

超出预期策略的实验研究^①

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摘要 在先前论文中提出与心理匹配策略相应的, 又一用以调节学生学习新材料的学习心向的超出预期策略基础上, 本文将该策略运用于数学教学之中, 进行现场的教学实验研究。研究表明: 在数学教学中可以运用超出预期策略对教材内容进行情感性处理, 且对调节学生学习心向, 提高认知学习的质量是有效的。

关键词: 教学心理学 教材内容 情感性处理 超出预期 教学策略

1 引言

针对美国心理学家奥苏贝尔(D. P. Ausubel)仅从认知维度上提出了旨在解决学生缺乏意义学习所需要的, 具有同化新材料的认知结构问题的先行组织者策略, 而未从情感维度上提出旨在调节学生意义学习所需的具有对新材料学习心向的问题,^[1] 我们曾提出了心理匹配策略,^[2] 并对其中的认知匹配策略和形式匹配策略加以实验验证研究。^[3] 但我们进一步研究发现, 奥苏贝尔提出的先行组织者策略只是从认知维度上解决新学习材料与学生已有认知结构之间的差距问题, 而未解决这个差距大小所涉及的学习难度的把握问题。前苏联心理学家维果斯基(L. S. Vygotsky, 1978)提出的“最近发展区”(zone of proximal development)理论,^[4] 为这方面的教学内容的处理提供了一个认知维度上的“跳一跳才能够得着”的把握难度分寸的操作策略。那么从情感维度上看, 又怎样才能使学生产生“跳一跳去够着”的那种认知愿望呢? 为此, 我们在教学实践基础上, 运用情感心理原理, 提炼出又一条涉及调节学生学习心向的教材处理的情感性策略——超出预期策略。^[5] 所谓超出预期策略(strategy of exceeding expectations), 是指教师在教学过程中应恰当处理教学材料, 使之呈现的教学内容超出学生的预期, 引发学生的兴趣情绪, 以有效调节学生的学习心向, 提高其学习的积极性。该策略的心理机制主要涉及两个环节。第一个环节是: 由超出预期的刺激引发惊奇情绪。这里所谓预期(expectation)是一个根据自己的经验、习惯对客观事物作出的一种事前估量。当客

观事物与个体需要之间的关系尚不明确之前, 只要客观事物超出个体预期达到一定的程度, 就会引起惊奇一类情绪, 而刺激的新异性和变化性则往往是客观事物超出预期的直接原因。^[6] 第二个环节是: 由惊奇转化兴趣。这里的“兴趣”是情绪性兴趣, 而非个性化兴趣。研究表明, 如果“刺激足以使有机体继续对它维持注意并对它进行探索, 惊奇就转化为兴趣情况”。^[7] 而这种刺激在教学活动中, 则主要与个体的认知需要相联系。因此, 兴趣的引发过程是: 具有新异性、变化性的客观事物超出个体预期产生惊奇, 而当个体发现这一客观事物是能满足自己认知需要时, 便使惊奇转化成兴趣。^[8] 而个体一旦产生由惊奇转化来的兴趣, 往往会在心理上伴以某种冲动感, 有助于学生产生“跳一跳”去掌握具有一定难度的新学习材料的学习心向。因此, 当新学习材料原本缺乏引起学生学习热情时, 教师也能运用超出预期策略来设法激发学生的学习心向。关于超出预期策略的详细原理、机制、作用等已在有关论文中阐述,^[9] 本文则在此基础上对该策略进行实验研究, 以考察其在学校学科教学中的可行性和有效性。

2 方法

为了对该策略进行实证研究, 同时也为了使研究的结果具有切实的教学应用价值, 提高生态化程度, 我们采用现场实验(field experiment)的方法。

2.1 被试

被试是上海市崇明中学高中一年级学生。我们选择在男女比例、学习成绩、学习态度、纪律状况等

① 此为全国教育科学“九五”规划教育部重点课题《从情感维度系统优化中学教学的研究》成果的一部分。上海市崇明中学陶月华参加本实验中的执教和编写教案的工作, 特此感谢。

