Exploring Online Numeracy Games for Primary Learners: Sharing Experiences of a Scifest Africa Workshop

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Introduction

On the 5th of May we (Mellony Graven & Debbie Stott) ran a workshop aimed at Grade 3–5 learners, accompanied by their parents or teachers, on the use of **free** online numeracy game resources. This workshop formed part of the programme of Scifest Africa, the national science festival held annually in Grahamstown. We had such fantastic feedback from both learners and teachers that we thought we should share how we ran the workshop in the hope that schools with online computer facilities will run similar workshops not only with their own learners but with learners in nearby schools who do not have such facilities.



Preparation

If you want to run a workshop like this, we highly recommend that you spend a little time getting familiar with the different websites, and the amazing games they have to offer, in order to become comfortable with the environment.

Setting up

We ran the workshop in a computer lab with 22 computers. We limited the numbers to 22 so that each learner had his or her own computer. This is highly recommended although if need be two learners could share a computer and take turns. Setting up the computers took us about 30 minutes as we needed to connect each computer to the internet and preload each website that we were going to use. For each



website that we were going to use. For each website that we were going to use. For each website we opened up a new tab so that learners would simply have to click on the tab when moving onto a new website and game rather than having to load each site from scratch. For all the games mentioned in this article one does not need to register but can simply play as a visitor or guest. At a later point learners might want to register as this would have the advantage of keeping their scores so they could compete against themselves. The attending teachers helped with individual attention to learners. A data projector connected to one of the computers helped in showing learners what to click on and how to start the games etc.

Learning and Teaching Mathematics, Volume 11, 2011, pp. 10-15

The learners

The learners came from various schools with differing exposure to computers. Some were familiar with the mouse and numbers on the keyboard while others had never used a computer before. It was surprising for us to see how quickly the learners who had not been exposed to a computer were able to pick up the use of the mouse and keyboard when engaged in something fun. Although they needed some help initially in moving the mouse around, they very soon got the hang of it. For a class of such learners I would recommend that one gets a number of additional tutors to help - these could be older learners who are briefed before the workshop.

The websites

From earlier experiences of using online games with Foundation Phase Maths Clubs the following sites were chosen as the most appropriate for Grades 3–5. Some learners from higher grades also attended and we were able to accommodate them as these games do lend themselves to higher levels by simply choosing a higher level of difficulty.

The three websites explored during the workshop were:

- www.mangahigh.com ("Ice Ice Maybe" & "FlowerPower Lite")
- www.mathsisfun.com ("Four in a Row", "Towers of Hanoi 2", "Proximity" & "Number Square Puzzle")
- www.sumdog.com ("Tower Climber")

The website details were included on handouts given to the learners as well as information for parents and teachers should they wish to use these games at home, in schools, or at a community centre. In this handout they were also encouraged to explore the following additional websites on their own for problem solving challenges: www.nrich.maths.org and www.coolmaths4kids.com

The games

The games were chosen for this one hour workshop because they are quick to pick up and do not take more than a few seconds before learners are able to get the hang of it. We have included a very brief explanation of each game with some screen captures just to give you a sense of each game. Of course the best way is to just explore the website yourself. A most useful feature on almost all of the games is the allowance for learners to adjust the level of play. One can also introduce an element of competition to see who can get the highest score in the games at particular levels.



The idea is to help penguins migrate across a perilous ocean patrolled by hungry killer whales. Players must use estimation and approximation skills to position floating icebergs and bounce the penguins safely from glacier to glacier. You are able to choose the level of difficulty (Easy, Medium and Hard) and the type of operation with which to practice.

A problem is shown at the top of the screen and players must click on the number line where they estimate the answer to be. This creates an iceberg for the penguin to bounce off. If it isn't in the right place, then the penguin gets caught by the whale.

Use the "*Close*" control at the top right of the screen to quit the game.



FlowerPower Lite

This is a number ordering game that includes fractions. The aim is to grow a plant by ordering the numbers correctly. This is done by dragging the number to its correct position. If it's correct it will have petals, if not, the petals will go brown.

Once a flower has been grown, the player can cut it and add the money to the bank. To do this, click on the money amount shown under the flower. After a flower has been cut, new seeds will appear to grow more flowers.

The game increases in difficulty as it goes on, with more difficult fractions and with more than one flower.

Use the Close control at the top right of the screen to quit the game.





Mathsisfun.com

- From the Home page, click on 'Games'
- There are 4 pages of games to choose from, so click on the required page and then locate the game you want.



• Once you are done playing a particular game, to find other games, click on the link to the relevant games page either just above the game you are playing or at the bottom of the game page.



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Four In A Row

• Go to the "Games 1" page and find "Four in A Ron" or, if it is shown elsewhere on the page, simply click on it.

