Developing Number Sense in Kindergarten Children Identified At Risk of Developing Mathematical Difficulties through the Use of a Tier 3 Intervention.

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1. Number Sense may be to Mathematics what Phonemic Awareness is to Reading. If we can test for it and teach it we may improve the numeracy understanding and thereby mathematical abilities of individuals, benefiting both them personally and society in general.1

Number sense is developed:
1) through ‘play’ with numbers
2) through ‘talk’ about numbers
3) prior to starting formal schooling.

It appears children from a low socio-economic background are particularly vulnerable to arriving at school with a poor number sense.

Number sense is:

a) fluency in estimating and judging magnitude
b) ability to recognize unreasonable results
c) flexibility when mentally computing
d) ability to move among different representations and to use the most appropriate representation. 2

This research seeks to determine if the Number Knowledge Test (NKT) can provide identification of Kindergarten children with number sense difficulties and then provide appropriate Tier 3 level intervention with the Number Worlds program? By the use of a single subject research design the program will be assessed with ongoing monitoring of the students’ progress with the Early Numeracy–Curriculum Based Measurements (EN-CBM).

SINGLE SUBJECT RESEARCH DESIGN

Single Subject Research (SSR) is particularly suited to special education where there are a limited number of students with unique learning characteristics. SSR can identify whether a particular intervention is suitable for a particular student by nature of its design.

SSR requires baseline data on an individual to be collected for a minimum of 5 sessions and to be graphed, at which point the trend of the data is analysed for stability. If the results are stable and no trend is observable then it is an appropriate time to start the program. Data will be graphed for visual analysis of trends before and during intervention. 3

Sample graph of SSR data 4

Number Worlds - a commercially available program, with hands on activities, following a developmental progression of how children acquire mathematical knowledge. In the development of this program Griffin (2005) simplified the principles of How People Learn down to three questions that apply specifically to the early learning and teaching of numeracy.
1. Where are we now? (What knowledge do the children need to build upon?)
2. Where do we want to go? (What knowledge do the children need to learn?)
3. What do we do to get there? (What learning opportunities need to be provided?)

Linked with this program is the Number Knowledge Test (NKT). It has been developed to determine what mathematical knowledge, specifically what number sense, children bring to the classroom. 5

Qualitative Data

To understand more fully the particular characteristics and background of the students and of the programme occurring in their regular mathematics class data will also be collected from:

- Surveys of parents
- Interviews with selected parents
- Interviews with children
- Observations of the classroom programme

References


Tiers of Intervention

Tier 1 - quality programming at classroom level

Tier 2 – extra drill & practise of classroom program.

Tier 3 - separate remedial program for 1 child or small group.