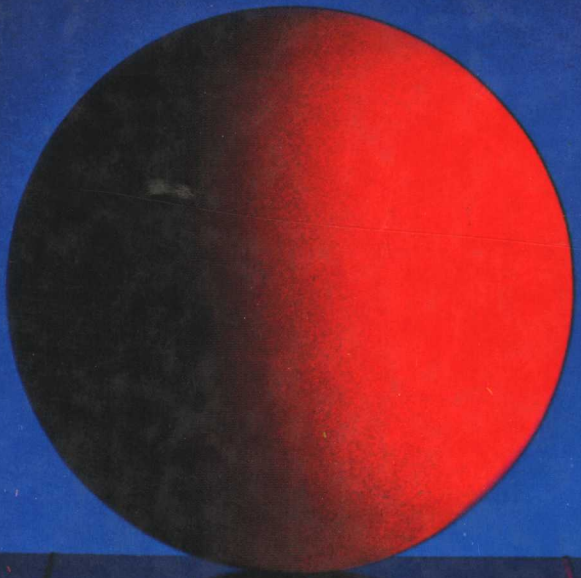
双向反馈教学法

王岳庭 著

By Wang Yue Tin



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BFTM

Bilateral Feedback Teaching Method

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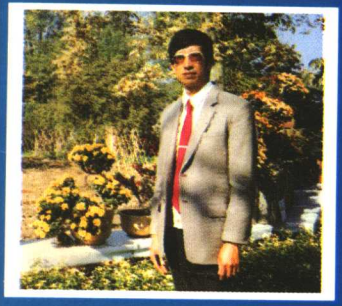

作者近照

王岳庭 男 1940 年 8 月生，上海人。1965 年 7 月毕业于华东师范大学数学系。现任杭州教育学院数学计算机系副主任、副教授，《初等数学报》常务副主编。已出版的编（译）著有 40 余部，五百多万字；已发表论文 30 余篇。

从 70 年代以来，长期从事数学教育的教学和科研工作，曾先后三次获浙江省高等师范院校优秀教学科研成果二等奖，1994 年被授于曾宪梓教育基金会高等师范专科院校教师奖三等奖。多次应邀出席数学教育国际会议。

前言

中国著名科学家茅以升指出："中学教育还是基础教育，以传授各门学科的基本知识为主，但同样有一个教学理论、教学方法问题，需要我们努力探索、研究和创新。我以为，当务之急是必须尽快改变那种层层加码，把学生当作教材的奴隶、作业的苦力的状况；改变老师讲、学生听（记）、满堂灌的'填鸭'式教学方法；采用启发式的教学方法，调动学生学习的主动性和积极性，培养学生具有初步的创造性思维能力。不但使他们牢固掌握基本的理论、概念、原理，而且能够灵活运用；不仅知其然，还要知其所以然。"（为《中学教育科学丛书》序，光明日报出版社，1987年）

茅以升教授的精辟论述，为我国正在进行的教育改革，特别是课堂教学改革指明了方向和具体目标。教育是科学，教育也是艺术，教育是伟大的事业，教育是国家万年根本大计。中共中央关于教育体制改革的决定中指出："今后事情成败的一个重要关键在于人才，而要解决人才问题，就必须使教育事业在经济发展的基

础上有一个大的发展。”因此，搞好教育改革，尽快摆脱传统教育观念和教学方法的束缚，代之以新的现代化教育观念和教学方法，以适应中国日益加快的改革开放步伐，适应中国社会主义市场经济发展，适应“面向世界，面向未来，面向现代化”这个教育大方向，成了我们教育工作者义不容辞的责任。

《双向反馈教学法》一书的理论与实践，正是在上述背景下产生的。作者自1989年9月开始，倾力于研究中学数学教学中关于学生“数学特殊能力培养”问题，在实验研究过程中创造了《双向反馈教学法》。这种教学方法是以现代心理学、现代教学论、学习论、现代控制论、信息论、系统论为理论基础，改变传统教学中信息传授的单向性，提倡现代教学信息传递的双向性；改变传统教学中的“模仿—记忆”学习活动模式，提倡学生按照“探索—记忆—创造”的学习活动模式；改变传统教学中单纯传授知识的观念，提倡打好知识基础，重在培养学生能力的新观念上。

