on the PR1 form. In the second last week, I gave another test to test my pupils understanding. I also administered questionnaire to the pupils. I use post-test to measure whether the finger method had helped them in mastering multiplication facts. After that, I also analyzed and presented the post-test data, questionnaire data, and the PR1 form data into the form of table and graph.

Target Group and Participants

For this research, I had selected 15 pupils from Year 4N, SK SJ, Kuching to be my target participants. They consisted of 8 boys and 7 girls, with their age ranging from 9 to 10. These pupils

could not master the multiplication facts from 6 to 9. Almost all of them got them wrong.

METHODOLOGY

Table 1.
Data, Method, and Source of Data Collection Based On The Research Questions

Research Questions	Data	Method	Source
1. Can the finger method improve the pupils' multiplication skills?	• Test score	• Pre-Test • Post-Test • Questionnaire (Pre and Post)	• Pupils
2. Can the finger method raise the pupils' interest in learning multiplication?	• Scores in interest	• Questionnaire (Pre and Post)	• Pupils
3. Can the finger multiplication method improve my own teaching performance?	• PR1 scores	• Observation	• Mentor

In order to answer the first research question, I used pre-test and post-test to find out whether the target participants had improved in their learning. Pre-test is a test given to the target participants, aiming to carry out an initial survey about the pupils' level of understanding according to the focus of this study. I had given the pre-test to the target participants. The test consisted of 45 basic multiplication facts, ranging from multiplication table 1 until 9, where there were five questions for each multiplication table. Besides, post-test was given to the target participants. This post-test was the same as the pre-test given earlier. I used the same instrument as post-test, aiming to measure the effectiveness of the finger method towards the pupils' mastery of multiplication facts. This test was administered to the target participants after I taught them how to multiply by using finger method. After giving them this post-test, I could compare the marks with the marks of pre-test and from there, I could conclude whether the finger method is effective or not in helping the target participants to improve on their mastery of multiplication skills. Apart from that, I also used questionnaire to get the pupils' feedback about their learning. The questionnaire consisted of eight items. The items

5, 6, 7, and 8 in the questionnaire were designed to measure whether the pupils had improved in their mastery of multiplication skills. I had given the questionnaire for my pupils to fill in before and after I implemented the finger method. By this, I could compare the findings of both the questionnaire to see whether the pupils' had improved in learning multiplication facts.

In order to answer the second research question, I used the same questionnaire to measure the pupils' interest in learning multiplication. The items 1, 2, 3, and 4 in the questionnaire were designed to measure whether the pupils had become more interested in learning Mathematics and multiplication. I had given the questionnaire for my pupils to fill in before and after I implemented the finger method. By this, I could compare the findings of both the questionnaires to see whether the pupils' gained more interest in learning multiplication.

In order to answer the third research question, I used the rating score of the PR1 form to measure my own teaching practice. I had asked my mentor and lecturer to assess and rate me by using the PR1 form during observation.

Effect of Finger Multiplication Method on Pupils' Learning

In this study, I had administered pre-test and post-test to the pupils. Both the pre-test and post-test contained the same multiplication questions. Each test consisted of 45 questions, five questions for each time table, ranging from time table 1 until timetable 9 respectively. Table 2 presents the data on pupil's test scores for pre-test and post-test.

Table 2.
Pupils' Test Scores For Pre-Test and Post-Test

Pupil	Test Score (out of 45 questions)	
	Pre-Test	Post-Test
P1	19	43
P2	17	31
P3	24	37
P4	39	44
P5	32	28
P6	41	45
P7	36	39
P8	30	30
P9	27	38

P10	27	35
P11	35	44
P12	40	41
P13	38	41
P14	24	36
P15	22	33

From Table 2, it could be clearly seen that most of the pupils had improved in their test score for post-test. P1 scored 43 out of 45 questions, which was 24 questions more than the score for pre-test. However, P5's result had dropped from the score of 32 to 28 out of the total of 45 questions.

The mean score for both the pre-test and post-test can be used to show whether the pupils had improved in their mastery of multiplication skills. Figure 1 presents the comparison of the mean scores for both pre-test and post-test.

