

Educational Games : A New Method Of Learning

Ali Asadipour , University of Warwick

Abstract

Educational Games are a new innovation in the field of all types of learning. A huge number of software developers have interested to work in this criteria. Nowadays, we can feel the influence of entertaining tools like game consoles in our kid's life and this is a good way to finding some ways to using these devices as self-study tools. Moreover, it can persuade kids to learn better without any pressure. This paper will introduce an interface for teaching primary student the basics of geometric shapes with evaluating them by some testing features.

Creating A Model

Before implementing anything it is necessary to understand what objectives should be considered in Educational learning tools. Is it just for wasting the learners' time or the objectives will lead them to a worth full aim. In the first step, it is necessary to collecting useful data from the important resources of this field which they are well-known as learners. For instance it needs to outline the content of specific concept and mixing it with what the learners expecting from an Educational interface. Today many students don't show any propensity to their classes and the problem is the teaching methods are not updated as fast as children's world. Also, it is important to be sure that all details of teaching concepts will give the user scientific know ledges without any mistake. Regarding the definitions above, just realize that human brain is like a professional

model creator. First, you can achieve observables by your eyes then after some process in brain it will give dependency between objects to define some rule for this dependency then you can predict future states and interfere in this routine by changing another states to achieve the suitable result. In computer-based modeling studies, for understanding and creating a good model the first thing is useful techniques, the new approaches in this field is well-known as Empirical modeling.

Choosing A Platform

The fact that observables will help a lot in understanding better is obvious for everyone. For this reason the platform must be able to illustrate the information, states, values and finally results to inform the learner about each step. Moreover, the important issue is showing the dependency between observables to show how they can influence on each other. Thus, the platform must be able to change the observables values on fly like a flexible environment. As a part of illustrating procedure this platform should support graphic environments to render the materials in a suitable way to entertain the learners as well as teaching them. Also, it is much more suitable if the platform is able to accept any changes to add some extra abilities to the interface by the learners not only by the developers. "Developing system models in ways that allow flexible adaptation, extension and re-use even by users who are not computer specialists, where models are evolved step-by-step"[1]. Finally, being accessible on web is

a useful feature for this platform¹. That is why EDEN is a good platform for implementing these features and also there are some different environment for supporting the visual parts like DONALD for 2D and SASSAMI for 3D and so on.

EDEN Drawbacks

As it mentioned EM is a new concept in computer-based modeling and Eden is in its first steps of development because of this reason we can't compare its feature with well established platforms like C++ or Java but there are some limitations which reduce the quality of some implementations. In this case this paper will outline some of these problems as below:

- 1- There are too many environment with different notations which sometimes will confuse the user. For instance, DONALD is for drawing simple shapes and it has its own notation but you must obey some routines to call DONALD variables in EDEN or vice versa. By a comparison with C++ and OpenGL interface you can just include the graphic library and simply use it without any limitations.
- 2- In creation of the appropriate files each operating systems follow its routine to create the extensions like when the user try to save a DONALD file in Windows the extension will be .donald but in Linux it is .d or when you save EDEN file in .e extension in Windows it will appear in capital form in Linux .E that will cause unknown file.
- 3- Some conditional expressions like if() will not work out of procedures or functions.
- 4- It needs to switch between environments to clarify them for compiler like %eden or %scout and the like. In some cases this will cause errors.

¹Web-EDEN

Why Educational Games?

"Students increasingly demand more constructive online courses that not only provide information but also facilitate studying experiences. Educational games offer a viable strategy to this end"[2]. As Killi mentioned in this statement internet is the best place for distributing knowledge in the world but which kind of representation methods will help us to persuade youth to attend to this knowledge?."Today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games"[6]. By a comparison between these statistics it is easy to figure out that old educational systems are not useful these days."Our students have changed radically. Today's students are no longer the people our educational system was designed to teach"[6], Marc Prensky said. regarding these evidences it is crystal clear that new learning tools will help the students to understand better what they want to learn. There are a plenty number of samples about this area like Alien Angle, Algebra Puzzle, Math Olympics and so on[7].

The other sample of using these tools is Geometer's Sketchpad. "Geometer's Sketchpad is used in many secondary mathematics classrooms throughout the United States and Canada. NCTM (National Council of Teachers of Mathematics) had identified one of its six principles as a Technology principle, stating that "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning." Geometer's Sketchpad is one of these examples. The program comes with program files to help deepen students' understanding of such concepts as slope, geometric transformations and arithmetic on integers."[5]. Even, these tools are reliable for teachers to use them for giving interactive visual explanations instead of boring definitions.