The aim of this game is to connect 4 pieces in a row, column or diagonally and you play against the computer.

There are many different levels of difficulty to challenge the learners.

This was a very popular game - the learners loved it!

Towers Of Hanoi 2

• This is on the "Games 1" page

A game of strategy, this is based on the well known physical game. The object is to move all the discs over to another pole. You cannot place a larger disc onto a smaller disc. Move each disc (with your mouse) onto the pole you wish to move it to. A recommended number of moves is shown, so players can aim for that as an incentive.

More discs increase the difficulty of the game. This can be adjusted in the area under the game.

Proximity

- To get started, find the game on the second games page
- Click on play, read the instructions and then click on *Quickstart*'

This is a great game that involves a little thinking and planning and not speed, which is sometimes not the way learners like to play!

The aim of this game is to have control of the most armies. You take turns to place a tile on the board. The aim is to try and place it next to armies of your own or opponent's armies of a **lower** number. Your colour is red and the computer's is blue. If you cannot join it to an existing set of armies, you can start a new set elsewhere on the board.

Press 'Q' on the keyboard to quit the game.





Number Square Puzzle

• This is found on the 'Puzzles' page.

This game takes some thinking and is not one that will always reach a successful conclusion!

There are 4 levels of difficulty. The aim is to fill in the missing numbers so that all the totals match. The game is timed, so that players can compete against themselves or other players if desired.

Simply type numbers into the white space. The blue number shows the current total and the red the desired total for that line.

Sumdog.com

- Choose a game from the Home page
- Select 'Play as a Guest' option
- From the next page, select 'Play' from bottom right

Tower Climber

Answer the questions to the problems shown on the screen by clicking on the correct answer and climb to be the first to the top of this tricky tower. If more than one player is online at a time, other characters will also be shown on the tower to add an element of competition to the game.

Use the controls at the top right of the page to play full screen or to quit the game. You can then choose to play again as a guest and to choose the same or different games from the page. Use the arrows next to 'Tower Climber' to scroll through the other games, all of which work on the same principles.

There are a number of other games for boys and girls which include:

- o Dress Down
- o Talent Show
- o Penalty Shootout
- Tennis Tie-break etc.

Some feedback from learners

In particular we were pleased to note learner's use of terms "fun" and "cool" which are seldom heard in maths contexts. For example: "The workshop is awesome and very cool", "It was fun and it was cool", "You rock! I had so much fun", "I thought it was the most fun thing I have been to", "I loved it the games were so cool it was lots of fun". And our personal favourite: "It was awasim" (his spelling).









Number Square Puzzle

Many learners also indicated that they didn't want the session to end and wanted to come back despite having concentrated on the games for an hour and a half although we did have a brief one minute stretch and eye break half way: "I had so much fun I want to stay for a long time", "I want to play again".

Some feedback from teachers

"The kids were absorbed and very busy – hard to get that for an hour and a half", "Good individual participation where they were able to challenge themselves", "The workshop was interesting and most fun and educational for the kids/learners.



My learners enjoyed it so much, it is so unfortunate that in the small computer lab we have we don't have access to the internet. How I wish our learners could go back and explore the games for they were so helpful in terms of calculations and mind-opening".

Challenges

The final quote above indicates some of the challenges of providing access for learners across our schools to such experiences. Computers are indeed the present and the future and are increasingly an essential educational experience rather than an optional extra. It is from this perspective that we wish to encourage all those with computer labs with internet access to run these sessions with your primary learners and then also to run them with teachers and learners in nearby schools who are less equipped.

The South African Department of Education (DoE) has chosen to take up the challenge of ICT and recognises that if we do not embrace this challenge there will be serious consequences to the appropriateness of the learning of our youth and our development as a nation. Of course commitment to a policy goal does not equate to achievement of that goal. Thus in 2011 we are clearly way off the following goal:

"Every South African learner in the general and further education and training bands will be ICT capable (that is, use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community) by 2013." (DoE, 2004, 19)

Howie and Blignaut (2009) reveal that South Africa has participated in three international studies undertaken by the International Association for the Evaluation of Educational Achievement (IEA) focusing on ICT in Education. The latest study, SITES 2006, reveals that whilst South Africa has made some progress since 1998 in terms of the implementation of ICT in education, the majority of schools are still in their infancy regarding the acquisition of ICT. Furthermore, most schools with access are still in the process of learning to integrate ICT into their teaching and learning. We hope that this article contributes some ideas on how to integrate ICT into numeracy teaching in the early grades of schooling.

We would love to receive your experiences of integrating ICT into numeracy teaching as well as news of other free games that you may come across. What we have included here is of course only the tip of the iceberg.

References

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