Evaluation of Implementation of Arrowsmith Program within TCDSB

Background

A meeting was convened on February 2nd, 2000 at The Hospital for Sick Children (HSC) to discuss the Arrowsmith School Program in the Toronto Catholic District School Board (TCDSB). Attending the meeting were representatives of the TCDSB, Arrowsmith School, The Learning Disabilities Association of Ontario (LDAO), and the Community Health Systems Resource Group (CHSRG) of HSC. The involvement of the Arrowsmith Program with the TCDSB was reviewed. The program had been provided to a number of students at St. Patrick Secondary School from the 1997-98 school year to the end of the 1998 - 1999 year and had been provided to a number of students at St. Theresa's Shrine Elementary School from February to June, 1999. It was decided that some type of evaluation of the Arrowsmith Program within the TCDSB should be attempted. The difficulties with planning an evaluation were the constraints of personnel to plan and conduct an evaluation as well as the short time left in the current year for the Program to show effects.

At the meeting, a consensus emerged that an evaluation should be attempted despite the difficulties that had been noted. Some discussion centred on the desirability of having a contrast group with which to compare the impact of the Arrowsmith program. After some consideration, it was decided that the AutoSkill "Academy of Reading" program offered a possible comparison group as it was available in both secondary and elementary panels. Thus, the plan was to have TCDSB personnel select learning disabled students for participation in the Autoskills comparison group and to run the two programs in parallel from March until the end of the year (i.e. June, 2000). Assessment of the students would take place in March and again at the end of term in June.

The assessments would be carried out or supervised by Peter Chaban, a TCDSB teacher currently working with the CHSRG. In addition, it was decided that the assessment should consist mainly of "academic skill" measures even though the Arrowsmith Program is focused on strengthening learning capacities proposed to underlie academic skills rather than practicing academic skills as such, whereas the AutoSkill Academy of Reading program works specifically on developing and improving reading acquisition skills. Barbara Young of the Arrowsmith School expressed her concern at the meeting that the Arrowsmith Program would be compared only on the academic measures. Finally, it was agreed that, if possible, we would use some measure of "self-esteem" in the students both pre- and post- program.

Since it was agreed from the outset that the size and time constraints of the current evaluation would make definitive results unlikely, it was agreed that the results should be reviewed by all parties together at the end and that the report when written should be written as a "collaborative" report.

Method and Process

On Tuesday April 25th, 2000, there was a parent meeting at St. Theresa's Shrine School where parents of children in the Arrowsmith Program attended and heard presentations explaining how the project was initiated and were able to ask questions of representatives from the TCDSB, the Arrowsmith School, CHSRG, and LDAO. At that meeting it was agreed that parents should have input into the design of a parent questionnaire to be sent to all parents of both groups. Fran Rauenbusch of the TCDSB agreed to organize this and Diane Wagner of the LDAO agreed to participate. Starting with a rating scale developed by the Arrowsmith School, the group devised a shortened version which was felt to be more acceptable in terms of effort and time by the parents. The rating scale was supplemented by a three question open-ended questionnaire that has been developed by LDAO to evaluate satisfaction of participants in learning disability programs. This scale and questionnaire were eventually distributed to all parents and to teachers of the students in the Arrowsmith Program. Secondary school students involved with both the Arrowsmith and the Autoskills Programs were asked to complete the three part questionnaire.

The Time 1 test of the students was carried out from Feb. 21st through March 10, 2000. The Time 2 testing was carried out during June 7th through June 28th, 2000. Thus, the "intervention period" for the programs was three months and two weeks.

The tests administered were:

Wide Range Achievement Test Third Edition,(WRAT-III; Wilkinson, 1993) affords assessment of reading, spelling and arithmetic and has extensive norms. (Test was administered to students in groups).

Woodcock Reading Mastery Test-Revised(WRMT; Woodcock, 1987) is used to assess decoding skills with nonsense words(**word attack subtest**) and passage comprehension(**passage comprehension subtest**).The word attack subtest measures change in letter-sound knowledge and evaluates phonological processes in word identification that are separate from the influence of specific reading vocabulary(Rack, Snowling & Olson,1992). The passage comprehension subtest measures actual text comprehension.

Peabody Picture Vocabulary Test(PPVT; Dunn,1965) is used to measure the amount of vocabulary that a child has acquired.

Piers-Harris Children's Self-Concept Scale(Piers & Harris, 1969) is used to measure children's self-esteem and emotional well-being. (The scales were completed in class groups).

