

# FACULTY OF EDUCATION UNIVERSITY OF MALAYA

### Statement of Original Authorship

Name of Candidate: INDRADEVI NARAYANA NAIR
Title of Project Paper: AN INVESTIGATION OF THE TEACHING
METHODS USING INFORMATION AND COMMUNICATIONS
TECHNOLOGIES TO PROMOTE HIGHER ORDER THINKING SKILLS.

I confirm that the materials contained in this Project paper are my own work. Where the works of others have been drawn upon, whether published or unpublished (such as books, articles, or non-book materials in the form of video and audio recordings, electronic publications and the internet) due acknowledgements according to appropriate academic conventions have been given. I also hereby declare that the materials contained in this Project Paper have not been published before or presented for another programme or degree in any university.

Signed: Date: 30th APRIL 1998

ACH-9375 INVC. 15/1/01 /ms7

## AN INVESTIGATION OF THE TEACHING METHODS USING INFORMATION AND COMMUNICATIONS TECHNOLOGIES TO PROMOTE HIGHER ORDER THINKING SKILLS

Indradevi Narayana Nair

A Project Paper Submitted to the Faculty of Education,
University of Malaya in Partial Fulfillment
of the Requirements for the Degree of
Master of Education

1998

Perpusiakaan Universiti Malaya

OK

avecu lät ikset ikkeläite.

#### Abstract

The purpose of this project paper was to investigate the teaching methods using Information and communications technologies(ICTs) to promote higher order thinking skills. A survey was carried out with a sample of fifty schoolteachers who were all computer literate. The survey instrument used was a questionnaire which attempted to find out what teaching methods these teachers are using in the classroom and how often they promote higher order thinking skills while teaching. It also collected information on teacher awareness of the resources from the ICTs and whether they knew how to use them in teaching. It also sought the reasons that limited the use of ICTs for promoting higher order thinking skills. The results of the findings showed that the most frequently used methods were those in which the teachers played the role of information providers. Although the teachers claimed to frequently promote higher order thinking skills, it was done by the use of teacher centered strategies. While most teachers could identify with the resources from the ICTs a majority of them did not know how to use it to teach. The major problems that limited their use of ICTs was the unavailability and high costs of ICTs as well as the lack of time and knowledge on how to use it. The results of the findings also implied the need to prepare teachers for their new role to meet the challenges of the information age, as well as to make system wide changes in the education system such as in the school curriculum and assessment system.

#### Abstrak

Siasatan terhadap penggunaan kaedah-kaedah pengajaran yang menggunakan Teknologi Maklumat dan Perhubungan untuk menggalakkan kemahiran berfikir peringkat tinggi.

Kertas projek ini bertujuan menyiasat kaedah-kaedah pegajaran yang menggunakan Teknologi Maklumat dan Perhubungan untuk menggalakkan kemahiran berfikir peringkat tinggi. Satu tinjauan ke atas lima puluh orang guru sekolah yang mempunyai pengetahuan komputer dijalankan dengan menggunakan satu borang kajiselidik. Maklumat tentang penggunaan kaedah-kaedah pengajaran yang digunakan kini dan kekerapan mereka menggalakkan kemahiran berfikir peringkat tinggi dalam masa pengajaran serta maklumat tentang kesedaran dan pengetahuan penggunaan sumbersumber dari saluran Teknologi Maklumat dan Perhubungan di perolehi. Masalahmasalah yang dihadapi dalam amalan kaedah-kaedah yang menggunakkan sumbersumber tersebut juga ditinjau. Hasil dapatan kajian ini menunjukkan bahawa kaedahkaedah pengajaran yang sering digunakkan jalah di mana guru memainkan peranan sebagai penyampai maklumat. Walaupun mereka serigkali menggalakkan kemahiran berfikir peringkat tinggitetapi ini di lakukan dengan strategi yang berpusatkan guru. Ramai guru sedar dan dapat kenalpasti sumber-sumber dari Teknologi Maklumat tetapi tidak tahu cara mengintegrasikannya dalam pengajaran. Halangan-halangan utama yang dikenalpasti oleh guru-guru ialah kekurangan kemudahan Teknologi Maklumat, kos yang tinggi dan kekurangan pegetahuan tentang penggunannya. Hasil dapatan dari siasatan ini juga memberi implikasi terhadap kepentingan menyediakan guru-guru untuk menghadapi peranan baru mereka dalam zaman teknologi maklumat dan juga kepentingan membuat perubahan dalam kurikulum sekolah dan sistem penilaian pelajar.

To Gerard .... for being a continuous source of inspiration.

#### Acknowledgements

My pursuit of M. Ed. has enriched my teaching experience and motivated me to spur for academic excellence. I gratefully acknowledge the following people who contributed towards the successful completion of my Project Paper and M. Ed program.

