
INTEGRATION OF GEOGRAPHIC INFORMATION SYSTEM (GIS) IN GEOGRAPHY TEACHING

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Abstract

Geography affords accurate, orderly, and rational description and interpretation of the variable person of the sector floor. It is that area that seeks to explain and interpret the variable person from location to location of the earth as the sector of man- (According to Richard Hartshorne, 1959) in his book The Nature of Geography.

Now days, the sample of dwelling and survival is converting and so does the technology. Geographical information system (GIS) is one of the such device that encompass essential gear that offer numerous degrees main to sustainable making plans and socio monetary improvement. For gift generation, gaining knowledge of has turn out to be greater superior and for that reason dealing most effective will textbooks is nowhere going to put into effect powerful effects. Higher secondary faculties, nowadays, have net facility to help teaching-gaining knowledge of technique. This has made it smooth for the Geography instructors and directors to conform their teaching techniques for essential integration of ICT and GIS in Higher Secondary degree schooling which has the capacity to decorate college students' information and talents with inside the subject. In this have a look at, an attempt has been made to have a basic view concerning the readiness of the Teachers of Geography in better secondary faculties to combine ICT and GIS in normal teaching-gaining knowledge of techniques. Keeping parity with the not unusual place perception, from this have a look at additionally, it's been determined (out of the scale studied) that more youthful Geography instructors are greater prepared to combine the ICT & GIS of their teaching on the Higher Secondary degree.

Keywords: *Geographic Information System (GIS), Information and verbal exchange era.*

Introduction

Geography is the study of the dynamic phenomena over the earth surface taking location considering its existence. On the alternative hand, Geographic Information Systems (GIS) may be described as a complete mapping device designed for capturing,

storing, reading, synthesizing, querying, editing, retrieving, manipulating and showing spatial facts received from earth's surface within side the shape of charts, tables, 3-d photographs and maps primarily based totally at the richness of the statistics entered into the GIS database (source: unknown). Specifically, Information verbal exchange Technology (ICT) and Geographic Information System (GIS) have large capacity to have an effect on teaching and gaining knowledge of, and studies within side the schooling region at each degree. It facilitates to accelerate, enrich, inspire and interact college students all through teaching and gaining knowledge of techniques thereby enhancing college students' expertise of standards (Falode, 2014). The teaching career has additional time skilled drastic modifications. These modifications had been pondered at the function of the academics, the classroom interest and verbal exchange technique and the teaching methodologies. Today, the function of instructors has modified from repertoires to facilitator of information. The school room interest has now taken the shape of interplay among the instructor and college students instead of mere practice because it used to be, with the verbal exchange technique incorporating each the instructor and the scholars. The philosophical (conventional) techniques of teaching had been fortified with mental (innovative) techniques which can be greater modern-day. These modern-day mental techniques emphasize using era, of which Information and Communication Technology (ICT) and Geographical Information System (GIS) are a component of. As such, they focus on turning in to the scholars the 4 Cs of gaining knowledge of (Communication, Collaboration, Critical thinking, and Creativity) while been pondered in Geography teaching.

Application of Information and Communication Technology (ICT) and Geographical Information System (GIS) in teaching Geography in better secondary schooling is a modern-day method within side the pedagogy of Geography (Rahamana & Bhattacharyya, 2001) It displays a paradigm shift in Geography schooling. It approaches the usage of era in a trendy manner to educate Geography college students virtual literacy, and fortifying them with the talents wished within side the 21st-century technological-primarily based totally exertions market. It is in vein of those, that this have a look at is saddled with the trouble of coming across the ones regions (standards/topics) in Geography that Information and Communication Technology (ICT) and Geographical Information System (GIS) may be first-rate implemented, unraveling the ones results and demanding situations of making use of it in teaching Geography in better schooling, after which offering viable answers to the demanding situations. On this basis, this study turned into chosen.

Review of Related Literature

Rahman & Bhattacharya (2001) in a study titled '**GIS and ICT software in teaching Geography at Higher Secondary degree: A nearer attention on Teachers'Readiness**', states that the makes use of GIS & ICT are very critical in The exclusive gear like use of era, infrastructure, device, and mental focus are very useful in teaching.

