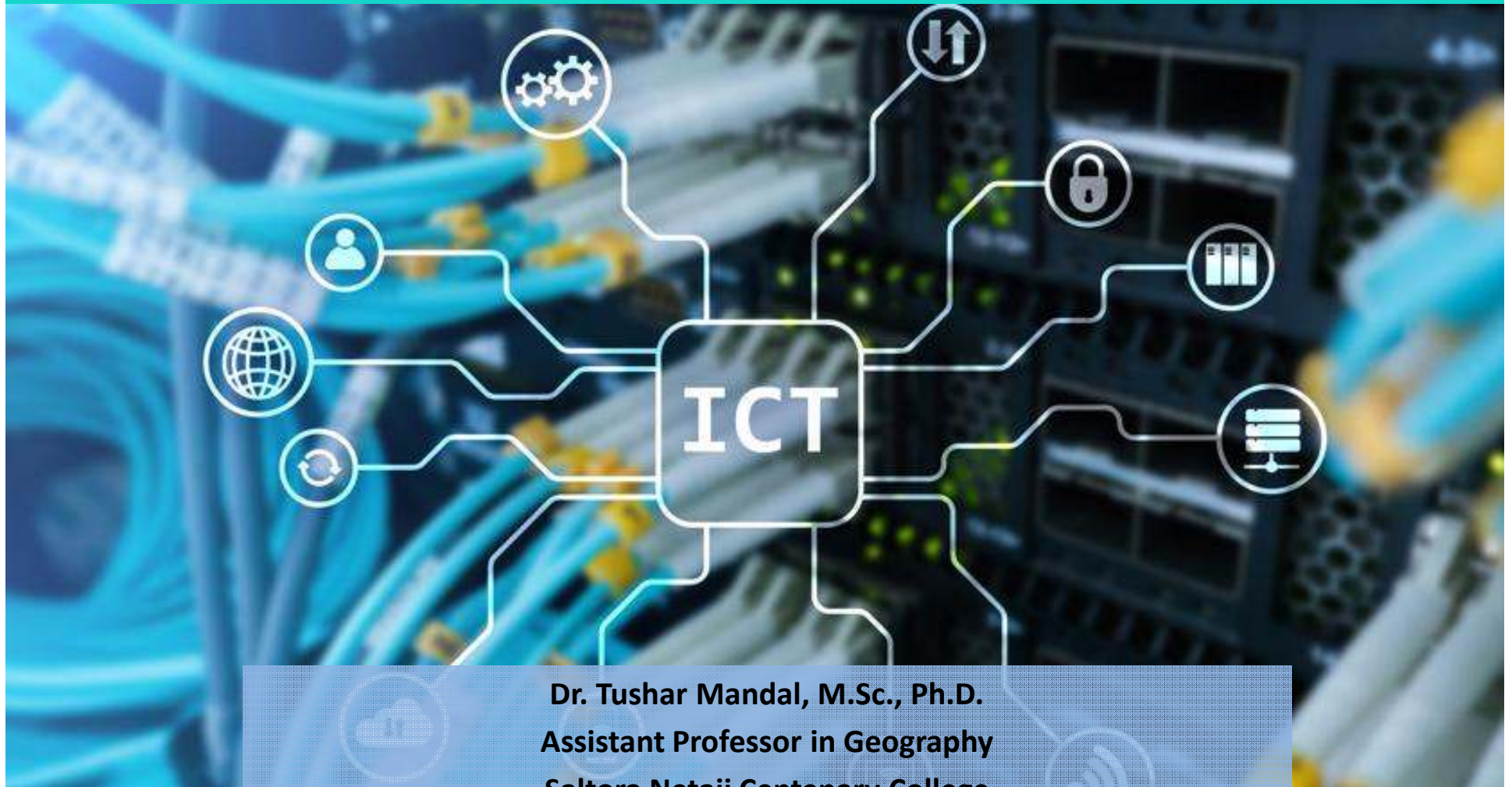


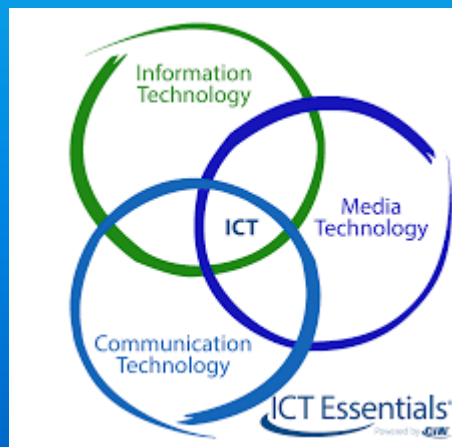
Role of ICT in Scientific and Technological Education & Research: A Geographical Perspective



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What is ICT?

Information and Communication Technologies (ICTs) is a broader term for Information Technology (IT), which refers to all **communication technologies**, including the internet, wireless networks, cell phones, computers, software, video-conferencing, social networking, and other media applications and services enabling users to access, retrieve, store, transmit, and manipulate information in a digital form. However, there is no universally accepted definition of ICTs considering that the concepts, methods and tools involved in ICTs are steadily evolving on an almost daily basis.



Source: Internet

Function of ICT in Spatial Analysis

ICT is the processes, tools and techniques for:

1. gathering and identifying information
2. classifying and organizing
3. summarizing and synthesizing
4. analyzing and evaluating
5. speculating and predicting