《双向反馈教学法》的内容共分六章。第一章双向反馈教学法的意义。主要叙述了教学方法选择的原则，什么是双向反馈教学法以及教学最优化与双向反馈教学法；第二章双向反馈教学法的理论基础。本章简要分析了双向反馈教学法与现代心理学、现代教学论、现代学习论及现代控制论、信息论、系统论等教育科学理论和综合科学理论的关系，说明这一教学方

法的科学基础；第三章双向反馈教学法的课堂教学结构。以中学数学课为例，论述了双向反馈教学法在数学课堂教学中的结构模式。主要包括：课堂教学系统、课堂教学系统中的子系统、教学目标的统摄作用、信息的传输和接受、信息的反馈和反馈信息的捕捉、反馈信息的评价与系统的调控等；第四章双向反馈教学法在课堂教学中的实施。在这一章中，系统阐述了数学课堂教学中的特征与分类，特别地对数学知识的双向反馈教学、双向反馈的解题教学、“再创造”的双向反馈教学、阶段性的双向反馈教学作了详细论述；第五章双向反馈教学法的实践效果。主要是反映实验学校采用双向反馈教学法的具体做法和取得的成果，包括实验原理、实验效果、优越性及值得进一步探索的问题等。第六章双向反馈教学法课堂教学实例选。

双向反馈教学法的部分成果曾在1991年8月，国际数学教育北京会议（ICMI-CHINA REGIONAL CONFERENCE ON MATHEMATICAL EDUCATION）上报告；论文《论数学教学中信息反馈的通道及形式》在1993年10月的中日美三国数学教育会议（China U. S. A. Japan Joint Conferece On Mathematical Education）上交流。两次交流，均引起了与会代表的关注。1993年8月福建教育出版社出版的《教学方法荟萃》中，收录了《双向反馈教学法》。1994年2月浙江省教育委员会授于《中学

数学特殊能力培养》课题为1993年浙江省高师院校优秀教育教学成果二等奖。

我大学的老师，著名数学家、教育家，ICME—8（第八届国际数学教育大会）的国际程序委员会成员，华东师范大学张奠宙教授的许多教育思想和新观点，以及他致力于建立具有中国特色的数学教育学的开拓精神，对我们的研究工作有很大影响，在此，我要向他表示敬意和感谢！

杭州教育学院领导以及数学计算机系的全体老师，对我们研究工作十分关心并全力支持。浙江省临安县教育委员会、县教研室、临安中学、于潜中学的领导，对我们实验工作的配合和热情支持，保证了《双向反馈教学法》实验的顺利完成。在此，我向他们表示衷心的感谢！

我们的实验研究工作，一开始便得到河南教育出版社的支持，特别是副编审张国旺同志，在他们的积极鼓励和支持下，本书才能有机会与读者见面。为此，我要借此机会向河南教育出版社、向张国旺同志表示衷心感谢！

最后，我也要向我们实验组的老师邓永奎、陈光大、王水琪、周友珍、周邦祥等表示感谢！因为无论是在实验研究阶段，还是经验总结阶段，他们与我共同经历了5年多的磨难。为了保证实验工作的顺利进行，实验组的老师们付出了许许多多心血，没有他们所作的贡献，也就没有双向反馈教学法的成果。

邓永奎、陈光大、王水琪参加了本书的编

写，周友珍、周邦祥提供了部分教案。

本书图表设制和配图是由张际南、雷瑛二位完成。在此一并致以谢意。

王岳庭

1995年2月于杭州

Preface

Chinese prestigious Scientist Maoyisheng pointed: "Secondary education is basic education, its major objective is to deliver basic knowledge of every subjects. For such purpose, I think, instructional theories and teaching methods is rather important. And need to be explored、researched and created. It' s imperattve to change the situation of considering students as slaves of textbook and homework, change the method of lecturing, employ method elicitation of to exercise students' initiatiues and foster their creative thinking. We should let students not only master the basic concepts、theories、principles. but also use them flexibly, not only know the phenomenon, but also understanding the reason of the henomenon."

