Standards for constructing interactive simulations of basic geographical concepts for second-grade pupils in the prep school

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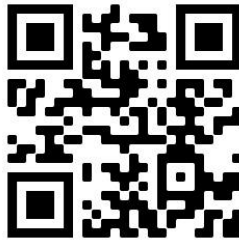
The impact of the sequential adaptive content delivery approach on the development of academic self-efficacy among educational technology students.

The major aim of this study was select, the adequate building standards of an interactive simulation for geographical concepts for second grade in middle school, the research sample consisted of (100) teachers in second grade of middle school, at EL-Minia Preparatory Secondary School in New Minia, the results of the research concluded the suitable of the adequate building standards of an interactive simulation for geographical concepts for second grade in middle school are right for him.

Research intro

The use of modern technology in our lives has become a feature of this era, where it is called the artificial intelligence age, and the current education systems are characterized by digital learning or electronic learning that occupies a large area in the educational process, and the world witnesses a great interest in reshaping the role of the teacher depending on the ideas of Constructive theory, The role of the teacher is no longer just a vector of knowledge but rather a guide and facilitator of the learning process.

Based on new pedagogical guidelines that emphasize the changing roles of the teacher and the learner, to be able to play this role a teacher must have underlain scientific knowledge about how the learner learns, the scientific content to be taught, and the skills of teaching different subjects in different sciences such as physics, mathematics, and geography.
Geography is the study of land forms, oceans and Earth's ecosystems; Geography means the writing of the Earth, scientists studying geography are known as geographers, people involved in exploring and studying the natural environment of the Earth and its interaction with humans or the reverse.

Map makers have been known to be geographers; but they are known today as cartographers

Studying geographical concepts has many benefits, including knowing the geographical location of places, as well as learning about its physical and cultural characteristic, Understanding the geography of the past, studying the role of human beings in their evolution, ideas, the places where they live and the environment around them, knowing the various events in the world and linking them to the land in which they live, becoming acquainted with the human system and the various strata of humans, in addition to knowing the changes in the surface of the earth, recognizing the spatial and geographical distribution of humans, understanding the complex interrelationships between people and places, being able to analyze the relationships between physical environment and society, and appreciating the earth by recognizing its importance for humanity and making appropriate decisions to conserve resources The planet and the environment as much as possible

Reda Ibrahim Abdel-Mu 'aboud (2014) stressed that the rapid and dramatic development of information technology (IT) and Their use in the instructional process, with their electronic learning environments, media and technological advances, and from here many effective learning strategies come into view and that make learning a mean of developing learners' thinking skills, including Geographical conceptualization skills, pg76-74

One such strategy is Aquinsula's confirmed interactive simulation strategy (Akinsola 2007)

Karal. Cebi and Peksen(2010) Samia Omar Deek (2010); Karal, Sibby, and Baxen

Zrakic, Barac, Bogdmanovic, jovanic, and Radenkovic (2012) are highly effective simulation environments, in which learners interact in an educational situation that may simulate a real phenomenon or present a problem requiring learners to solve, using higher thinking skills such as guesswork and modern

reasoning for decision making, observation, analysis, and investigation of specific educational goals.

The research problem.

Considering all of the above, the problem of researching is the need to define criteria for building an interactive simulation which Geographically appropriate and suitable for eighth graders

Research questions

The research therefore sought to answer the following key question

What are the criteria for constructing the appropriate pedagogical simulation which Geographically appropriate and suitable for eighth graders?

From the main question sub questions follow:

1- What are the criteria for building an interactive educational simulation that is appropriate for geographical concepts?

2- What are the criteria for building an interactive programmatic simulation appropriate for geographic concepts?

Research goals:

The current research goal is to identify criteria for building interactive simulation.