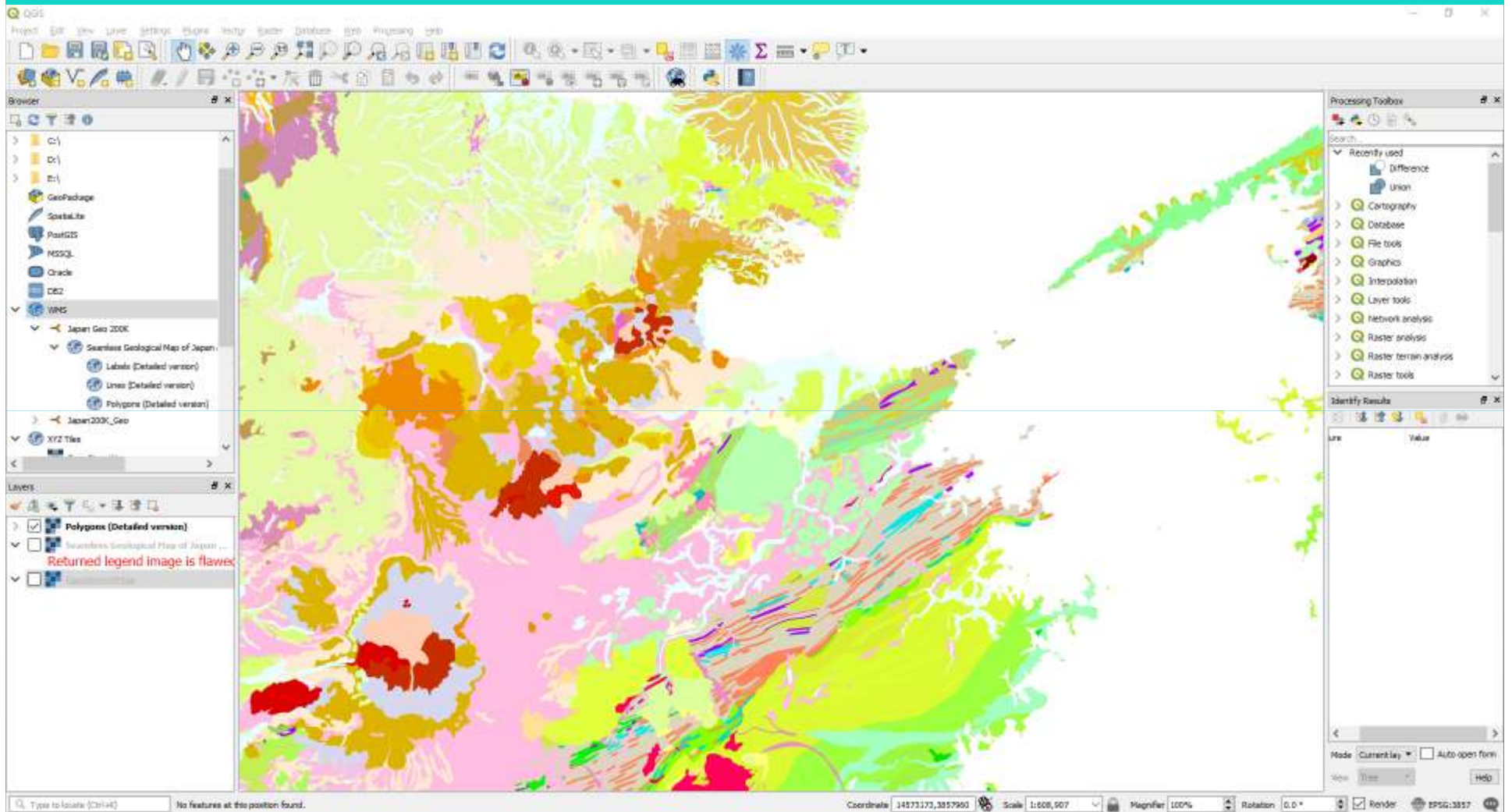
Components of ICT: Hardware Resources

- 1. IT Suits:** Networked computer systems and groups of computers concentrated in dedicated IT suites as part of a whole school or college policy
- 2. Laptop Computers:** Use of a class set of laptop or notebook computers within a science area. These computers can be linked via a wireless connection to the school network to access the full facilities that this provides
- 3. Whole class viewing system:** So that it can be used as an everyday, integral part of learning
- 4. Digital Screens and Boards:** For viewing purpose.
- 5. Scan converters:** It allows any image that can be viewed on a computer to be seen by a class on a TV.
- 6. Use of science software:**