AutoSkill's Academy of Reading(AutoSkill International Inc.,1999) is used to train students in developing reading skills. The Phonemic Awareness Training test is used to give a base-line score for phonemic skills.

The Writing Sample consists of a 5 minute expository writing task which gives a qualitative sample of each student's ability to plan, organize and encode information. (Writing samples were gathered in class groups).

Both Arrowsmith and AutoSkill programs were "embedded" in the students' regular school programs. Arrowsmith programming took up approximately two periods per day while the AutoSkill programming required approximately one period per day. Thus, the two programs should accurately be thought of as "Arrowsmith Plus" and "AutoSkill Plus" programs. While both programs began approximately at the beginning of Feb., there was some difficulty in getting the AutoSkill program running well at St. Rose of Lima School. Once again, the duration of the two intervention between Time 1 and Time 2 testing was three months and two weeks or slightly less in the case of some of the AutoSkill group.

Results

All the data were scored and entered into the Statistical Package for the Social Sciences (SPSS) and analyzed by Dr. Gordon McClure of the CHSRG. The first analyses compared the Arrowsmith and AutoSkill groups at Time 1. Since the groups were small and the two groups had roughly the same proportion of male and female students as well as secondary and elementary students, the data was combined for the 15 Arrowsmith students and the 12 Autoskills students . Table 1 in the Appendix shows the means for the two groups and despite the higher scores of the Arrowsmith group on all measures, these initial differences were not statistically significant.

The impact of the programs were assessed by comparing the Arrowsmith group's scores at Time 2 versus Time 1 and the same process was followed for the AutoSkill group. These results are presented in Table 2 of the Appendix. The Arrowsmith group showed a statistically significant gain in their Word Attack skills using the grade equivalent scores but not the standardized scores. The AutoSkill group showed a statistically significant gain on the Word Attack test using the standardized scores but not the grade equivalent scores. In addition, the AutoSkill group showed a statistically significant gain on the Passage Comprehension test on the grade equivalent scores but not the standardized scores. There were no statistically significant differences on any other measure.

Teacher and parent ratings and questionnaire results were returned only for the Arrowsmith group so are of no help in contrasting the two groups. The rating scales for the students were done on 24 items on 0 -3 scale reflecting the range from "never a concern"(0) to "extremely noticeable change"(3). The teacher and parent ratings for the students in Arrowsmith program have been summarized by Barbara Young to show the percentage of students rated as changing on each item and these tables are included in the Appendix.

The group which met to review the results have summarized and transcribed the comments from parents and students and these are included in the Appendix. Further, Barbara Young noted some commonality in reported changes and suggests a relationship between these reported changes and the Arrowsmith program. Her notes regarding these are included in the Appendix.

Note that the Phonemic Awareness Training Test of the AutoSkill program was obtained only at Time 1 for the Arrowsmith group and, therefore, was not analyzed and the writing samples were not analyzed as the proposed "standard scoring methods" did not prove to be feasible.

Conclusions

The results of this brief evaluation project indicate that both Arrowsmith and AutoSkill programs produced statistically significant gains in specifically academic skills over the three and one-half month period of the project. Both showed clear gains in Word Attack or phonological processing skills while the AutoSkill group also showed improvement in the comprehension of written passages. While the lack of a "no special program" comparison group does not allow us to conclude that the gains were definitely due to the presence of these two specific programs, that explanation makes the most sense in this situation given the size of the gains and the expected progress of such students in their regular classrooms.

Given that the questionnaires were returned by the Arrowsmith group only, the feedback from the students, and parents does not allow us to compare the Arrowsmith and AutoSkill groups. It is clear from the comments for the students in the Arrowsmith Program that this program was seen to be of benefit to the students in the current elementary and secondary programs as well as those students who had been in the secondary program the previous year (completed at St. Patrick in June 1999).