1. pedagogy appropriate to geographical concepts

2. Software suitable for geographical concepts

Importance of research: The importance of current research has been determined as follows

For Students: this research has kept pace with modern educational trends that make the learner the focus of the learning process; Where research provides teaching assistance to students by providing appropriate criteria for building an interactive simulation of geographical concepts, due to the importance of interactive simulation in encouraging self-learning and helping them develop mental capabilities

For teachers, the research provides a guide for the social studies on how to determine criteria for constructing an appropriate

interactive simulation of geographical concepts in the teaching of social studies by developing teachers' methods of teaching and shifting them from focusing on traditional theoretical methods to modern methods of teaching.

For Curriculum designers: Curriculum designers may be useful in introducing a new approach to teaching. Interactive simulation construction standards as a new approach to teaching geographical concepts

Researchers: Research opens up multiple horizons for other studies which seek to contemplate the geography unit of a social studies course by linking it to other thinking programs in their study, to achieve a higher level of development of geographical concepts and to connect them to reality: the limits of research

Tram Current Research with the following limits:

Human limitations: This research was applied to a sample of 100 teachers of social studies in middle school

Time limits: Research applied during second semester 2023-2024 because of content within second semester courses

Academic boundaries: Defining criteria for building interactive simulations at the Geography Unit from 2024-2023 Social Studies course in the second semester

Research terminology:

Interactive simulation

Ghaleb Abdel Maatee Al-Farajat (2014) defines interactive simulations as: Ancient similar events

Allah and simulating the attitudes that the student practices in his real life by providing the student with models, activities and training (27) through computer software and applications, p

And Rabab Wade Sophia (2010), it is a learning package, an immaculate system found in Walloon (66).

Electronics may be similar to a practical bar synthesizer to simulate a moped, or p (156). Important opinions according to specific steps.

Grana Baja, an attic prone to galactic phenomena and affectionate situations

Geographical Concepts

Mervat Abd AL- Nabi Dabour (2016) defined the tasks of a literal man as mental or manic conceptualizations (8).

Doaa Mohamed Daroush (2013) defines the Geographical illusionism as an abstract mental conception (229).

The Ajranba Graphical Concepts if defined as: The ability of second-grade students to understand graphical concepts that are unified in the study unit, in the determination of social studies, on the method of port expression.

Theoretical framework and past studies:

Definition of interactive simulation:

Nabil Gad Azmi (2014) defined interactive simulation as allowing the designer to intervene and add new variables of change existing variables values p (435), Abir bint Mohamed Al-Masodi (2013) defined simulation as interactive game-like environments and animation that represent visual and conceptual models in geography p (77), Islam Mostafa Al- Samahi (2018) and Hatim Abdo Abdel- Aty (2018) agreed that computer simulation are an interactive and effective virtual element in simulating nature and have the ability to reach similar results.

Design criteria for interactive simulation:

Allam Ali Mohammed (2011) has compiled a set criterion for designing interactive simulations:

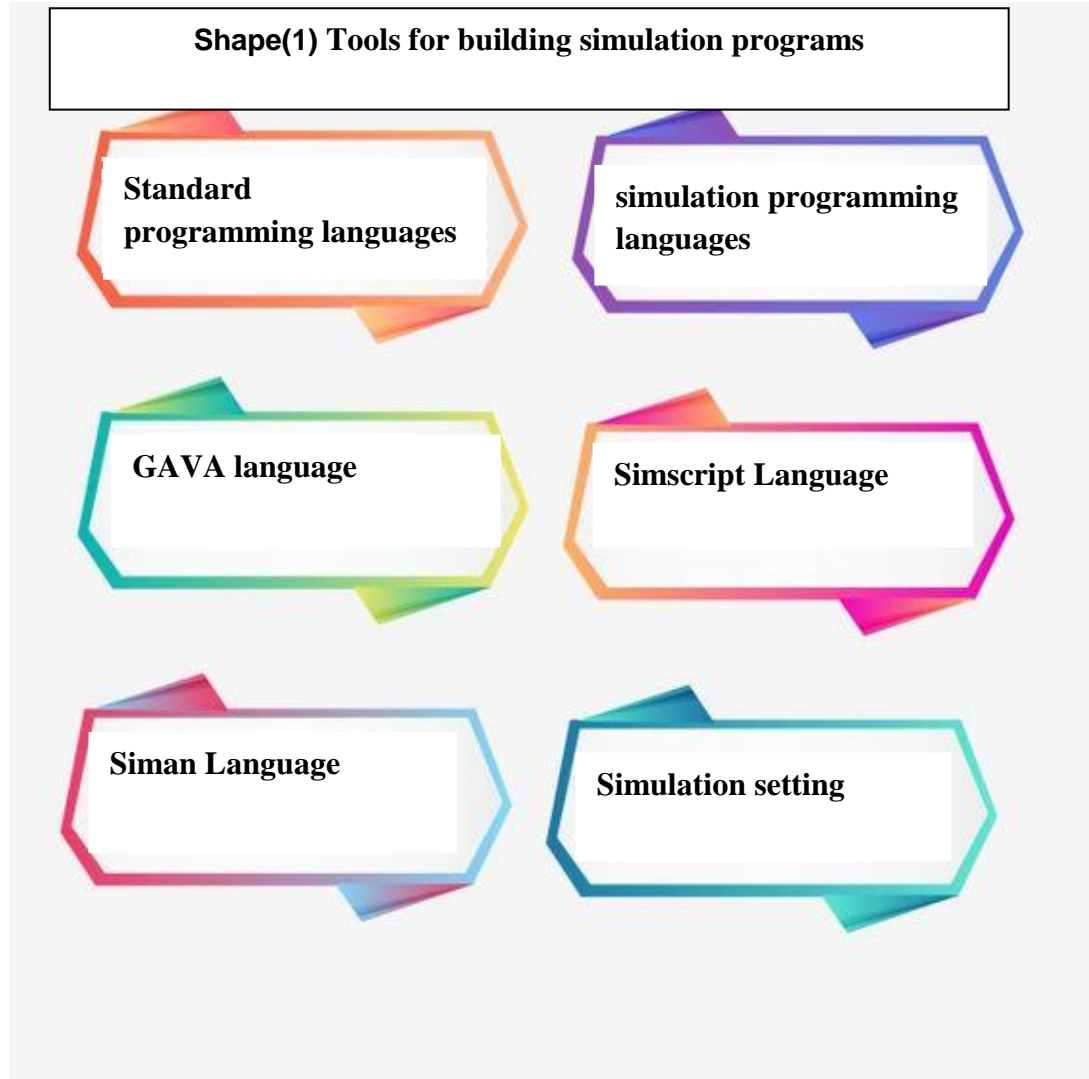### Educational Standards for interactive simulation construction:

- Consider current curriculum requirements.

- Precise choice of instrument within program.

- Objectively defining program Objectives.

- Set goals at the beginning of the show.

Software criteria for building interactive simulation:

- Consider individual differences among learners.

- Consider the learners' characteristics (age- past experience).

Self-error and attracting learners' attention p (627-630).

Tools for building simulation programs:

Shape(1) Tools for building simulation programs

Standard programming languages

simulation programming languages

GAVA language

Simscript Language

Siman Language

Simulation setting

1- **Standard programming languages**: it is the least used, because it is not originally designed to program simulation models like c and java.

2- **simulation programming languages:** Specially designed for the development of simulation by providing a general software framework that conforms to the requirements of simulation.

3- GAVA language from IBM.

4- Simscript Language.

5- Siman Language.

6- Simulation setting.

## Justification for using simulation in the learning process:

Salah Abdel Mohsen Ajaj (2023 Ref.Net) explained that as computers evolved, interest increased.

Computer simulations are effective and exciting in teaching concepts.

Simulation language are varied and used in teaching, simulation has also been used for few material and moral losses. This has made it an active activity and pleasure in laying the foundation of learning for some difficult skills and topics that are difficult to deal with. In fact, it is a simplification of some of the real-life situations in which an individual has a role. It is active in it others in light of the elements of simulated situation.