 - a. Simulation software.
 - b. Information and retrieval software
 - c. Geographical Information System software

Components of ICT: Software Resources

1. GIS Softwares: ArcGis, QGIS, TNT Mips, Arc Info, ArcGis etc.
2. Statistical and mathematical software: Matlab, R, SPSS etc.
3. Word processing software: MS Word, LaTeX
4. Spreadsheet software: MS Excel
5. Presentation software: MS Powerpoint
6. Text-Editor and Mark-up tools: LaTeX, Gedit etc.
7. Webpage designing tools: Brackets, HTML
8. Web based office tools: Google Docs
9. Anti-Plagiarism software: Urkund (auriginal), Turnitin etc.

Screenshot from QGIS on thematic mapping



Source: Internet

HIV Positivity at ANC

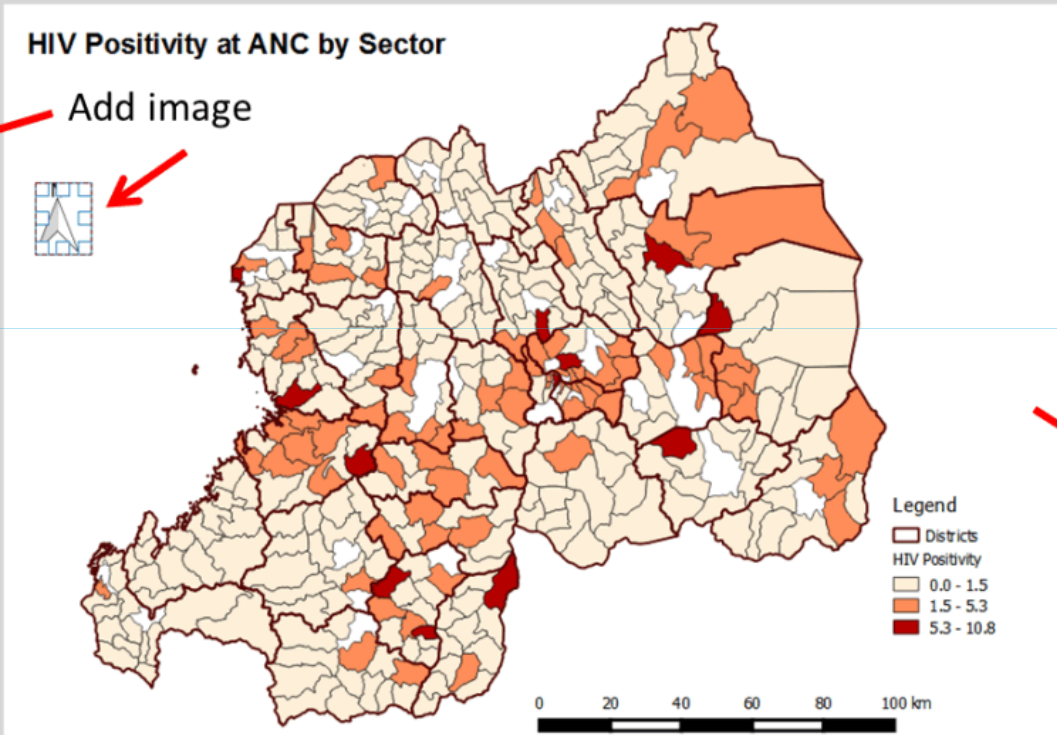
Composer Edit View Layout Atlas Settings