Appendices

Statistical Tables

2008/11/26

<table>
<tr><td colspan="5">Learning Disabilities Study
Time 1
Initial Mean Scores of Arrowsmith Plus & Autoskills Pluss</td></tr>
<tr><td>Measures</td><td>Arrowsmith Plus</td><td>Autoskills Plus</td><td>t-scores</td><td>Significance</td></tr>
<tr><td>Sex</td><td>11 boys
4 girls</td><td>7 boys
5 girls</td><td>0.8</td><td>n. s.</td></tr>
<tr><td>Panel</td><td>8 elementary
7 secondary</td><td>7 elementary
5 secondary</td><td>0.3</td><td>n. s.</td></tr>
<tr><td>Mean Age</td><td>13 yr. 4 months</td><td>13 yr. 8 months</td><td>- 0.9</td><td>n. s.</td></tr>
<tr><td>Spelling WRAT</td><td>86.9</td><td>80.8</td><td>1.2</td><td>n. s</td></tr>
<tr><td>Math WRAT</td><td>84.9</td><td>83.8</td><td>0.3</td><td>n. s.</td></tr>
<tr><td>Reading WRAT</td><td>93.3</td><td>84.8</td><td>1.2</td><td>n. s.</td></tr>
<tr><td>Word Attack Woodcock (standard scores)</td><td>92.0</td><td>83.9</td><td>1.3</td><td>n. s.</td></tr>
<tr><td>Passage Comprehension Woodcock (standard scores)</td><td>84.1</td><td>75.5</td><td>1.6</td><td>n. s.</td></tr>
<tr><td>Word Attack Woodcock (grades)</td><td>7.0</td><td>5.8</td><td>0.5</td><td>n. s.</td></tr>
<tr><td>Passage Comprehension Woodcock (grades)</td><td>5.2</td><td>3.8</td><td>1.6</td><td>n. s.</td></tr>
<tr><td>Picture Vocabulary Peabody</td><td>94.3</td><td>86.4</td><td>1.2</td><td>n. s.</td></tr>
<tr><td>Self Esteem Piers-Harris</td><td>67.3</td><td>54.3</td><td>1.2</td><td>n. s.</td></tr>
</table>

	Arrowsmith Plus					Autoskills Plus				
	Time 1		Time 2			Time 1		Time 2		
Measures	Mean	SD	Mean	SD	Sig.*	Mean	SD	Mean	SD	Sig.*
Spelling WRAT	86.9	14.3	85.9	14.1	n. s.	80.8	11.3	80.8	11.3	n. s
Math WRAT	84.9	12.4	85.8	12.4	n. s.	83.8	6.5	79.8	9.5	n. s
Reading WRAT	93.3	19.3	97.1	19.1	n. s.	84.8	15.8	86.7	13.0	n. s
Word Attack Woodcock (standard scores)	92.0	14.4	98.7	16.1	p<.06	83.9	17.5	87.8	17.3	p<.04
Passage Comprehension Woodcock (standard scores)	84.1	17.1	84.7	18.6	n. s	75.5	9.6	79.0	11.4	p< .08
Word Attack (grades)	7.0	5.4	9.8	6.4	P<.02	5.8	6.0	7.1	6.4	n. s.
Passage Comprehension (grades)	5.2	3.0	5.6	3.5	n. s.	3.8	1.0	4.5	1.5	P<.04
Picture Vocabulary Peabody	94.3	17.4	94.3	18.3	n. s.	86.4	17.0	83.7	17.1	n. s.
Academy										
Writing										
Self Esteem Piers-Harris	67.3	26.4	63.0	28.6	n. s.	54.3	28.7	54.3	27.3	n. s.

Learning Disabilities Study   Table 2
Improvements over three months

Feedback from students and parents regarding the Arrowsmith Program as summarized by the review group.

This summarizes feedback from students, former students and their parents:

Feedback from parents of former students (St. Patrick's)
Benefit of Arrowsmith program:
- ❑ Ability to focus and concentrate
- ❑ Organize activities
- ❑ Better use of time
- ❑ Homework completion / work habits
- ❑ Doing better academically
- ❑ Growth of self-esteem
- ❑ Understanding / clarity of thinking
- ❑ Reading skills
- ❑ Speaks more clearly
- ❑ Memory

Suggested changes
- ❑ Interact with different people
- ❑ More time on writing skills
- ❑ Credit
- ❑ Continue
- ❑ Through all grades
- ❑ Nothing
- ❑ Longer involvement in program
- ❑ More hours / year round
- ❑ More breaks
- ❑ More teacher training
- ❑ More school support

Continuation of program
5 yes
1 yes, if credit can be given
1 not sure, bored at end despite changes

Former students
Benefit of Arrowsmith program
- ❑ Ability to focus
- ❑ Reading ability
- ❑ Self-esteem, patience, maturity
- ❑ Specific skills: computer, typing, handwriting, spelling

Suggested changes
- ❑ Credit issue

Half of former Arrowsmith students would continue in the program. The majority would recommend it to another high school student.

Current students in Arrowsmith program at St Patrick

Benefit
- Improved memory, shows up in other areas: reading, understanding, thinking and speaking

Changes suggested
- Looking for credit certification
- Looking for upgraded computers

100 percent indicate a wish to continue with the program. They see gains in other areas.

