Success Starts at Home: An educational partnership

Maria-Joao Peres, M.Ed
Assistant Professor, Escola Superior de Educação / Escola Secundária de Águas Santas
Porto, Portugal mj.peres@netcabo.pt

Abstract

It takes a village to raise a child: educational success results from common efforts developed by a committed community. In this process, the school and the family play leading roles. At Escola Secundária de Águas Santas, a secondary school near Oporto, Portugal, mathematics teachers are involving parents in a three-year project designed to promote positive representations of mathematics, to improve self-confidence in one's abilities to "do maths" and to consolidate and deepen mathematical knowledge and skills,

In its first year, the project, named "Success Starts at Home", followed a Paired Maths methodology (Topping and Bamford, 1998) involving a group of 26 parents.

At the end of the school year parents and students showed a clear change in attitudes, namely:

- both parents and students considered mathematics as an enjoyable meeting point;
- students showed more concentration, better work habits and a positive view of errors;
- parents were less tolerant to stereotyped arguments about difficulties in learning maths, urging their children to serious self-commitment in their own learning process.

Meeting parents' demands, next year the project will include workshops focused on curriculum contents.

Introduction

In the past year, Portuguese educational authorities have committed to the improvement of student's mathematical achievements on a nation-wide basis. Policies involve intensive in-service teacher training (levels 1-6) and support to local action plans designed by maths teachers in order to meet specific aims and needs of their schools and students (levels 5-9).

This battle for quality has a major enemy: strong negative social representations of mathematics as a "difficult" subject that only a few "enlightened" are able to master. There also seems to be a generalised genetic inevitability ("*no one in the family ever succeeded in maths*") shared both by parents and students as an undeniable argument to justify failure.

Therefore, it often happens that efforts undertaken by teachers and schools to promote success in maths are sabotaged by social acceptance of failure in maths as inevitable, unsolvable and, above all, not blameable on students.

It is urgent to put an end to this situation. The strong social investment currently being made in maths education by teachers, schools and educational authorities demands – and deserves – a positive return. Success in mathematics is a social responsibility for which students and parents are also accountable.

The "Success Starts at Home" Project

The "Success Starts at Home" Project (SSHPr) is part of the mathematics action plan (*Plano de Acção para a Matemática* – PAM) designed and developed by the Department of Mathematics of Escola Secundária de Águas Santas, Maia, Portugal, a secondary school with a strong image of quality and dynamism among the community.

The PAM was launched in September 2006 as a three-year project. Targeting seventh-grade students (the lowest level imparted by the school), the PAM allowed for:

- A reorganization and reinforcement of the weekly maths schedule,
- Individual and/or small group tutoring for students with particular needs,
- Conditions to improve and focus teachers' teamwork.

Targeting parents, the SSHPr started three months later. Its aims were:

- To promote a positive representation of Mathematics from the point of view of parents,

- To actively involve parents, as educational partners, in the PAM's development,
- To provide parents with tools to support students' success in mathematics.

Having only one teacher directly working with parents in the SSHPr, it was decided to limit the number of participating parents to a maximum of 30. The following selection criteria were adopted:

- Students with low yet recoverable achievement in maths,
- Students whose parents showed commitment towards educational issues.

The three teachers imparting grade-7 maths classes were also involved in the project, acting mainly as school-family liaison elements.

Table 1 presents the distribution, per class, of the number of students/parents involved in the project:

	Grade 7 – Class:							Total
	A	B	C	D	E	F	G	
Total number of students in class	28	27	28	27	25	28	17	180
Number of students selected for SSHPr	5	6	4	4	7	6	6	38
Number of parents at 1 or 2 sessions	2	4	2	2	2	3	2	17 (44,7%)
Number of parents at 3 or 4 sessions	1	2	2	0	3	0	1	9 (23,7%)
Number of non-participating parents	2	0	0	2	2	3	3	12 (31,6%)

Table 1. Students and parents involved in the SSHPr.

Developing the project

Parents were informed about SSHPr by their children's maths teacher and/or class tutor. They received an explanatory leaflet together with the first-term evaluation grades, and were invited to attend a meeting in mid-January.

Presentation session - January

There were 21 parents present at the first session. They were first confronted with some of the beliefs about mathematics and maths education shared by the project's team:

- Success in maths is an attainable goal…
- … requiring time, patience, previous knowledge/skills and personal investment.
- Learning maths involves effort, dedication, discipline, will, organization, working habits.
- To succeed in maths one **must want** to succeed in maths.
- The success of any measure to promote maths achievement demands:
  - A change in the attitude of parents towards maths,
  - The active cooperation of parents as educational partners.

In general, parents strongly agreed with these principles, but soon stated their insecurity regarding any maths they might be asked to develop with their children: they felt their maths literacy was not up to the situation, either because they had been poor achievers themselves or because they had never learned "today's maths".