His excellent remark shows the direction and goal of our undergoing educational reform, especially the classroom teaching reform. Teaching is science as well as art, education is great cause and the foundation of the country. As central committee of chinese communist party and central government ' s decision on educational system reform pointed: "our country ' s future depends on talent and talent depends on education. With eco-

nomic development, education needs considerable development. "therefore, It' s our indispensable responsibitity to replace traditional educational ideas and methods with modern education ideas and methods to facilitate Chinese reform、opening to the outside world and development of Chinese Socialist market economy.

Theory and practice of bilateral feedback teaching method is a baby of such circumstances. Beginning in sept, 1989, I' m engaged in the research of how to develop special mathematical capability of secondary school students. Bilateral feedback teaching method is product of the research. The method is based on psycholog、instructional theories、control' s theory、informative theory and systematic theory etc. It attempts to replace unilateral delivering of information with bilateral delivering of information, replace "imitation-memorization" learning model with "exploration-memorization-creation" learning model, replace the idea of only delivering knowledge with the idea of fostering student' s capability.

Theory and practice of bilateral feedback teaching method consists of six chapters. Chapter one is implications of bilateral feedbcck teaching method which includes principles of bilateral feedback teaching method, concept of bilateral feedback teaching method, instructional optimization and bilateral feedback teaching method. Chapter two is the theoretical foundations of bilateral feedback teaching method which includes the

relationship between bicateral feedback teaching method and psychology、instructional theories、control's theory,informative theory、systematic theory. Chapter three is the classroom instructional structure of bilateral feedback teaching method, taking mathematics lessons of secondary school as examples, It analyse classroom instructional structure of bilateral feedback teaching method. It indudes classroom instructional system, subsystem of classroom instructional system, functions of teaching objectives, delivering and receptron of information, information feedback and information acquisition, evaluation of information and adjustment of system. Chapter four is implementation of bilateral feedback teaching method in classroom instruction which includes characteristics and classification of mathematics teaching in classroom, bilateral feedback teaching of mathematics know ledge, bilateral feedback teaching of problem-solving, bilateral feedback teaching of recreation, phasic bilateral feedback teaching. Chapter five is effect of bilateral feedback teaching method which includes experimental principles、experimental effect of bilateral feedback teaching method and further exploratton of bicateral feedback teaching method. Chapter six is selective classroom instruction examples of bilateral feedback teaching method.

Results of bilateral feedback teaching method was presented in ICMI — CHINA REGIONAL CONFERENCE ON MATHEMATICA (EDUCATION) in Aug,

1991. Channels and forms of information feedback in mathematicacs education was presented in China、U. S. A、Japan joint Conference on mathematical Education in oct, 1993. Achievement of the method drew the attentions of the participants. Bilateral feedback teaching method is one method of collections of teaching methods published by Fujian Education press. Zhejiang Education Commission awarded developing special ability of mathematical teaching in secondary school second-class prize of teaching achievement in zhejiang province in 1993.

I′ d like to take this opportunity to express my appreciations and thanks to my teacher, zhangdianzou, professor of normal university of Eastern china, distinguished educator and mathematician, member of ICME —8 council for his influences on my work and encouragement.

I′ d also like to express my sincere gratitude to leaders and colleagues of Hangzhou Institute of Education Education commission ot Lin Ean county、Linan middle school、Yuqian middle school for their cooperation and support.

From very beginning, our research work gained the support of Henan Education press, especially co-editor Zhang guo wang, with his support and encouragement, the book can be published.

At last, I should extend my gratitude to members of research group: Dengyongkui, Chenguangda, Wang-

shuiqi, Zhouyouzhen, Zhoubangxiang, for their unselfish contribations. Without their efforts, the research can' t be accomplished.

Dengyongkui, Chenguangda, Wangshuiqi are the co —author of the book and Zhouyouzhen, zhoubanyxiang provided some teaching plans.

Wang Yueting
May, 1995
Hangzhou

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