Types of simulation:

Shape(2) Types of simulation

Physical simulation

Procedural simulation

Positional simulation

Practical simulation
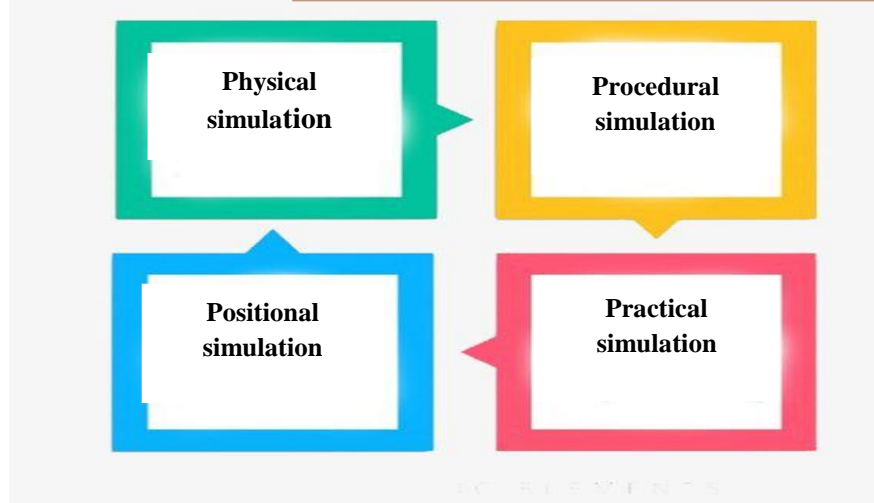
1- **Physical simulation:** Four types of simulations are reported by Shaima Mahmoud Kamel (2010) one related to the treatment such as airplane flying, deep sea simulation.

2- Procedural simulation: This type of simulation aims to learn a series of procedural simulation.

3- Positional simulation: The learner has a key role in a scenario that presents, not just learning, rules and strategies.

4- Practical simulation: in this type, the learner does not play a role in process simulation, he is an external observer and experimenter, while the learner cannot see.

Components of interactive simulation:

Simulation are three items that the learner goes through and acts on to produce his or her responses by Mohamed Atia Khames (2009):

Introduction: Introduction introduces the objectives of simulation, scenario and roles of learners and tutors.

interaction: Learners interact with a computer through an educational situation and computer role play.

Debriefing: Learners demonstrate results through interaction over a computer in which they arrive at responses that are required to apply.

Previous study:

The study by med Yousef Al-Attar (2015) that showed the development of scientific thinking skills among female students, the ninth basic grade using the Gaza- enhanced Addison program. Adel Salah Al-Malki study (2017) validate the impact of super electronic tatty maps in complementing the positive analysis iteration skills. Susan Hussen Sarraj Study (2019) addressed the effectiveness of a software based on the use of tablet and the internet in the light of the communication theory of interactive simulation strategies and digital science stations, hence drawing research from Previous studies to the possibility of applying simulation and overtaking it in stages.

The Research approach:

The current research has used the descriptive approach to determine the criteria for building simulation and optimization suitable for the ends geography for students in the second grade or preparatory school, which is one of the common forms of educational research, and seeks to determine the current status of a particular phenomenon and then to describe it.

It depends on the study of the reality, or phenomenon as it exists in reality, and is concerned with its accurate description.

Tools Research:

Research tools fill in the following tools:

-Unstructured interviews of some teachers in New Minia.

- list of building expressions of interactive appropriate simulation to the geographical concepts of second graders.

- Preparations Educational literature, Studies and previous research.

Table (1) List of criteria for interactive simulation

Educational Standard

Aims	
-	Clear general objectives
-	Clear learning goals
-	Formulating Goals Behavioral Formulation
-	Educational goals are measurable
Characteristics of Students	
-	Appropriate interactive simulation construction standards
-	Select the target Category
-	Gradual consideration of pupils cognitive characteristics
Educational Content	
-	Relation of the content to the selected objectives
-	Covering all the ideas and concepts of the subject
-	Scientific accuracy of content
-	The novelty of content
The view	
-	Present content in an engaging way
-	Clear learning goals to students
-	Display content in a coherent manner
-	Simple linking of information and media
-	Display content in individual learning
Software standards	
Design interactive simulation screens	
-	Clarity of written texts
-	Headlines are different from subheadings
-	Observance of the principle of colored contradiction and harmony
-	No more than 3 colors
-	Display pictures and graphics integrated with text