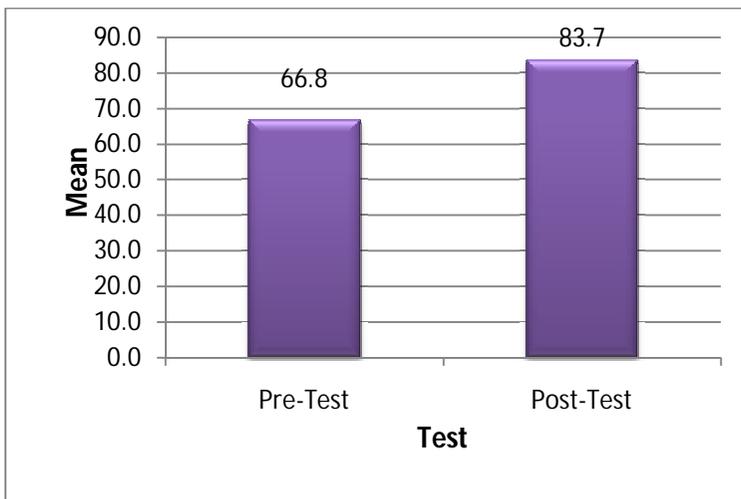


Figure 1. Comparison of Mean Scores for Pre-test and Post-test.

From Figure 1, it is clearly seen that the mean score for post-test was higher than the mean score for pre-test. The average score has increased by 16.9, which shows a great improvement in the pupils' learning performance. This indicated that the pupils had improved in their mastery of the multiplication facts.

However, it is not enough to prove that all the pupils had improved in their mastery of multiplication skills by just looking at the mean score. Although the mean score was high, it could not fully prove that all the pupils had improved. There is a possibility that few pupils might get extremely high scores and many pupils might get average scores. The aspect of individual difference must be taken into account here, which means the standard deviation of the test should be considered. Standard deviation is a measure of the dispersion of a set of data from its mean. Figure 2 shows graphically the comparison of the standard deviation for both pre-test and post-test.

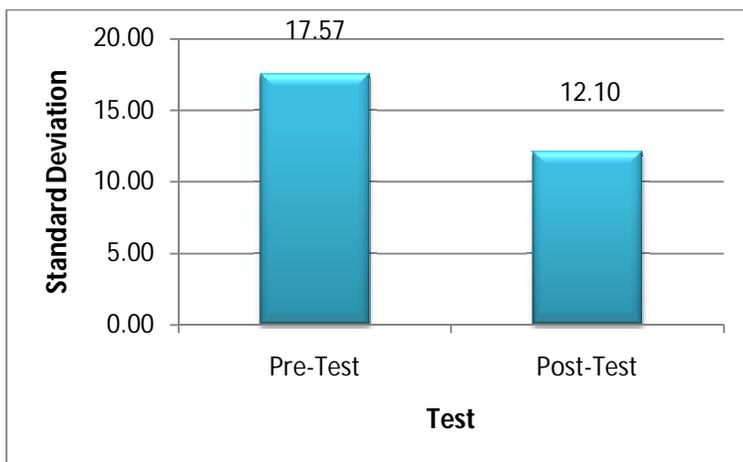


Figure 2. Comparison of Standard Deviation for Pre-test and Post-test.

From Figure 2, it is clearly seen that the standard deviation for the post-test was lower than the standard deviation for the pre-test. The standard deviation for the post-test was 12.10, which is 5.47 lower than the standard deviation for the pre-test. The high standard deviation in the pre-test tells that there were relatively more pupils scoring toward one extreme or the other. This indicated that the marks were spread out widely and far from the mean score, which shows that the pupils' scores diverged widely. Therefore, it could be said that the individual differences among the pupils was bigger.

On the other hand, the standard deviation for post-test was lower. This indicated that the marks were not spread out widely and it was near to the mean score, which showed that the pupils' scores did not diverse widely. Therefore, it could be said that the individual differences among the pupils was smaller.