At that point, they were told what this project asked of them: daily, in a quiet place with no distractions, for 10 to 15 minutes, they should play a specific game with their children, keeping it

as long as it felt pleasant and stimulating, stopping it if it turned boring or too difficult. The idea sounded tranquilising and parents agreed to it.

Parents were then taught to play five games involving strategy, space and number skills. Each game was carefully explained, namely on maths skills involved. Games had already been chosen foreseeing parents' insecurities and objections, so in the end all parents considered themselves fit for the task.

Parents were also asked to keep a daily log (simply referring game played, time spent and level of difficulty) to be handed back to the project coordinator at each new meeting.

Follow-up sessions – February, April and June

On the whole, 17 parents attended the follow-up sessions. Each time they gave their feed-back on the games played and learned new games.

Games presented in February (five games) and April (six games) progressively introduced parents to some important curriculum contents and resources – concepts like fraction and power or the use of calculators.

Foreseeing the end of the school year, games chosen for the last session (12 games) were mainly strategy games or puzzles easily played in many holiday situations.

Assessing the project

Considering the number of parents involved, the project's assessment was based on personal open interviews that took place after the second and the fourth sessions (March and June, respectively).

Changing attitudes

Both parents and students quickly showed their attitude towards mathematics was changing. They were all more confident, wouldn't mind falling in error and, if so, made it into a learning experience. Parents became less tolerant about justifications such as "maths is difficult" or "I can't do it", as they were also making a strong effort themselves. Children rapidly acquired the daily game routine, complaining if it was broken and pressing parents to keep it. Several parents referred that "playing maths games" was becoming an enjoyable activity that involved the whole family.

As a matter of fact, the project strongly contributed to approach parents and children. As one mother put it, "*my son enjoys the games, but most of all he enjoys the time we spend together*". Teachers pointed out that, when asked about the project, children often referred to this issue as very positive.

Parents soon asked for more difficult games and felt at ease to raise difficulty levels. They re-invented some games they had been playing (introducing new rules, for instance) and brought ideas for new games. Experiences and trials were put in common, strategies were shared and more general parenting issues were often discussed – frequently on how to say "no" to a teenager…

Providing mathematical tools

Meeting one of the project goals, some parents showed interest in going beyond the games – i.e., actually improving their mathematical literacy. Due to time and resources issues, it was not possible to address these wishes on a structured, regular and enlarged basis. This will be done in the next school year, with the organization of separate workshops focused on main curriculum contents for smaller groups of parents.

References

Topping, K.J. and Bamford, J. (1998). *The Paired Maths Handbook: parental Involvement and Peer Tutoring in Mathematics*. London: David Fulton Publishers; Bristol PA: Taylor & Francis.

Wolfendale, S.W. and Topping, K.J. (eds) (1996). *Family Involvement in Litteracy: Effective Partnerships in Education.* London and New York: Cassell.

Success Starts at Home
List of games

Combinations (1)

You need: 1 game board per player, 2 dice, 12 white counters, 12 black counters.

Player	1	2	3	4	5	6	7	8	9	10	11	12

Players take turns to roll both dice and add up the numbers rolled. Use counters to cover that number on your game board or any other numbers that add up to that same amount. For example, if you rolled 3 and 5 (3+5=8) you could cover 8, 7 and 1, 6 and 2, 5 and 3 or 4 and 4 (use two counters). Keep playing until you run out of counters. Add up the numbers which have not been covered on your board. The winner is the one with the lowest score.

Combinations (2)

You need: 1 game board per player, 2 dice, 36 white counters, 36 black counters.

Player	1	2	3	4	5	6	7	8	9	10	11	12
	13	14	15	16	17	18	19	20	21	22	23	24
	25	26	27	28	29	30	31	32	33	34	35	36

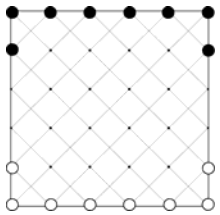
Similar to Combinations (1), except that after rolling the dice you multiply the numbers you rolled. All the rest remains the same.

KONO

You need: game board, 8 white counters, 8 black counters.

Start with player A's counters on the points marked ○ and player B's counters on the points marked ●. Take turns to move one of your counters one space diagonally. There are no jumps or captures.

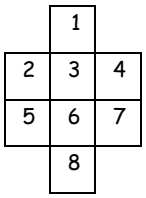
The first player ending up in the other player's starting positions wins.



ALL CHANGE

You need: game board, 3 white counters, 3 black counters.

Put the white counters on squares 2 to 4 and black counters on squares 5 to 7. You can move one square in any direction at a time, including diagonally. Every turn you must move a counter of the other colour to the turn before. Aim to change round the positions of black and white counters in as few moves as possible



Who adds up to 20?

You need: nothing.