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

0 20 40 60 80 100 120 140 160 180 200 220

HIV Positivity at ANC by Sector

Add image



Legend

- Districts
- HIV Positivity
 - 0.0 - 1.5
 - 1.5 - 5.3
 - 5.3 - 10.8

0 20 40 60 80 100 km

Items Command history

Command history

- Scalebar segment size
- Number of scalebar segments changed
- Picture added
- Picture changed
- Change item size
- Picture changed

Composition Item properties Atlas generation

Item properties

Picture

Main properties

Image source

C:\PROGRA~1\QGISWI~1/apps/qgis/svg/arrows/NorthArrow_04.svg

Resize mode

Zoom

Placement

Top left

Search directories




Image search paths

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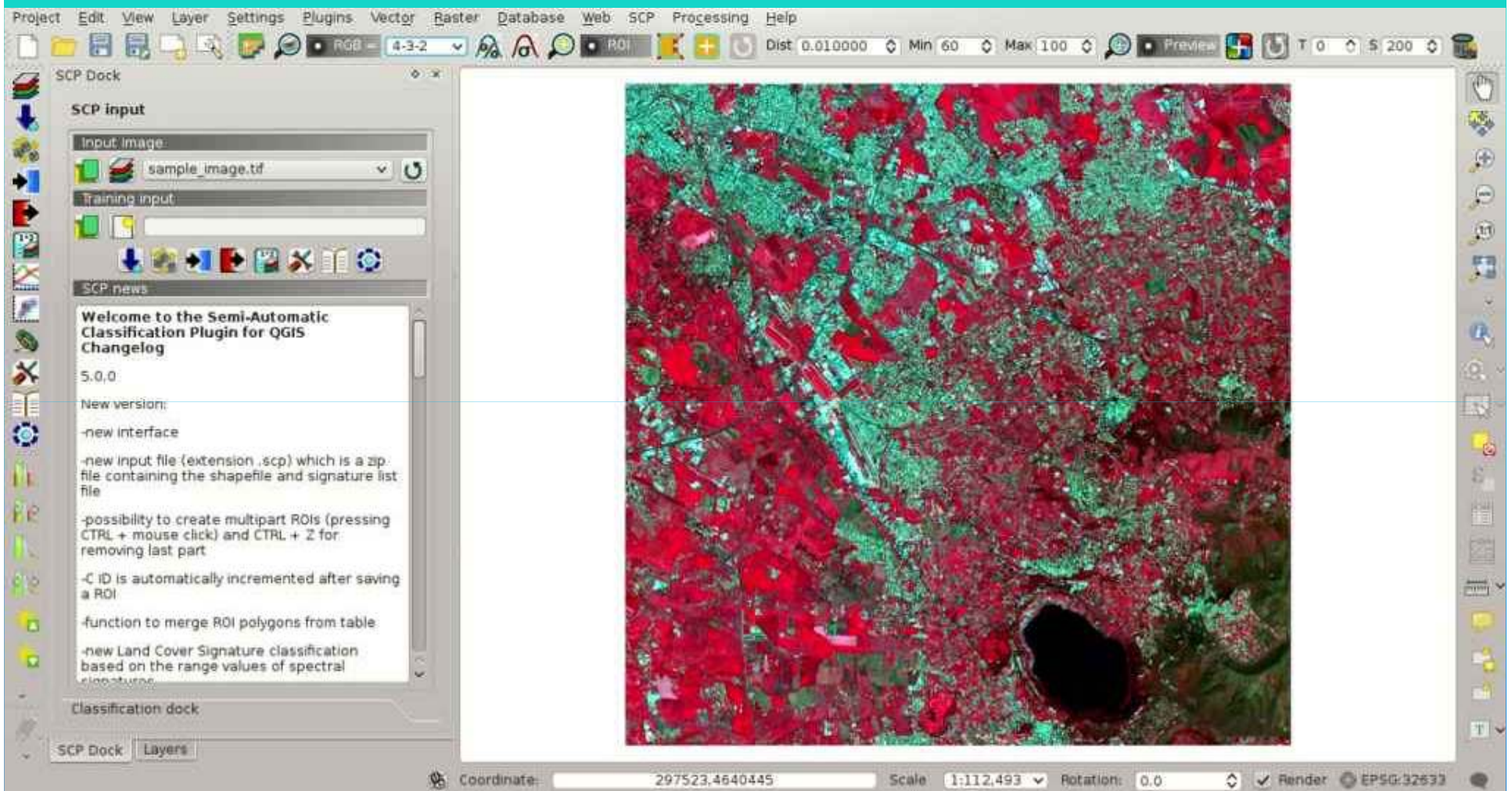
Remove Add...