-	Image simplicity and harmony available
-	Clarity of data associated with graphics
-	The Clarity of the video clip and its relevance
Operation	
-	Provision of assistance to students
-	Proceed with the teaching plan properly
-	Instructions for use are clear
-	Avoiding logical replication errors
-	Use appropriate icons in screen design
-	Logical and sequential linkage between screens

Research procedures:

This research has followed the following procedures to answer his questions:

Select the objective from the criteria list:

Several sources were referenced when the list was constructed.

Analyze the abacus, previous studies and interactive simulation literature, and examine their standards and analysis, as well as performance of education technology experts and specialists in the standards of interactive.

Preliminary Criteria list:

By previous sources the standards have been formulated, each is prerequisite for the development of geographical concepts.

List of criteria before arbitrators:

The preliminary picture of the list was shown to a group of gentlemen arbitrators, curriculum, teaching methods, educational technology, it was made in the light of the arbitrators' opinions in terms of adding certain necessary criteria that could not be observed and measured, and incorporating some criteria that would fulfill the same task, and linguistic for some of the criteria and finalization of the list.

First- Present and analyze the research results in the light of its questions:

After the research study was completed, the results were statistically processed using the statistic package software to calibrate the research result to analyze the data and describe it in tables: SPSS V.23.

Table (1) List of criteria for interactive simulation

Educational Standard	Ratio of agreement
Aims	
- Clear general objectives	95%
- Clear learning goals	90%
- Formulating Goals Behavioral Formulation	92%
- Educational goals are measurable	82%
Characteristics of learners	
- Appropriate interactive simulation construction standards	95%
- Select the target Category	90%
- Gradual consideration of pupils cognitive characteristics	92%
Educational Content	
- Relation of the content to the selected objectives	92%
- Covering all the ideas and concepts of the subject	87%
- Scientific accuracy of content	98%
- The novelty of content	91%
The view	
- Present content in an engaging way	85%
- Clear learning goals to students	90%
- Display content in a coherent manner	89%
Instructional Standard	**Ratio of agreement**

-	Simple linking of information and media	93%
-	Display content in individual learning	90%
Software standards		
Design interactive simulation screens		
-	Clarity of written texts	85%
-	Headlines are different from subheadings	90%
-	Observance of the principle of colored contradiction and harmony	92%
-	No more than 3 colors	90%
-	Display pictures and graphics integrated with text	91%
-	Image simplicity and harmony available	92%
-	Clarity of data associated with graphics	87%
-	The Clarity of the video clip and its relevance	89%
Operation		
-	Provision of assistance to students	94%
-	Proceed with the teaching plan properly	98%
-	Instructions for use are clear	97%
-	Avoiding logical replication errors	85%
-	Use appropriate icons in screen design	91%
-	Logical and sequential linkage between screens	93%

Interpretation of the outcome:

From the foregoing, the arbitrators agree on educational terms and technical standards.

The degree of agreement ranges between (82%: 98%) to come up with three criteria with the highest agreement rate of 98% which are (scientific accuracy of content) and (centralization of educational activities around students), and to proceed with the implementation of a plan to teach correctly without software errors. The standards are graded in the proportion of convergence

to obtain only one statement, which is (clear and explicit instructions for use), has97% agreement rate, and four terms get, the rate of derivation in 95% and the rate of 94% included one criterion (provision of assistive methods of learning, when needed and the rate of achievements of 93% and six criteria meet 92% and four expressions achieve 91% agreement rate while 90% release included the highest.

Research recommendations:

-Adoption of the interactive simulation construction criterion used in the current research to serve as a guiding model for the development and teaching of geographical concepts.

- Further revisions of these standards in line with modern technology development.

- Time plan has been established by decision makers to speed up the application of high simulation standards.

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