

# Multiple Perspectives on a Withdrawal Programme in Mathematics

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Te Kunenga  
ki Pūrehuroa



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# Background to the Study

- **Pilot Study**
- **Interest in mathematically gifted**
- **National Research (2004)**
- **National Administration Guidelines**
- **Talent Development Initiatives**  
(Maths Olympiad)

# Research Question

**What are the key factors that contribute to a gifted student's sustained interest and achievement in mathematics?**

**Three Perspectives:**

- **Student**
- **Parent**
- **Teacher (School context-policy)**

# Sub-Questions

**What are the students' perceptions of the withdrawal programme compared to the regular class programme?**

- **What are the key features of the withdrawal programme?**
- **What are the shortcomings of the regular class programme?**
- **What are the perceived benefits of the withdrawal programme?**

# Method

## Case Study

### Data Gathering Tools

- **Surveys (student & parent)**
- **Observations**
- **Interviews – students, teachers, parents, specialist teacher**
- **Documents (school policy, teacher plans, Student workbooks)**

# Setting and Sample

- **City primary school**
- **Roll: 578**
- **Decile: 10**
- **Withdrawal class for mathematically gifted and talented 20 Year 6 students**  
**Research group: 18 students**
- **Female: 6      Male: 12**

# School Policy

- **To provide responsive school and classroom environments which encourage the natural display of talent.**
- **To identify the children who demonstrate special abilities and provide appropriate differentiated programmes.**
- **To assess the learning needs and progress of children with special abilities.**

# Mathematics Policy

- **Learning objectives will reflect a need to broaden math experiences and to create learning situations which allow children to develop more fully the ability to apply their high level of knowledge.**
- **Units will be planned to allow children to investigate numbers and how they work.**

# Identification

Teacher nomination based on

- **Achievement test results (PAT: national standards maths test +95<sup>o</sup>ile)**
- **Basic Facts knowledge**
- **Problem Challenge test (teacher designed)**

# Mathematics Provisions

## Regular class

- A programme based on the national curriculum document – emphasis on numeracy

## Withdrawal class

- Taken by specialist mathematics teacher
- An enrichment programme

# Student interview

- **Introductory questions re-interests, how well do you think you are doing in maths?**
- **The withdrawal programme – differences to regular programme, strengths and weaknesses**
- **Perceived level of achievement**
- **Their future mathematically**

# Findings:

## Student Interests and ability

**Very involved in other activities –  
drama, music, sport**

**Early awareness of above average  
ability**

**Highly motivated in maths – 4  
students**

**Motivated – 7 students**

**(based on Karen Rogers' Mathematics  
Interest and Attitude Inventory)**

**Selection Process**

# Findings: The Regular Programme

Daily Top ten challenge – the  
challenge without a challenge

Regularity – sameness

Number focussed – computations

Limited connections, meaningful  
contexts

Focus on presentation

# The Regular Programme

It's a bit pointless writing down all this stuff.

You have to write down heaps and you already know the answers.

I don't know why we have to make it look nice.

It's the teacher's rules.

# Students' Desires

## Re: Regular Programme

### Content and Process

- More choice and more time
- Less focus on computations
- More investigations
- Better links to real world

### Level

- More choice and challenge

# Withdrawal Programme: Strengths

## Mathematical Content

- Challenge

## Process - Teaching and Learning Approach

- Research – investigations
- Collaboration – group vs independent
- Mathematical talk
- Use of technology
- Competitions and competitive spirit
- Self Assessment

## Social

- Working with like-minded peers
- Students from other classes

# Withdrawal Programme

I feel like I want to succeed more.

It's more interesting because everyone is **so** good.

It's cool seeing how different people work things out.

I like all the talk that goes on.

# Withdrawal Programme: Weaknesses

- Content
- Lack of consultation
- Limited time in programme
- Links not made between the regular and withdrawal programme
- Scheduling

# Teacher Qualities

- **Good at mathematics**
- **Sense of humour**
- **Relates well to children**
- **Willing to listen**
- **Helpful and encourages you to persevere**
- **Can teach a variety of levels**
- **Shows you harder ways of doing mathematics**
- **Encourages you to take risks**

# Specialist Teacher

## Qualities

## Planned Programme

- Investigations
- Contexts
- Use of technology
- Ownership
- Connections

## Contradictions

# Regular Teachers

## **In-class issues**

- **Resources**
- **Ability levels**
- **Withdrawal of students**

## **Other issues**

- **Communication**
- **Links to classwork**

# **Background Literature: Parent-school**

- **Parents as first teachers**
- **Valuing of achievements**
- **Modelling attitudes and behaviours that support children's achievements**
- **Monitor and structure children's time and participation**