Besides analyzing the data as a whole, I had analyzed the data for each multiplication table, to see whether the pupils had problem in which multiplication table. The pre-test and post-test administered consisted of 45 questions with five questions for each multiplication table, ranging from time table 1 to time table 9. Figure 3 presents the comparison of percentages of correct answers for each multiplication table for both pre-test and post-test.

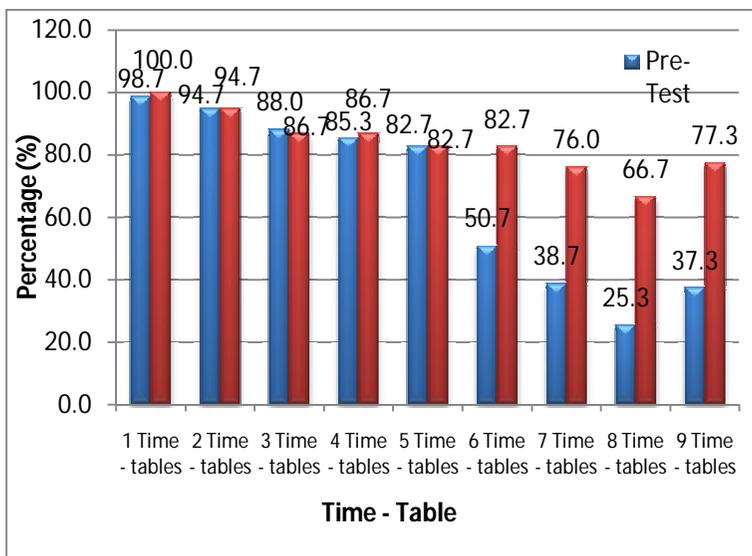


Figure 3. Comparison of Percentages of Correct Answers for Each Multiplication Table for Pre-test and Post-test.

From Figure 3, it is clearly seen that there was great improvement on the percentages of correct answers for time table ranging from 6 to 9. This indicated that the pupils had

improved in their mastery of multiplication skills especially on the time table ranging from 6 to 9. This shows that the finger method was effective in improving the pupils' multiplication skills. From Figure 3, it can also be concluded that the time table 8 was the most difficult for the pupils to learn as the percentages for both pre-test and post-test were the lowest.

To support the findings shown previously, I had also given the pupils questionnaire to fill in. The questionnaire was given before and after the finger method was implemented. It consisted of 8 items, at which item 5, 6, 7, and 8 were used to measure pupils' learning. Figure 4 presents the comparison of mean score for each item in both the questionnaires which were given before and after the implementation of finger method.

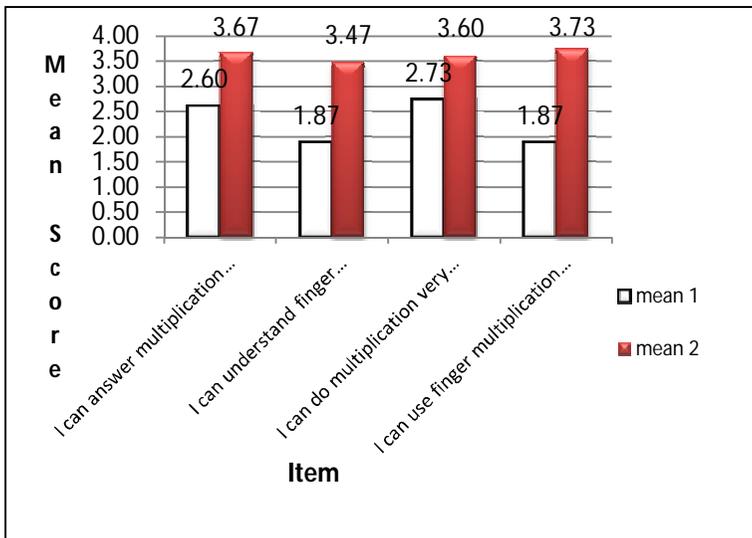


Figure 4. Comparison of Mean Scores for Items in Questionnaire (Pre & Post).