Player A chooses a number, 1 or 2. Player B adds 1 or 2 to the number chosen by player A. Players take turns to repeat the process. The winner is the first player who adds up to 20.

This game can be adjusted to different rules, for example:

- play with more numbers,
- aim to add up to a higher number,
- start at 20 and aim to reach 0, taking turns to subtract 1 or 2.

Digital Tic-Tac-Toe

You need: paper, pencils of two different colours.

Play tic-tac-toe using numbers 1 to 9 instead of noughts and crosses. Each number can be used only once in a game. The winner is the first one to complete a line of three numbers which add up to 10. You can also agree that the winner is the one to complete a line of three numbers in the same colour pencil (i.e., put by the same player) that add up to 10.

Boundaries

You need: paper, pencil, calculator.

Players start by picking an interval, for example:

263 273

Player A chooses an integer and introduces it in the calculator. Starting with player B, players take turns to multiply that integer by another one, at their choice. The winner is the first player to get a product that "falls" into the chosen interval. You can raise the difficult level narrowing the interval or using rational or real numbers instead of integers.

Sprouts

You need: paper and pencil.

An agreed number of dots (you can start with two or three) is drawn on a piece of paper. Taking turns, each player joins two dots (any line will do) and draws a new dot on that line. A line must not cross another line and no dot can have more that three lines going from it. The first player who cannot make a move looses.

You can also play Sprouts drawing crosses instead of dots. In this case, you cannot have more than four lines going from each cross – one for each end.

What is the rule?

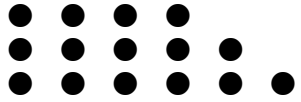
You need: a pack of 52 cards.

Each numbered card counts its value, ace counts 1, jack counts 11, queen counts 12 and king counts 13. Player A thinks of a rule (for example: a red card follows a black card, cards are arranged in pairs adding up to 14) and organizes the pack (or part of it) according to it. The pack is placed face-down and player B keeps turning top cards until he/she can predict the next card correctly. Player A scores the number of player B's wrong predictions. Change round so that player B arranges the pack and so on. The winner is the player who scores higher.

Nim

You need: 15 counters.

Put the counters in three rows, like shown.
Take turns to remove one or more counters from one same row.
The player who takes the last counter looses.
"Marienbad" is a version of this game played with 16 counters in four rows of one, three, five and seven counters each..



Sim

You need: paper, pencils of two different colours.

Draw six points on a paper in the form of a hexagon.
Take turns to join any two points with a straight line using your own colour pencil. The aim is to make the other player complete a triangle all sides of

their own colour. The triangle must touch three points of the hexagon, i.e., any triangles formed within the hexagon do not count.
This game can be played with any other shapes.

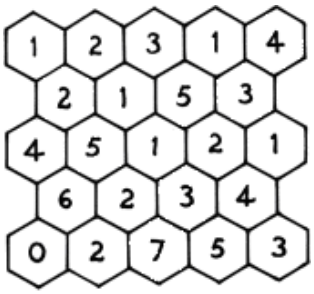
Coloured squares

You need: two blank 3x3 squares per player, pencils of three different colours.

Player A starts by colouring one of the blank 3x3 squares: three smaller squares of each colour, any two smaller squares of the same colour must have a common side. Player B is then allowed to ask questions in order to reproduce the pattern in one the blank squares. Change round so that player B colours the square and player A asks the questions. The winner is the player who gets to reproduce the pattern asking less questions.

Target

You need: game board, 12 white counters, 12 black counters.



Players agree on a target: any number over 100.
Players take turns to cover a number with a counter. Numbers covered can be added, subtracted, multiplied or divides.
The winner is first player who reaches the target using an adequate choice of numbers and operations. When this is not possible and all numbers have been covered, the winner is the player who gets closer to the target.

Pig

You need: two dice.

Players take turns to throw the two dice as often as they want, keeping a note of the total of the numbers thrown. Players can choose to stop at any time and bank the total so far. Every time a 1 is thrown, all score for that turn is lost and the turn ends. The winner is the first player to reach 200 points.

Fifteen

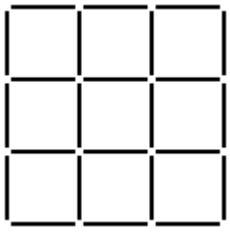
You need: a pack of 52 cards.

Each numbered card counts its value, ace counts 1, each picture (jack, queen, king) counts 10.
Each player receives a hand of five cards and gets 2 points for each combination of cards in that hand that adds up to 15. One card can be used in more than one combination.

Puzzles with matches

You need: 24 matches.

Use the matches to reproduce the pattern.
Take these challenges:



- remove eight matches and get two squares;
- remove six matches and get three squares;
- remove four matches and get five squares;
- remove eight matches and get five squares;
- remove eight matches and get three squares;
- move all matches and get two squares;
- discover new challenges!