Poudel, K.(2014) in a study titled **Application of Geographic Information Systems within side the Geographical Research** said that geographical studies are a seek to get solutions of questions or queries regarding approximately the phenomena of area, society, humanity and herbal techniques. Geographical Information Systems (GIS) assist to hold at the study through permitting the facts capture, database control, statistics dealing with and reading the complicated phenomena inside an interactive user's interface surroundings with excessive diploma of accuracy and in a brief time. Verticality and versions are the residences of mountains panorama. Application of GIS on geographical studies permits to investigate the ones precise residences of mountain panorama with potential accuracy degree.

Murayama (2000) in **Geography with GIS** pondered that the reputation of GIS within the subject of geography has risen at a top notch rate. If we investigate beyond 10 years, using GIS is being significantly hired and geographers are taking increasingly more interested by this new technological subject and in addition it's also utilized in cultural in addition to ancient components. His study overwhelmingly depicts that GIS is now extraordinarily powerful device for database control, facts processing, fieldwork, surveys etc. in collaborative studies.

Objectives of the Study

The findings of the study assist the stakeholders in schooling to recognize the elements that have an effect on using ICT within side the schooling device and make applicable choices. The administrators also can additionally use the findings from this study to formulate the right ICT regulations.

The present study is accomplished with the goals of locating

1. What is GIS?
2. How GIS is assisting in daily purposes?
3. How GIS is assisting in disaster management?

4. How GIS is powerful in making lesson plans for the teaching?
5. The methods wherein GIS facilitates in schooling and gaining knowledge for learners?

1. What is GIS?

A Geographical Information System (GIS) is a device for capturing, storing, reading and handling facts and related attributes, that are spatially referenced to the Earth (Audet & Paris, 1997). In their book "Geographic Information Systems: An Introduction" posted in 1990, Star & Estes outline GIS statistics device designed to paintings with facts referenced via way of means of spatial or geographic co-ordinates. According to the authors, a GIS is a database device with precise skills for spatially-referenced facts, in addition to a hard and fast of operations for operating with the facts, i.e., reading it.

Lang (2000) affords this definition: "A geographic information system (GIS) is a device for reading and mapping pretty much anything, shifting or stationary. A GIS integrates not unusual place database operations, consisting of question and statistical evaluation, with the capacity to peer how facts relates in area and time. The maps produced with a GIS are beneficial for displaying locations and the activities that arise there, like outbreaks of disease. They are beneficial for reading and visualizing any device it's spatial or spatio-temporal (that still modifications with time), for mapping a patient's coronary heart or brain, for instance, or displaying a breakdown of diagnoses on a map of the body, or maybe indicating which beds on a health facility ground are occupied, for a way long, and via way of means of whom."

2. Usage of GIS in Daily purposes.

Geographic information system, no question is a boon in today's technological superior world. There are a few unexpected programs of this software. Here are a number of the use if GIS in daily life.

Mapping

Mapping may be very vital within side the subject of geography, for that reason the very most important function GIS performs within side the subject is of mapping. Various software like Google maps, Google earth affords fantastic instance of technological development that still facilitates in visible interpretation of facts.

Accident Analysis and Hot Spot Analysis

With superior technology, superior intelligence additionally is available in and for that reason make us to paintings smart. GIS facts facilitates to become aware of

coincidence places, and avenue networks may be optimized the usage of facts intelligence. This intelligence facilitates to enhance avenue protection measures and lets in higher visitors control.

Urban making plans

Now a days Urban making plans is a prime attention of virtually maximum of the growing countries and a good way to do sustainable making plans, right format of challenge is need to that may be without problems made with the assist of GIS. GIS examine the facts for the increase of city regions and whilst implemented correctly numerous different elements also can be encountered for a success city making plans.

Transportation Planning

GIS facts is normally used for handling transportation issues. It may be beneficial in handling the right visitors float and now no longer most effective this with the assist of gear new routes may be planned.

Agricultural Applications

How are we able to neglect about the common practice being undertaken in our country? GIS facts creates farming techniques, additionally the technique of soil evaluation is likewise trending those date a good way to carry out higher manufacturing practices.

Navigation

We all use GPS and stay tracker that lies proper in our hands, this may now no longer be accomplished without the facts manipulated with the assist of software program this is being procured via way of means of satellite tv for pc imageries and in addition made beneficial to the general public for regular use.

Natural Resources Management

Natural resources are the lungs of the planet for that reason it's very critical to hold over its control. This may be without problems accomplished with the assist of the GIS software via way of means of allocating the assets and environmental parts that are at more dangers or vulnerable to get exhausted. Thus right control is very critical that may be accomplished via way means of GIS.