方面都比较接近的5班(44人)和6班(43)作为平行班,并随机认定5班为实验班,6班为对照班。他们都由同一位数学教师临时执教一堂数学课。

2.2 材料

2.2.1 教学材料 上海市高中一年级数学《等比数列的求和》的教学内容。

2.2.2 实验材料 教师根据超出预期策略的内涵及其运用要求,并结合教材内容编写的教案所规定的区别于对照班的各种教学处理。

2.2.3 测验材料 ①认知测验材料:包括认知前测、认知后测以及认知巩固性后测,均为任课教师根据教学内容中的有关知识点自己设计和编制的。认知前测用以检测实验班和对照班涉及本课学习的认知准备情况,旨在检验两个班在这方面的认知基础是否一样。认知后测则针对该课教学中所教授的知识点,了解学生对其理解和掌握情况,旨在检验运用超出预期策略的教学对促进学生认知学习有否效果。认知巩固性后测在该课教学结束一周后实施,旨在检验运用超出预期策略对促进学生认知学习效果上的巩固程度。为节约时间,认知试卷的题型以选择题为主,占70%,非选择题占30%,题量控制在10分钟内能做完为限;②情感测试材料:包括情感前测和情感后测,均为我们设计、编制的问卷调查表,主要用于调查学生情感在教学中受感染的程度和对教学内容的倾向程度。该表由9道呈封闭式结构的问卷题组成,具体涉及学生在课堂上的注意集中、动脑积极性、学习兴趣、学习热忱、情感感受、触动、感染以及所受影响、课堂情绪气氛等九项内容。每道题后面都设有5级评分表,供学生选择性评分。第一级为1分,第二级为2分,……第五级为5分。这里的课堂情感前测问卷和后测问卷的各项内容是一样的,只是在前测中调查的是学生对以往该课教学中有关的情感方面的情况,而后测调查的是学生对本课教学中有关的情感方面的情况,属同质调查问卷,以便进行比较分析。

2.4 实验过程

任课教师分别给实验班和对照班学生上课。教学内容和认知方面的要求在两个班上是一样的,所不同的是,在实验班上,教师在教学中运用超出预期策略进行教授,而在对照班里,教师则按传统的教学方法进行教授。实验班和对照班学生均不知道正在进行实验。实验班和对照班的基本实验程序均为:情知前测—授课—情知后测—认知巩固性后测。

该策略在教学中是这样具体实施的:在整个教

学过程中教师处处设法使教学内容超出学生的预期,以引发学生的兴趣:(1)教师在导入新课时,并不开门见山地讲述本课教学内容,而是讲了出乎学生预期的一个问题:“现在我有个信息需要通过你们传递出去,但有个条件,每位同学只能花费二分钟时间同时告诉二人,除此之外不能再告诉其他人。如果崇明有60万人口,请问需要多少时间可将此信息以最快速度传遍全县?”问题抛出后,学生们窃窃私语,猜测各异,有的说要一天、有的猜二天等。三分钟后当教师宣布“只需40分钟!”这一结果时,学生都十分惊讶,教师这才引出新课内容——“等比数列的求和”。(2)教师在推导等比数列求和公式时,又出乎学生预期地介绍了除书本上运用的推导方法之外的4种别开生面的推导方法。其推导的思维方式之灵活多变,推导的过程之精彩巧妙,使学生又惊叹不已。(3)教师在讲到等比数列求和公式的应用时,不仅回答了本课开始时提出的那个问题,而且还以古老传说解迷(有一术士为国王发明了一种玩棋,国王要重赏他,让术士自己提要求,术士说:在棋盘的第一格放一粒米,第二格放二粒米,第三格放四粒米,依次在后面格子里放进前面格子2倍的米粒,64个格子放满。这就是他所要的赏赐。国王想这点米算不了什么,便一口答应了。结果国王用掉了倾国之粮都无法填满64个格子,哪是为什么呢?)、银行利息巧算(老师有现金人民币10000元,三年内不任何投资,将这钱存入银行,而银行现在的利率调整为:存1年,年利率为1.98%,存3年,年利率为2.16%,请问同学们我该采取哪一种存款的方式合算?)、模拟“贷款”计算(同学们,我有个决定要告诉大家:从下个月开始,在以后的一个月时间里,本人愿每月出资300元给在座的某些同学,但作为条件:要求这些同学在这一年内须第一个月内返还1元钱,第二个月返还2元钱,第三个月返还4元钱……以后每月返回的钱数是前个月的2倍,有谁愿意?)等不入窠臼的形式超出学生的预期。(4)最后在分析等比数列求和公式的常见错误时,再次将看似简单的问题,通过巧妙设计问题情境,引起学生认知冲突,激发学习兴趣,并使学生的“常见病”等顽症取得巩固的“疗效”。