Image rotation

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x: 283.25 mm y: 128.585 mm page: 1 58.4% 1 item selected

Source: Internet



Source: Internet

World Wide Web (WWW) deserves a special mention...

The internet is a vast store of information that can be highly relevant, detailed and up to date. It can provide information ranging from data on atmospheric ozone levels and medical research to photographs from the Hubble space telescope. Unfortunately, much information can also be irrelevant, and a distraction from tasks set for students, so that they waste much time on fruitless searches. Search engines such as Yahoo, Google, Altavista and Ask Jeeves produce best results when the search request.

Q. What Internet resource can we use?

A. Applets (animated images), Tutorial videos, Three-dimensional visualization etc. Communicating through emails, video conferencing, using internet based cloud services, using different types of interfaces etc.

How can ICT contribute in scientific /geographical research?

- ❑ The most straightforward use of ICTs in research is in **data processing**. The unprecedented growth in bandwidth and computing power provide opportunities for analyzing/processing huge amounts of data and performing complex computations on them in a manner that is extremely fast, accurate and reliable.
- ❑ The steady increases in bandwidth and computing power available have made it possible to **conduct complex calculations on large data sets** (weather data, census data, large scale other types of primary data)
- ❑ Communication links make it possible for research teams to be **spread across the world** instead of concentrated in a single institution.

Contd.

- ❑ The combination of communications and digital libraries is equalizing access to academic resources, greatly enriching research possibilities for smaller institutions and those outside the big cities.
- ❑ Another important dimension of ICTs in research is the use of **online full text databases and online research libraries/virtual libraries** which are the direct outcome of the growth in telecommunications networks and technology.
- ❑ ICT has also played a major role in **university and industry partnership**.

ICT in geographical teaching & learning

ICT widens the range of material that can be used in teaching and learning to include text, still and moving images and sound, and increases the variety of ways that the material can be used for whole class and individual learning. This means that **a teacher can go some way to meeting the needs of students with different learning styles**. ICT also **allows geography teachers with different teaching styles** conducive for spatial analysis to a great extent. ICT provides opportunities for teachers to be **creative** in their teaching and in student learning.