100 percent would recommend it to other students.

Parents of current students in Arrowsmith program: secondary
Benefit of Arrowsmith Program
- Do things in sequence
- Memory
- Telling time
- Socializing at lunch
- Build good work habits
- Time management
- Clear, concise thinking
- Self-esteem
- Getting main idea / thinking
- Understanding math
- Task completion

Suggested changes
- More integration into curriculum
- Available in more schools
- More time and intensity

100 percent wish to continue in the program

Parents of current students in Arrowsmith: elementary
Benefits of program
- More focused
- Better understanding of reading and more interest in reading
- Self esteem, confidence and independence, positive attitude
- Penmanship
- Organization
- Taking responsibility
- Takes risks and deals with frustration better
- Lower anxiety
- Writing makes more sense
- Small class size

Suggested changes
- Longer and consistent placement
- Credit and Ministry acceptance
- Anxiety of future placement
- Begin earlier in elementary system

100% wanted the program to continue.

Comments from Barbara Young Re: Reported Changes and Arrowsmith Program
(Janet Grey, a parent of a student in the Arrowsmith Program, also asked to have this summary data included)

I think that in the report that it should be noted that there is a commonality in the changes reported on the open-ended questions of the questionnaire by students and parents of the three Arrowsmith groups suggesting that some underlying feature or features are changing as a result of the program. The same characteristics were rated by all groups suggesting that the Arrowsmith Program is leading to improvements in specific areas. I have summarized this in the following chart:

Reported Benefits of the Arrowsmith Program:

Parents:

*Ability to focus and concentrate
*Growth of self-esteem, confidence,
  independence, positive attitude
*Understanding / clarity of thinking
*Reading skills including better
 understanding of reading and
  more interest in reading
*Speaks more clearly
*Memory
* Penmanship

*Organize activities
*Better use of time/ Time management
*Homework completion / work habits
*Doing better academically
*Do things in sequence
*Telling time
*Socializing at lunch
*Understanding math
*Getting the main idea
*Taking responsibility
*Takes risks and deals with frustration better
*Lower anxiety
*Writing makes more sense

Students:

*Ability to focus
*Self-esteem, patience, maturity

*Understanding, thinking
*Reading ability

*Improved Speaking
*Improved Memory
*Specific skills: computer, typing,
  handwriting, spelling

Eight components of the 19 of the Arrowsmith Program were offered to the TCDSB students. Each student worked on five components specific to their assessed needs. The changes reported by parents and students are specific to the areas being addressed and are the same as those reported by parents and students at Arrowsmith School.

The following is a list of the Arrowsmith Program components implemented in the TCDSB and the associated changes reported by parents and students are in brackets for each component.

Motor symbol sequencing – this strengthens the capacity to learn sequential symbol patterns that are necessary for writing and eye tracking in reading (see parent/student comments about improvements in handwriting/penmanship/writing makes more sense)

Symbol relations – this strengthens the capacity for understanding and being able to reason with symbolic information (see parent/student comments about improvements in understanding/understanding of reading/understanding math)

Memory for Information/Instructions – this strengthens the capacity for holding and remembering auditory information (see parent/student comments about improvements in memory)

Predicative Speech – this strengthens the capacity for remembering sentences and fluency of speech expression (see parent/student comments about improvements in memory/speaks more clearly/improved speaking)

Symbolic Thinking – this strengthens the capacity to organize oneself, to focus and concentrate, and to think and problem solve (see parent/student comments about improvements in clarity of thinking/getting the main idea/ability to focus and concentrate/ability to organize activities)

Symbol Recognition – this strengthens the capacity to remember visually presented symbol patterns and is a key capacity necessary for the reading process – (this would be one of the explanations for the gain of 2.8 grades on the Woodcock Word Attack test, from grade 7.0 to 9.8, in the 3 months of the program – also the motor symbol sequencing capacity would contribute to this gain as it is necessary for eye tracking in reading) (see parent/student comments about improvements in reading skills/reading ability/spelling)

Supplementary Motor – this strengthens the capacity to hold numbers inside one's head and to be able to do mental mathematics and structure time (see parent comments about improvements in understanding math/better use of time/time management)

Artifactual Thinking – this strengthens the capacity for nonverbal interpreting of situations (see parent comment about improvements in socializing at lunch)

The reported changes by both parents and students are consistent with the component areas being addressed by the Arrowsmith Program.