From Figure 4, it can be clearly seen that the mean scores for all the items had increased. The mean score for the item "I can answer multiplication questions easily" had increased from 2.60 to 3.67. For the item "I can understand finger multiplication easily", the mean had increased by 1.60. Besides, the mean for

the item "I can do multiplication very quickly" had increased from 2.73 to 3.60. The mean for the last item had also increased, which was by 1.86. All these indicate that the pupils had improved in their multiplication skills after the finger method was implemented.

Effect of Finger Multiplication Method on Pupils' Interest

Questionnaire had been used to collect data on this aspect. This questionnaire was administered to the pupils before and after the finger method was implemented. It consisted of eight items, at which item 1, 2, 3, and 4 were used to measure pupils' interest in learning mathematics and multiplication. Figure 5 presents the comparison of mean score for each item in both the questionnaires which were given before and after the implementation of finger method.

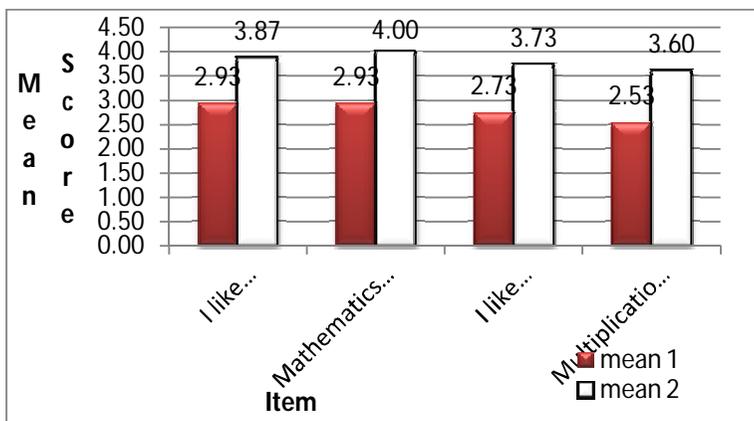


Figure 5. Comparison of Mean Scores for Items in Questionnaire (Pre & Post).

From Figure 5, it can be clearly seen that the mean scores for all the items had increased. The mean score for the item "I like Mathematics" had increased from 2.93 to 3.87. For the item "Mathematics is fun", the mean had increased by 1.07. Besides, the mean for the item "I like multiplication" had increased from 2.73 to 3.73. The mean for the last item had also increased, which was by 1.07. All these indicated that the pupils had gained

more interest in learning the multiplication skills after the finger method was implemented.

Effect of Finger Multiplication Method on My Teaching Practice

I had asked my mentor to observe and rate me based on the criteria listed in the PR1 form which we used during our practicum at school. The criteria included introduction, teaching development, classroom control, communication, quality of learning, closure, achievement of learning objectives, and integration of values. The highest rating is 5 for each criterion while the lowest is 1, and the full mark is 40. There were three observation carried out throughout the process of my study. The result is presented graphically in Figure 6.

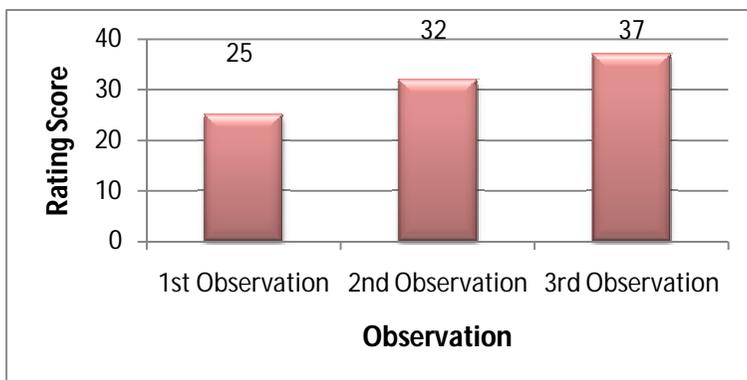


Figure 6. Mentor's Rating on Teaching Performance for 3 Observation.