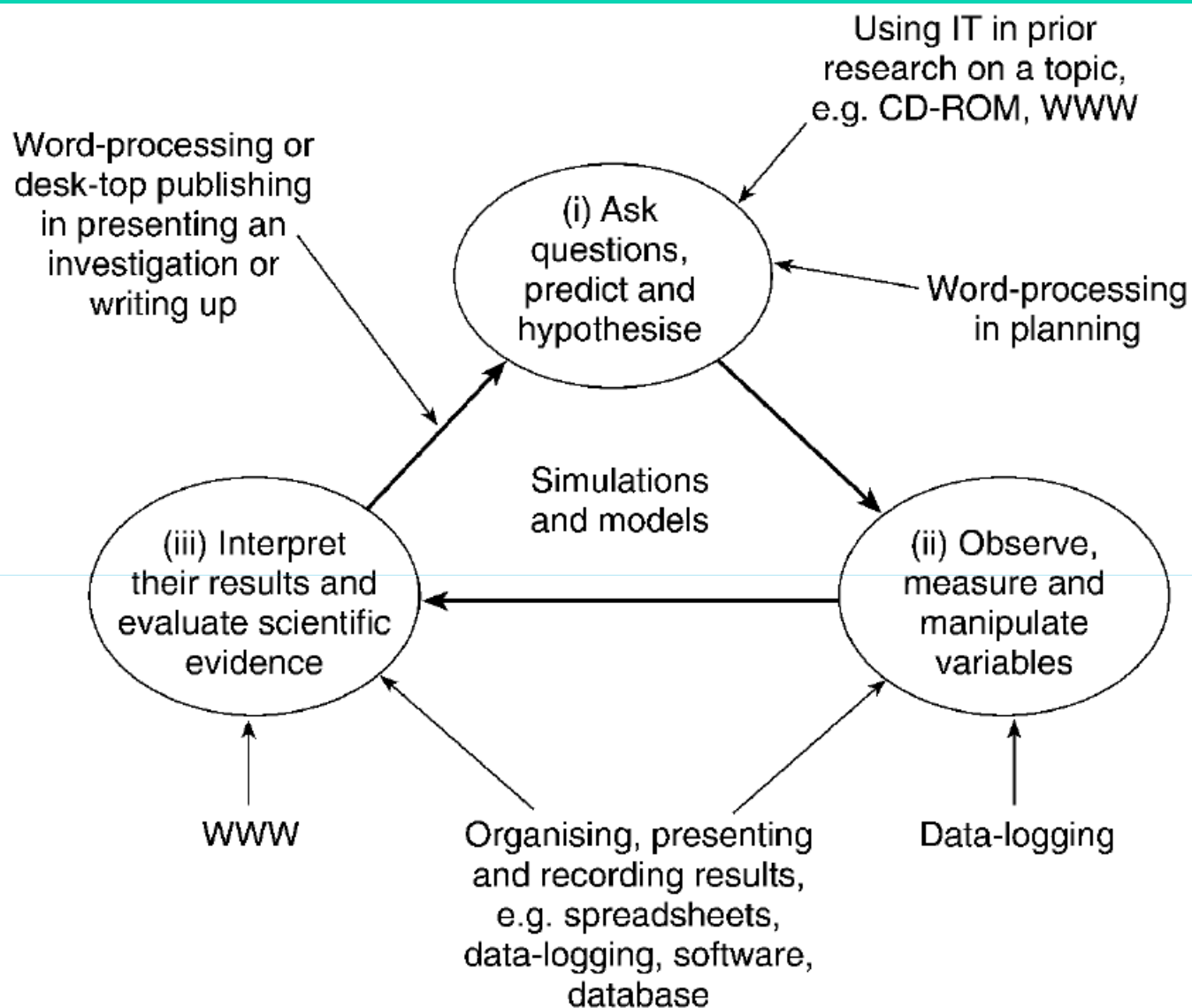
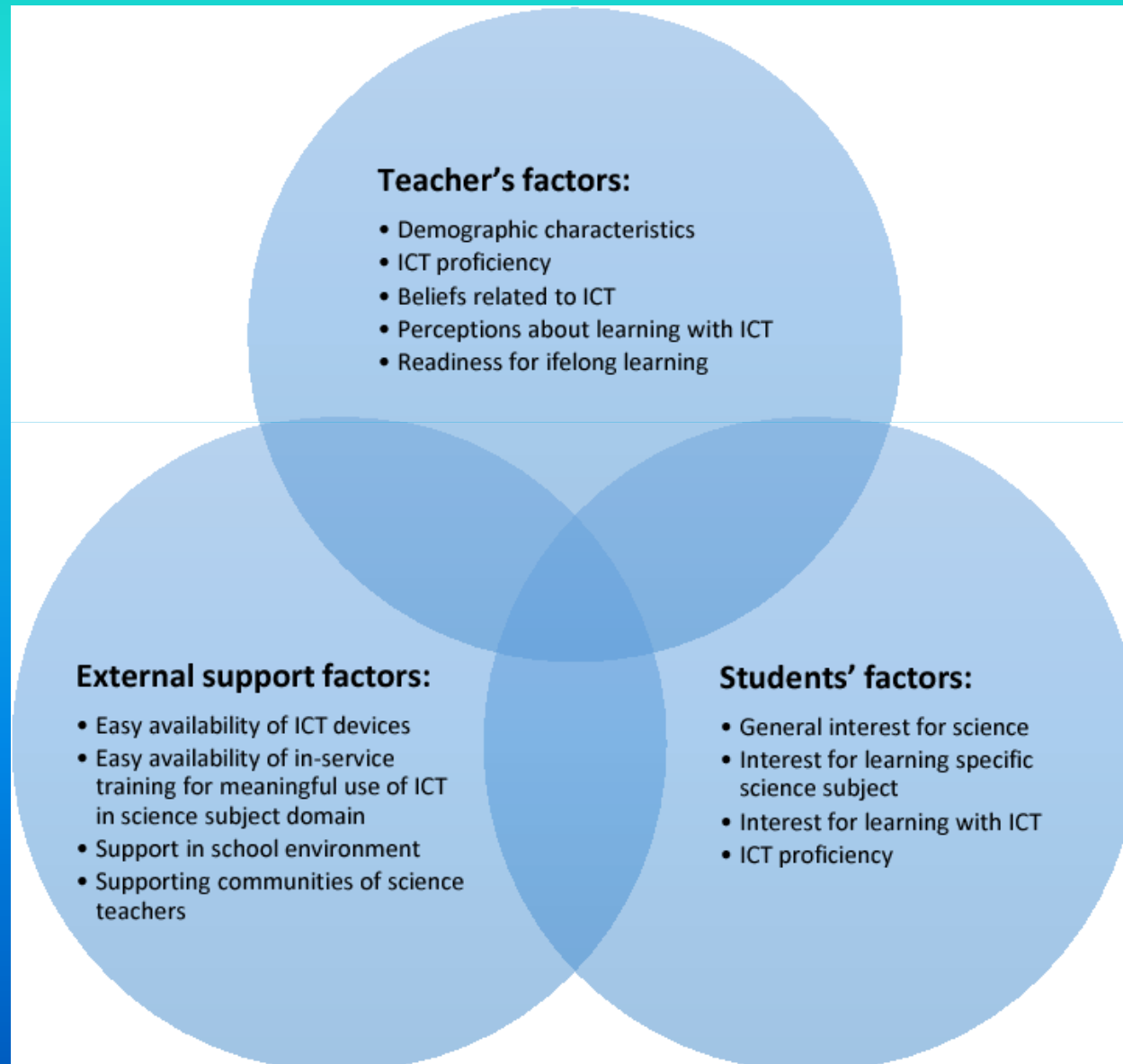


FIG. 1. A model of the iterative process of science that can be used to structure experience of science at the school level with some examples of current use of ICT (from McFarlane, 2000).

Exactly how an ICT enabled successful teaching-learning process in geographical/spatial education is possible?



Thank you!