Banking

GIS performs a substantial function in handling the financial institution pushed sports that relies upon particularly on its capacity to offer client pushed services. It facilitates in making plans, organizing and choice making within side the banking region.

Taxation

Geographic Information System additionally performs a substantial function in resolving the trouble of taxation and maximize the earnings of the government, that may be utilized in constructing tasks and handling assets taxes geographically.

Surveying

Surveying is a technique that includes finding the spatial gadgets, marking it includes measuring the vicinity of gadgets in the world via way of means of the usage of Global Positioning systems, the facts procured via way of means of that is integrated with GIS device a good way to put together a motion plan or layouts.

Geology

GIS is a top notch software that may be very beneficial to geologists in reading soil, determine seismic statistics and create 3-d presentations of geographic features. It facilitates in reading rocks and locating first-rate places for exclusive styles of rocks.

Assets Management and Maintenance

GIS facts facilitates businesses turn out to be greater green with finite assets. With an expertise of the population at risk, planners can allocate assets greater correctly.

Planning and Community Development

GIS gear are hastily taking location within side the making plans and improvement region a good way to meet the worldwide demanding situations. This gear facilitates in laying out numerous plans or layouts for the developmental functions.

Irrigation Water Management

Geographic information system facilitates in figuring out the substantial plants, plants variety, soil type, suitability of it for cultivation, however except irrigation may be very critical for that reason, the supply of water without delay to the fields wishes right music vicinity in order that it is able to attain to large regions.

Pest Control and Management

GIS performs a critical function in mapping out the inflamed regions with the assist of its numerous layers as pest manage is vital for agricultural manufacturing. This can assist in greater powerful making plans.

3. GIS for Disaster Management

Disasters, as the phrase says are disastrous and are spatial in nature. Largely or in general there are surprising and unplanned and reasons massive destructions. That will

have an effect on all of the humanistic components like social, monetary, and surroundings sectors. Disaster control is the employer and control of the assets for managing all components of emergencies to reduce the effect of the harm caused. Here comes the software to rescue, GIS in catastrophe control acts as a device for helping choices. This device facilitates in expertise the character of the catastrophe after which to mitigate the complexities of failures. In addition to that, choices can most effective be made via way of means of reading the exclusive Geographic Information System layers. Thus, with using GIS, control and making plans of failures, in addition to dealing with disastrous situations will become smooth and beneficial, with the assist of geo-spatial and socio-monetary facts. This software can soak up to counter and examine numerous failures as follows.

Preparedness for disasters

Planning and Mitigation

Response and Recovery

Building a common running surroundings

Data Management

Providing live facts

Flood Mapping

4. GIS, a powerful support system in making lessons plans for teaching.

Geographic information system has a top notch function in making curriculum in addition to lesson plans in geography. Besides, the usage of it for drawing and decoding this device also can be used to assist pupil to interpret the map making manner all through lesson making plans or numerous obligations whilst getting ready training consisting of surveys and fieldwork. GIS may be used to create tale through texts, symbols or permitting annotated related to pictures and videos, telling the geographical narratives. It also can help choice making physical games to evaluate a huge variety of demanding situations, consisting of the blessings of precise web sites or routes.

For example: If a teacher need to take lesson by Connecting GIS Education to Bloom's Taxonomy, the lesson plan will follow the frame work included all the six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation.

Plate tectonics is one of the frequently taught lesson at multiple level of education in geography and science courses. Thus let us know that how GIS can be proved as a helping tool in the teaching.

Sample objective based activity is given for the topic Plate tectonics.