From Figure 6, it can be clearly seen that my teaching performance had shown improvement over time. For my first observation from my mentor, I only managed to score 25 marks out of 40 marks. The marks increased by 7 marks for my second observation, and it increased to 37 marks for my final observation. The marks had increased by a total of 12 marks. I started to implement the finger method during my second observation, and it clearly showed that my teaching performance was better based on the marks. This indicated that the use of finger method had improved my teaching practice.

REFLECTION

During the process of my study, I found that the action I had taken, which was teaching pupils to learn multiplication skills by using finger method was very effective. In the aspect of technical efficiency, finger method was very effective in helping the pupils understand the multiplication facts easier. From the findings of my study, it could be seen that the pupils had shown improvement in their mastery of multiplication skills. Apart from the pupils' learning, my teaching performance also improved in time with the implementation of finger method during my teaching of multiplication.

By implementing this finger method, the objectives were achieved. However, there were some inevitable problems that occurred during my implementation of finger method in this school. For example, the time constraint limited my ability to carry out more sessions of finger multiplication lessons with my target participants. Besides, some of them were not comfortable with the finger method as they preferred to use "Magic Maths" to do their multiplication. They have been practicing it all the time since they were in primary 2 as "Magic Maths" was implemented by the school teachers to teach multiplication. It created problems for the pupils who could not adapt themselves with the change in their methods of doing the multiplication questions.

In terms of contextual practicality, I found that this method is practical enough. I did not find any problems in implementing the finger method in teaching my pupils multiplication. It did not consume much time and it was cost free as all the pupils used their own hands and fingers. It is very useful and effective to be implemented during teaching and learning process in the classroom, as it can be easily done anywhere and anytime, provided the finger method is suitable to be used to help the pupils to understand the topic and concept taught on that particular day. I found that finger method is very suitable for the school context as most of the pupils in this school could not memorize the multiplication table. By implementing this method in school, the pupils might not have problems in mastering the multiplication facts.

Apart from that, I found that this finger method is actually helping the pupils to develop holistically in line with the main objective of the National Philosophy of Malaysian Education (NPME). The research that I had done could help the pupils develop intellectually, spiritually, emotionally and physically. As the saying goes, "we learn best when we do, not when we see and hear." By practicing this finger method, the pupils can use their own fingers to multiply. This enables them to learn kinesthetically and visually. Their own fingers serve as the best asset and realia for them to refer when they do multiplication questions.

Besides that, by implementing this finger method, I can inculcate the values of being initiative and independent among the pupils. When they know how to do multiplication on their own, they tend to try and do the questions on their own, with the help of their own fingers. When they know how to do the questions, they have the sense of satisfaction and this will enable them to learn by themselves and being initiative in their learning. Besides, I was also indirectly instilling the value of cooperation among them through finger method. They learned how to cooperate with friends and with me, the teacher. Apart from that, by implementing this finger method, the pupils were able to master all the basic multiplication facts which serve as a strong foundation for their future learning. If they do not have this foundation, they cannot move beyond. It is very significant for the pupils to have very strong foundation so that they can move on when they further their studies.

As for myself, I had learnt a lot through this study. I found finger method a very effective method in helping my pupils learn multiplication. Besides that, this action research also helped me in improving my teaching practice. It also made me realized that as a teacher, we have to be concern about our own teaching. We have to implement the right and suitable strategies to create positive impact for the pupils.

Future Action

Reflecting on this research helped me to plan for my next action to be taken. For the next cycle of my action research, I would like to focus on problem solving involving multiplication. This is because the pupils in the schools also faced difficulty in solving

mathematical problems. For the future action, I would like to focus on the Polya's four steps problem solving method. There are four steps in this problem solving method which is understand the problem, devising the plan, carrying out the plan and looking backward. For this method, I will teach my pupils to solve the mathematical problem step by step. Finger method had helped them to build a very strong foundation in doing multiplication. However, it only helps the pupils to master basic multiplication facts. When it comes to application, the pupils will have problems if the pupils are not exposed to the problem solving steps. Therefore, my focus for my further action to be taken is problem solving strategy.

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