Geometry Teaching Tools

First question is why geometry? are there any special issue about geometry in computer world? well the answer is yes.geometry has special role in understanding shapes and it is a fundamental part graphic environment.This project is implemented for primary students to learn basic shapes and maybe going a bit further to drawing n-gons and finally reaching to definition of circle.Moreover there are some questions which students should first answer them and then see the results of some calculations.The important thing is there should be some classification for users with different knowledge it means that maybe this project will useful for a kid but it is not suitable for a university student.For this reason It is possible to design the other versions of this idea with more functionality and much more complex calculations and even implementing shapes in SAS-SAMI environment as a future vision.

Implementing Project

As an EM modeling Project there are three features which must be declared:

- 1-Observables
- 2-Dependency
- 3-Agency

The first version of this project was just about observables and agency.The project was created with EDEN platform with using SCOUT and DONALD as the graphic and screening environments.The First idea was about creating shapes with two point on screen, In This version all the shapes' vertices was created from those two points which user has defined.Some procedural tasks calculate the next point for drawing the shape.But since the procedures are parts of Agency it is not efficient to define shapes in this way.The other solution was clarifying the next

node by defining a dependency between next node and the previous one:

$$P(i+1) = \{ K @ (n-i-1)*a \} + P(i)$$

it means we can draw n-gon with rotate a radians and transforming the offset to previous point position the edge length which is represented as K this scenario is useful cause it is not necessary to define all the points and lines for each shape.Also, by combining two features of for() statements with DONALD notations in the form of execute command it has reduced extra code lines for clarifying nodes and lines. In this project when you define an N as an input for number of edges and also edge size in pixel with clicking on the screen and pushing enter button you can see the n-gonal object on the screen with converting and calculating some data to centimeter for further calculation.In this part student must calculate the NGON's Area and perimeter to evaluate herself.Moreover, there is another aim in this project and it is about what is the relation between NGONs and Circle.In the program there are two questions about a key point of how it is possible to define a function to draw a circle in graphic world.The first one ask about "'There Are some Values For N Which After Them n-gon Will Approximately Transform To Circle', is it True or False?" the point is when you increase the number of edges to an infinite and decrease the edge size to size of a point the final object will be a circle.And the other one ask about "'All The n-gon Vertices Must Be correct in This Formula: $X^2 + Y^2 = R^2$ ', is it True or False?" which the question want to point on this fact that each regular n-gon has a surrounding circle which the vertices are on the circle's perimeter.

Summary

Today, a big concern is about low scores in educational courses from the new generation of

children in Europe and the like. Then why it is not considered that new educational method can solve these problems. It is the time to invest on these development and create an organization to evaluate these software and starting to use them officially. "Teachers often found it difficult to justify the use of simulation or adventure computer games during school time because their content did not map the national curriculum"[4], said Professor McFarlane². But if educational material could be built in, such games could be used in the classroom legitimately, she said. The researchers found games developed strategic thinking "For example, you could use an historical event like the Battle of Hastings and - knowing the facts are accurate - get pupils to put themselves in the place of one of the soldiers or generals. But it must be considered to that using these tools without any limitation and supervision may cause some kind of addiction which will ruin the kids' abilities in understanding lessons.

detected[6]

References

- [1] W.M Beynon, Empirical Modeling for Educational Technology , University of Warwick
- [2] K. Kiili, Content creation challenges and flow experience in educational games: The IT-Emperor case, The Internet and Higher Education Volume 8, Issue 3, 3rd Quarter 2005, Pages 183-198
- [3] Dostl, J. Educational software and computer games - tools of modern education, Journal of Technology and Information Education. 2009, Palack University, Olomouc, Volume 1, Issue 1, p. 24 - 28. ISSN 1803-537X
- [4] BBC NEWS , Video games 'stimulate learning', Monday, 18 March, 2002, 13:46 GMT
- [5] Carol A. Marinas, Ph.D., GETTING TO KNOW-GEOMETERS SKETCHPAD Barry University
- [6] Marc Prensky , Digital Natives, Digital Immigrants From On the Horizon (NCB University Press, Vol. 9 No. 5, October 2001)
- [7] <http://www.dangerouslyirrelevant.org/2009/07/do-most-educational-games-suck.html>
<http://www.mathplayground.com/games.html>
<http://www.funbrain.com/>

²Director of the Teachers Evaluating Educational Multimedia (Teem)