3 结果

将实验班和对照班上获得的各类前后测数据输入计算机,运用社会科学统计软件包(SPSS9.0)进行数据统计处理,结果如(表1—表5)。

表1 实验班和对照班认知和情感前后测结果比较

		认知					情感			
		<i>n</i>	\bar{x}	<i>s</i>	<i>t</i>	<i>p</i>	\bar{x}	<i>s</i>	<i>t</i>	<i>p</i>
实验班前测	44	21.14	11.66			28.09	5.40			
对照班前测	43	17.91	12.26	1.25	0.21	28.86	3.58	0.78	0.44	
实验班后测	44	73.18	15.52			34.43	5.75			
对照班后测	43	59.07	17.97	3.92	0.00	31.81	5.41	2.19	0.03	

表2 实验班和对照班认知和情感前后测平均数差数结果比较

		<i>n</i>	$\bar{x}_{前}$	$\bar{x}_{后}$	$\bar{x}_{后-前}$	<i>t</i>	<i>p</i>
		认知	实验班	44	21.14	73.18	52.04
	对照班	43	17.91	59.07	41.16	3.49	0.00
情感	实验班	44	28.09	34.43	6.34		
	对照班	43	28.86	31.81	2.95	4.36	0.00

表3 实验班和对照班情感细项前后测结果比较

		前测				后测							
		实验班		对照班		实验班		对照班					
		\bar{x}	<i>s</i>	\bar{x}	<i>s</i>	\bar{x}	<i>s</i>	\bar{x}	<i>s</i>				
注间集中		3.35	.74	3.47	.80	.78	.44	3.73	.54	3.55	.67	1.38	.17
积极动脑		3.15	.72	3.24	.77	.60	.55	4.04	.70	3.67	.62	2.54	.01
学习兴趣		2.85	.74	3.01	.56	1.13	.26	3.61	.78	3.26	.79	2.12	.04

表4 实验班和对照班各自情感细项前后测平均数差数结果比较

		<i>n</i>	$\bar{x}_{前}$	$\bar{x}_{后}$	$\bar{x}_{后-前}$	<i>t</i>	<i>p</i>
		注意集中	实验班	44	3.35	4.16	0.81
	对照班	43	3.47	3.78	0.31	3.77	0.00
积极动脑	实验班	44	3.15	3.89	0.74		
	对照班	43	3.24	3.53	0.29	3.55	0.00
学习兴趣	实验班	44	2.85	3.61	0.76		
	对照班	43	3.01	3.26	0.25	3.21	0.00

表5 实验班和对照班认知巩固性测验结果的比较

	<i>n</i>	\bar{x}	<i>s</i>	<i>t</i>	<i>p</i>
实验班	44	75.91	17.03		
对照班	43	49.30	19.69	6.75	0.00

4 讨论

4.1 超出预期策略对学生学习心向的调节具有显著作用

这是一堂讲解《等比数列的求和》的数学课。在对照班上,教师按传统方法讲解,学生比较被动地接受教学内容,学生的学习心向没有得到调节,学习的积极性也就没能得到调动。但在实验班上,教师有意识地在教学导入、公式推导、实践应用和纠正常见错误等一系列教学环节中处处注意运用超出预期策略,调节学生的学习心向。情感前测时,实验班和对照班的情感总分差异并不显著($p=0.44$);而情感后测时,实验班和对照班的情感总分差异达到显著水平($p=0.03$)(见表1)。其中最能反映学生学习心向的“学习兴趣”、“注意集中”、“积极动脑”三个项目在前测时实验班和对照班的平均得分差异都不显著(分别为 $p=0.26$, $p=0.44$, $p=0.55$);而后测时,实验班和对照班在这两个项目上的平均得分差

异达到显著水平(分别为 $p=0.04$, $p=0.01$),只是“注意集中”项目上平均得分差异不显著($p=0.17$),但也已出现前者高于后者的逆转状况(见表3)。考虑到实验班和对照班在情感前测时出现前者低于后者的趋势(虽不显著),因此我们进一步对实验班和对照班各自情感前后测的平均数的差数进行检验,结果发现,包括“注意集中”项目在内,在上述三个项目上差异均达到非常显著的水平($p=0.00$, $p=0.00$, $p=0.00$)(见表4)。这就充分表明超出预期策略在调节学生学习心向方面是有明显效果的。