My foremost thanks and wishes go to my supervisor Prof. Madya Dr. Mogana

Dhamotharan for her initial support, continued guidance and assistance towards the successful completion of my Project paper.

My sincere thanks to Pn Norsiah bt Md Yusuf, Principal of SMKDMS Nilai for being considerate in allowing me to take time off from school when I most needed it.

To Siti Hawa and Iris for the motivation.

To my mother, for her support and help throughout this course.

To my husband, Gerard, for his patience, encouragement and assistance while I worked long hours to complete my M. Ed.

Finally, my thanks to all my friends, colleagues in school, M.Ed. lecturers and peers for their timely help and enlightening intellectual discourses.

Table of Contents	Page	
Abstract	i	
Abstrak		
Dedication		
Acknowledgements		
Table of Contents		
List of Tables	vi	
Chapter 1. Introduction	1	
1.1 Background	1	
1.2 The need to change teaching /learning strategies	1 3	
1.3 On higher order thinking		
1.4 Integrating ICTs as the answer	5	
1.5 Teaching methods using ICTs that can promote		
higher order thinking skills in the classroom	7	
1.5.1 Problem solving	7	
1.5.2 Projects	7	
1.5.3 Collaborative learning	8	
1.5.4 Role-play 1.5.5 Games	8 8	
1.5.6 Student writing for an authentic audience	9	
1.5.7 Electronic field trips	9	
1.6 Statement of the Problem	10	
1.7 Research Questions	11	
1.8 Significance of the Study	ii	
1.9 Limitations of the Project	12	
Chapter 2. Review of related Literature	13	
2.1 Introduction	13	
2.1 Why ICTs are considered a powerful teaching	13	
and learning tool in promoting higher order		
thinking skills	13	
2.3 Methods that can promote higher order	13	
thinking skills using ICTs	14	
2.3.1 Using ICTs in Inquiry Learning	14	
2.3.2 Using ICTs for Projects	17	
2.3.3 Using ICTs in Problem Solving	. 18	
2.3.4 Using ICTs for Collaborative Learning	20	
2.3.5 Electronic Field Trips	21	
2.4 Problems faced by teachers in integrating ICTs		
for higher order thinking skills	23	
2.5 Implications	25	

Chapter 3. Me	thodology	27
3.1	Introduction	27
3.2	Subjects	27
	Instrument	28
3.4	Structure of the Questionnaire	28
3.5	Validation of Instrument (Pilot study)	29
3.6	Administration of Questionnaire	30
3.7	Methods of Analysis of Data	31
3.8	Summary	32
Chapter 4. An	alysis and Results	34
4.1	Introduction	34
4.2	What teaching methods are teachers with	
	computer literacy using to teach?	35
4.3	How often do they promote higher order	
	thinking skills while teaching?	42
4,4	Are teachers aware of the resources available	
	through the ICTs that can be used for teaching?	43
4.5	Do teachers know how to use teaching methods	
	that can use ICTs to promote higher order	1 12
	thinking skills?	46
4.6	What are the problems that teachers think limits	
	their use of ICTs in promoting higher order	
	thinking skills?	49
4.7	Summary	53
	onclusions and Recommendations	55
5.2	Introduction	55
	2 Implications of the findings	56
5.2	2.1 Teachers favor teaching methods that enable	
	delivery of large amounts of information	56
5.2	2.2 Teachers are making attempts to promote	
	higher order thinking skills	57
5.3	2.3 Teachers are reluctant to use teaching methods	
	using ICTs that promote higher order thinking skills	57
5.3	2.4 Teachers lacked pedagogical skills in using ICTs to	~~
	promote higher order thinking skills	60
5.3	2.3 Teachers claimed to face the following problem	-
	that limits the use of ICTs	60
	3 Conclusion	63
5.	4 Recommendations	64
	References	68
	Appendix A	70

## List of Tables

Tabl	able	
4.1	Percentage of teachers who used the various methods.	35
4.2	Frequency of use of teaching methods.	36
4.3	Percentage of teachers who used the various methods daily.	38
4.4	Percentage of teachers who used the various methods weekly.	39
4.5	Percentage of teachers who used the various methods monthly.	40
4.6	Frequency of scores for promoting higher order thinking skills.	42
4.7	Percentage of teachers who scored higher based on type of activity.	43
4.8	Percentage of teachers who know of the availability of each of the resources listed.	44
4.9	Percentage of teachers who know of resources available by amount listed.	45
4.10	Knowledge and use of teaching methods using ICTs to promote higher order thinking skills.	47
4.11	Percentage of teachers who responded to the problems.	50