Table 1 Objective base activity by using GIS for the topic Plate tectonic

Bloom's Taxonomy Verbs	Example from teaching plate tectonics with GIS
Remembering	Learn about faults, the zones underneath the Earth's surface, continental vs. oceanic crust, types of plate boundaries such as transform, converging, and diverging, types and heights of volcanoes, and the magnitude and depth of earthquake. Use cardinal directions (north, northeast, etc.) and other spatial terms (adjacent to, clustered, dispersed, linear, etc.) in describing the mapped data.
Understanding	Change the symbology and the classification method of the earthquake and plate boundary map layers to visualize the map layers in different ways. Interpret the earthquake, volcanic activity, and plate data to determine how many earthquakes typically occur each month, the pattern of the earthquakes by magnitude and depth, and how many have occurred within 50years.
Applying	Determine how many earthquakes have occurred over the past 50 years. Consider soil types and building construction materials used, and how these influence potential damage from a major earthquake on the types of buildings in the learners country. Assess continental vs. oceanic earthquakes and apply this knowledge to earthquakes in each scenario.
Analyzing	Analyze the relationship between frequency, depth, and magnitude of earthquakes to converging vs divergent boundaries. Measure the offset from the Nazca-South American plate boundary to the Andes Mountains, and investigate the reasons for the offset. Open and sort the data tables behind the map layers to determine the largest and deepest earthquakes that have occurred over the past 30 days. Measure the distance from the learner's community to these earthquake, and the distance from these earthquakes to the nearest plate boundary
Evaluation	Compare the ocean floor base map to the plate boundaries layer and assess the spatial differences between the two, consider the reasons for the differences, and discuss the implications. Make recommendations on how to build resilience in cities and among individuals and households in the face of increasing population and continued Earth dynamism.
Creation	Creates a presentation about earthquake, risk around the world and in learners own environment using maps and applications such as story maps and spatial data, and present the results visually and orally to the instructor and peers.

Source: Environmental System Research Institute (ESRI),community.esri.com

5. The methods wherein GIS facilitates in schooling and learning

The geographic information system has numerous makes use within school teaching. It may be used correctly in numerous degrees of casual and formal schooling. Besides that, GIS will join freshmen to their communities. The use takes place in all levels which

include primary, secondary grades, and maintains to college guides. Here are the programs of GIS in schooling.

1. Emphasize standards

Instructors are emphasizing teaching with GIS to educate talents and ideas in geography, earth science, arithmetic guides, history, organic science, and chemistry.

2. Research device

Universities and faculties makes use of GIS as a totally distinguished device for his or her studies functions in numerous disciplines like demography, geography and geology.

3. GIS schooling

Many faculties inside and outside of the country are focusing greater on bringing GIS with inside the center guides for the schooling. Beside that in many universities GIS has already have become dominant and is being taught as a theory. The route is found in disciplines like geology, environmental studies, engineering, business, and geography.

4. Enhance gaining knowledge of capacity

The use of GIS facilitates to decorate gaining knowledge of talents and cause them to assume severely whilst fixing trouble and reading facts. With this they are able to make their very own choices without relying on every person. In addition to that, college students can use numeric and range talents in addition to gear that technique and ship statistics.

5. Enhance linguistic intelligence

The geographic information system complements linguistic intelligence. It facilitates the freshmen to understand the capacity of decoding the capacity of studying the symbols can also additionally it's visuals, for instance, searching at a photograph of the map and interpret ancient and vicinity statistics.

6. Map literacy

GIS facilitates in improving the map reading skills. The beginners get appropriate information of visualizations of spatial styles and may enquire over it.

7. Display idea without delay

Despite the supply of several textbooks, guides, technology GIS is something that consists of multi-function which include gear procedures, and techniques. Hence present the entire standards without delay additionally making it greater appealing.

8. Analyze dynamic content material

The geographic information system performs a critical function in reading the dynamic content material that may be without problems made to be available on-line and every person can without problems have get access to it is a good way to decorate the attain of statistics to the loads in whilst and without tons cost.

9. Planning

GIS has a totally distinguished function in making plans, in preference to the usage in school room, the college, frequently use in making plans, the numerous centers like infrastructure, area control, powerful control and implementation of assets. Also it facilitates in administrative sports and setting up networks.

10. Safety

The use of GIS can make contributions in handling the safety possibilities for administration, instructors and different college workforce a good way to put together for an emergency.

Conclusion

The findings of the study might assist to recognize the elements that have an effect on using GIS within side the schooling in addition to numerous different components of existence wishes. The mixing of ICT with GIS needs the infrastructures in addition to the technical help. There are several utilization of GIS that now no longer most effective serves as an software however manner greater just like the technical help to ease out the regular functioning in numerous geographical fields like:

1. GIS is assisting in day to day usage.
2. GIS is assisting in disaster management.
3. GIS is powerful in making lesson plans for the teaching.
4. GIS facilitates in schooling and gaining knowledge for learners.

In view of the persevering with call for GIS professionals and the extent of class and complexity of many GIS programs, it's miles inevitable that GIS can be taught someplace in lots of Schools, faculties and universities' programs. At the moment, a majority of the educational departments teaching are taking up GIS as a part in departments of geography (Morgan, 1990). This phase examines the exclusive goals that may be set up for GIS guides, considers wherein those guides may be positioned in geography curriculum largely, and ends with a dialogue of suitable prerequisites.

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