4.2 超出预期策略对学生认知学习有直接的促进作用

由于教学内容的处理处处超出了学生的预期,积极调节了学生的学习心向,使学生的学习兴趣大增、学习注意力集中、动脑思维积极,学习的效果也就得到明显改善。这就集中表现在该堂课的认知学习的成绩提高上。认知前测时,实验班和对照班的认知得分差异并不显著($p=0.21$),这表明实验班和对照班在学习等比数列的求和知识前的认知基础是基本相同的。但认知后测时,实验班的认知成绩大大高于对照班差异达到非常显著的水平($p=0.00$)(见表1)。考虑到实验班和对照班在认知前测时出现前者高于后者的趋势(虽不显著),因此,我们进一步对实验班和对照班各自认知前后测的平均数的差数进行检验,结果发现,仍达到非常显著的水平($p=0.00$)(见表2)。一周后,我们又以实验班和对照班学生进行巩固性检查,结果发现,实验班成绩高于对照班,差异达到非常显著的水平($p=0.00$)(见表5),这表明该策略的运用对提高学生认知学习质量不仅有效,而且有着较为持久的作用。

4.3 关于超出预期策略验证的二点说明

第一,超出预期策略与其它策略一样,也不是具体方法,是为教师调节学生学习心向而对教学内容进行情感性处理提供了操作上的指导,具体方法则是多种多样的。其关键是:“出奇制胜”——要尽可能使处理教学内容的呈现超出学生的预期,超出预期越大,对学生调节学习心向的作用会越明显。

第二,我们之所以通过一堂课进行现场实验,是为了更好地控制无关变量(我们很难在一连数课不同内容的教学中都使用同一策略),使实验更为科学。事实上,由于该策略在调节学生对学习内容的心向,具有即时效应,故其效果也确能从一堂课中得到一定的反应。(转第405页)

如在各类职业中, 科教文卫职业对老年人的总体记忆、外显记忆有明显维护作用; 而从事工人、个体经营等职业的老年人日常生活记忆相对较差, 可见不同职业对不同记忆功能有着不同的作用。但总的来说脑力劳动者的记忆功能比体力劳动者的要好。许淑莲研究中将几种职业归类为脑力与体力劳动两大组进行比较, 同样发现脑力劳动组的记忆成绩比体力劳动组的好, 差异有显著意义^[1]。

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(接第434页)

5 结论

- 5.1 经教学实验的初步验证, 在数学教学中可以运用超出预期策略来对教材内容进行情感性的处理。
- 5.2 经教学实验的初步验证, 运用超出预期来对数学教学内容进行情感性处理, 对调节学生的学习心向, 进而促进学生认知学习, 提高课堂教学效果是有作用的。

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A STUDY OF THE PRACTICE EFFECT OF COGNITIVE PROCESS IN CATEGORICAL AND METRIC SPATIAL RELATION ENCODING

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The processing levels of visuospatial relation encoding were tested in twenty pilots and controls to examine the practice effect in the two typical processing subsystems of categorical and metric relation encoding. The results indicated that among the two main subsystems involved in visuospatial relation encoding and judgment, there was a stronger practice effect and the corresponding function was improved with systematic training in the metric/coordinate subsystem of visuospatial relation encoding. In contrast, fewer practice effects on the function of subsystems concerning categorical subsystem in visuospatial relation encoding were found. The study suggested that influenced by some hereditary and intrinsic attributes of the brain nervous anatomic structure, the metric/coordinate subsystem showed a significant practice effect, while the property of categorical subsystems, however, relatively showed a cognitive stability or lower plasticity. The implication was further discussed from a high-level visual processing theory developed by Kosslyn.

Key Words: categorical spatial relations, metric spatial relations, processing subsystem, practice effect.