# Research Question

**What role(s) do parents play in the development of a child who is identified as gifted and talented in mathematics?**

# Parent Survey

## Parental Involvement Questionnaire (Cai, 2003)

### 5 Parental Roles

- **Motivators**
- **Resource Providers**
- **Monitors**
- **Maths Content Advisors**
- **Maths Learning Counsellors**

# Parent Interviews

- **Early indicators of mathematical giftedness**
- **Level of school involvement**
- **Provisions over time**
- **Issues**
- **Aspirations**

# Results

(Mean PIQ Score)

**Motivator 3.2**

**Resource Provider 3.0**

**Monitor 3.0**

**Content Advisor 3.1**

**Learning Counsellor 2.9**

## Results (ctd.)

**Provide home environment conducive to learning (games, puzzles) 91%**

**Use Public Library 61%**

**Bought maths-related books 58%**

**Spent time talking about progress in maths 91%**

**Not concerned about monitoring time spent on maths at home 73%**

**Not aware of homework requirements 45%**

## Results (ctd.)

<b>“At this stage” felt they could help with maths problems</b>	<b>88%</b>
<b>Had strategies to help</b>	<b>85%</b>
<b>Not aware of strategies used to teach their children maths at school</b>	<b>50%</b>
<b>Tried to find good ways of helping their children</b>	<b>80%</b>
<b>Tried to match expectations with child’s potential</b>	<b>85%</b>

# **Pre-school**

**Fascination with numbers**

**Ability to complete puzzles**

**Independent workers**

**Sustained periods of time**

**In advance of peers or siblings at  
same age**

# **At school**

**Beginning School – “wait and see”**

**Year 3 significant**

**Teacher significant**

**(Qualities such as: encouraging, valued maths, sense of humour, loved maths, interested in the child’s giftedness)**

**External providers**

**Competitions**

**I want my child  
working with kids  
who think like  
him.**

**I don't want my  
child to lose their  
love of maths.**

**I have faith that my  
child will be  
accommodated next  
year.**

# Conclusions

- Regular programme is not meeting students' learning needs
- Selection process inadequate
- Withdrawal programme only partly meeting students' needs
- Programme lacks mathematical consistency and continuity
- Students not involved in the programme content
- Competitions are an important part of the programme
- Communication lacking

# Programme Recommendations

- Selection process to be fine tuned
- Strengthen communication
- Provide acceleration opportunities and an enriched programme
- Provide sustained programme
- Evaluate the programme

# Transfer/Transition

Choice made in collaboration with child

Based on:

- Siblings
- Friends
- Location
- School reputation

Expectations:

- Continued challenge
- Special provision

# Limitations

- Sample size and demographics
- Identification

# Implications

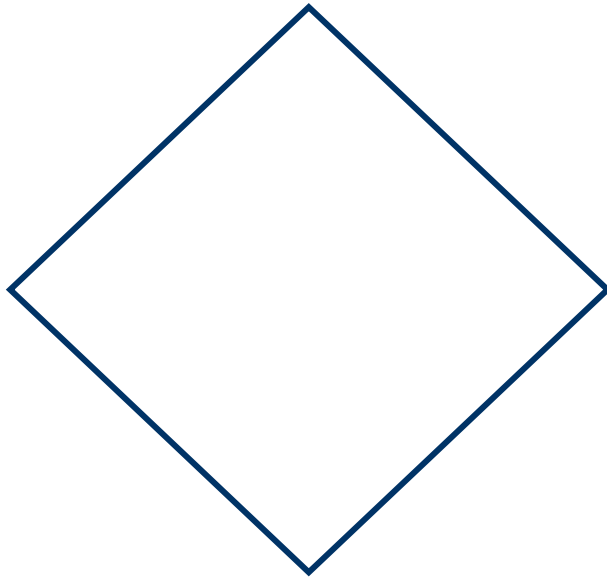
- Identification (preschool...)
- School entry
- Parent nomination
- Advocacy role
- Communication – Parent ↔ school
- Transfer

**I just want to  
be challenged.**

**I don't want my  
child to lose their  
love of maths.**

**These kids  
challenge me.  
It's great!**

**Thinking outside the square**



***“one size does  
not fit all.”***