EFFECTS OF TEXT STRUCTURE AND TIME STRESS ON WEB READING PERFORMANCE

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The effects of text structure and time stress on web reading performance were examined. The 2 * 3 experiment design was employed. The independent variables were text structure and reading time respectively. The mean time for seeking related information and the mean number index of extra node passed by were employed as dependent variables. It was found that text structure, reading time and their interaction had significant effects on the web reading performance. In other words, the efficiency of hypertext reading was significantly lower than linear text reading when reading time was set for 10 or 20 min, whereas they were not significantly different from each other when reading time was set for 30 min. There were significant differences in reading performance among three reading times for hypertext, whereas there was non for linear text material. It was concluded that time stress exercised a notable impact on hypertext reading in particular.

Key Words: linear text, hypertext, time stress, extra node.

AN EXPERIMENTAL RESEARCH OF THE EFFECTS OF SELF-REINFORCEMENT AND STUDENTS' EXPECTATIONS ON LEARNING EFFICIENCY IN THE DYNAMIC SYSTEM

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This research studied the relation between the two factors in the dynamic system, self-reinforcement and students' expectation, and high school students' learning efficiency in education. The result showed that under the same teaching conditions, proper and immediate satisfaction with students' expectations had great effect on the improvement of junior middle school students' learning efficiency, but hadn't the same great effect on senior high school students; training in students' self-reinforcement will be helpful to the improvement of senior high school students' learning efficiency, but had no great effect on that of junior high school students' learning efficiency. There was no reciprocal effect in the research.

Key Words: learning efficiency, dynamic system, self-reinforcement, students' expectation.

A RESEARCH ON THE EFFECT OF THE QUALITY OF FORSTER-PARENTING ON THE DEGREE OF ADAPTED CHILDREN'S SATISFACTION IN LIFE

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This survey investigated the influential factors on adopted children's life satisfaction. Questionnaires were administered to adopted children randomly selected. The results indicated that: 1) most of the adopted children had a relatively higher level of life satisfaction; 2) family structure and harmony between the adoptive parents had higher correlations with children's life satisfaction; 3) four factors had great effect on the adopted children's life satisfaction: emotional satisfaction, behavioral support, family's dominant emotion and children's satisfaction of needs.

Key Words: adopted children, family's attributes, Life satisfaction.

A RESEARCH ON THE STRATEGY OF EXCEEDING EXPECTATION — THE AFFECTIVE HANDLING OF TEACHING MATERIALS

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In the previous paper was put forward the strategy of exceeding expectation, which regulates students' learning set for new learning materials in correspondence with the strategy of mental match. On the basis of the previous paper, a field experiment was conducted with the application of the strategy of exceeding expectation to mathematics teaching. The results showed that the teaching materials could be handled affectively by means of the strategy of exceeding expectation in mathematics teaching. This kind of affective handling was found to be helpful to regulating students' learning set and improving their cognitive learning quality.

Key Words: instructional psychology, contents of teaching, affective handling, exceeding expectation, teaching strategy.

A RESEARCH ON THE METACOGNITION OF COLLEGE STUDENTS

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This research focused on the situation of college students' metacognition and its relationship among non-intelligence factors such as motive, method and persistence. The result showed unbalance in the development of metacognition's various aspects. There was significant sex difference in metacognition. Also we found a significant relationship between students' metacognition and non-intelligence. The result showed that to improve college students' ability of metacognition, we should pay more attention to the training of non-intelligence.

Key Words: metacognition, non-intelligence, college students, cognitive strategy.

DOES THE PHONEMIC SIMILARITY PROCESS

OF TWO-CHARACTER WORDS EXIST IN LEXICAL ACCESS?

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In Experiments 1-2, the related syllables were in the first constituent position and the second syllables in both primes and targets. The results showed there was no phonetic similarity effect in lexical decision and there was limited first constitute homophonic effect in naming. Compared with Indo-European languages and the Chinese one-character word, the phonological similarity played a limited role in lexical access.

Key Words: phonological similarity, the Chinese two-character words, lexical access.

THE THREE-DIMENSION PROMOTING MODEL'S CONSTRUCTION AND THE EXPERIMENTAL RESEARCH OF ENGLISH QUALITY EDUCATION

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Based on the deep understanding of the English teaching situation of Guizhou's average-level middle schools, the Three-Dimension Promoting Model was constructed to solve the main problems in English teaching. This mode was put into English teaching experiments and the results showed that it could enhance the students' listening and oral ability, and improve their achievement in English tests.

Key Words: quality education, English learning, Three-Dimension Promoting Model.