Books for SDI Education and Training in South Africa

Victoria Rautenbach and Serena Coetzee

26th International Cartographic Conference
Dresden, Germany

www.up.ac.za
Spatial Data Infrastructure (SDI)

In the early 1990s the concept of a spatial data infrastructure (SDI) emerged when the emphasis moved from stand-alone geographic applications towards a networked and collaborative information infrastructure that coincided with the development of the World Wide Web.

A spatial data infrastructure (SDI) is a platform which facilitates and coordinates the exchange and sharing of spatial data between stakeholders.
Spatial Data Infrastructure (SDI)

A collection of technologies, systems (hardware and software), standards, policies, agreements, economic and human resources, institutions and organisational aspects that have to be orchestrated to make it possible for users to access data.

SDIs are complex, dynamic and multifaceted and success relies heavily on people.
South African Spatial Data Infrastructure

The South African Spatial Data Infrastructure Act was promulgated in 2003 (Act 54 of 2003) and the Committee for Spatial Information (CSI), as described in the Act, was established in 2010.

Main objectives of the SDI Act:

- establish the **South African Spatial Data Infrastructure** (SASDI), the Committee for Spatial Information (CSI) and an **electronic metadata catalogue**;
- to provide for the determination of **standards and prescriptions** with regard to the facilitation of the sharing of spatial information;
- to provide for the **capture and publishing of metadata** and the avoidance of duplication of such capture; and to provide for matters connected therewith.
Committee for Spatial Information (CSI)

The CSI consists of a principal committee, established according to the Act, and six sub-committees:

- Data,
- Systems,
- Standards,
- Policy and legislation,
- Education and training, and
- Marketing and communication.

The CSI was established to achieve the objectives of SASDI.
Importance of Education

**Education** has been identified as an *essential component* in the successful development and maintenance of a national SDI.

Education and training programs for GIS professionals and other individuals involved in the development of an SDI are important.

Globally a lot of effort has gone into **understanding and implementing SDIs** and other types of data infrastructures. From these efforts a collection of **education and training material** has been produced.
Importance of Education

Ignorance and relevant skills shortages are potential impediments to the realization of the SASDI objectives. Concerns have been expressed over the lack of SDI expertise in the country and its negative effect on the successful development of a SASDI.

In South Africa we need to leverage the international knowledge on SDIs and their implementation to ensure the success of SASDI.
Methodology

The objective is to present the results of a survey of books for potential use in SDI education and training in South Africa.

To achieve the objective:

– the needs for SDI education and training were identified;
– available material was surveyed; and
– available material was matched to the identified needs.
Identifying the needs for SDI education and training

GSDI Small Grant Award, titled ‘Developing a framework for South African SDI education and training’.

Two open workshops were held at the University of Pretoria in November 2011 and July 2012.
SDI Target Audiences

CSI members

Decision makers, funders, and policy makers

Custodians of SASDI identified base data sets

Producers of SASDI non-base data sets

Producers of SASDI services

Providers of SASDI base data sets and services

End users and consumers
SDI Knowledge Areas

The value of spatial information for their respective purpose or job in SASDI

Spatial data and the principles of geographic information systems (GIS)

Overview of SDI, SDI principles and its benefits

**SDI component:** data and metadata

**SDI component:** standards and specifications

**SDI component:** web services

**SDI component:** institutional agreements
# Level of specialization

<table>
<thead>
<tr>
<th>Level of specialization</th>
<th>Media</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research (contribution)</td>
<td>Postgraduate degree or research project</td>
<td>PhD / MSc Geomatics Research project by CSIR</td>
</tr>
<tr>
<td>Design solution: Independent problem solving (use own research and ideas)</td>
<td>Four year degree or certificate course at appropriate level</td>
<td>BSc (Hons) Geoinformatics Registered GISc Practitioner</td>
</tr>
<tr>
<td>Select solution: Formulation of sol to problems</td>
<td>Three year degree or certificate course at appropriate level</td>
<td>BSc Geoinformatics B Tech Geomatics Registered GISc Technologist</td>
</tr>
<tr>
<td>Apply solutions: Apply predefined sol/methods to problems (solve familiar problems)</td>
<td>Diploma or certificate course at appropriate level</td>
<td>Diploma in Cartography CE at UP Intro GIS-certificate Registered GISc Technician</td>
</tr>
<tr>
<td>Skills (how?)</td>
<td>Attendance course, workshop, material</td>
<td>CE at UP 3-day GIS (hands-on training)</td>
</tr>
<tr>
<td>Knowledge (what?)</td>
<td>Attendance course, workshop, material</td>
<td>SDI workshop (presentations)</td>
</tr>
<tr>
<td>Awareness</td>
<td>One-on-one discussion, presentation, material</td>
<td>PositionIT article NSIF brochures</td>
</tr>
</tbody>
</table>
Book Survey

The survey of SDI education and training material was performed on two sources:

1. search for books on Amazon.com; and

2. sending a request for education and training material to a number of mailing lists in the geospatial community.
Survey Results

A search for books on Amazon.com with the keyword ‘spatial data infrastructure’ (without quotes) returned 572 books. From the email survey 9 responses regarding books were received.
Process followed

1. Identify books
   - Is the book relevant?
2. Specify category and identify content
   - Is category either SDI included or SDI specific?
3. Specify the level of specialisation
4. Possible SDI education and training material
Survey Results

Basic information for each book was recorded, such as the title, authors, etc.

In the first phase, the following books were removed:

– duplicates,
– earlier editions (only the latest edition of a book was considered),
– research articles, and
– books that are irrelevant at first glance.

After completing the first phase, **124 books** remained to be surveyed in the next phase.
# Matching Book Survey Results to Identified Knowledge Areas

<table>
<thead>
<tr>
<th>Knowledge area</th>
<th>Awareness</th>
<th>Knowledge</th>
<th>Skills</th>
<th>Apply solution</th>
<th>Select Solution</th>
<th>Design solution</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value of spatial information for their respective purpose or job in SASDI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial data and the principles of geographic information systems (GIS)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overview of SDI, SDI principles and its benefits</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
## Matching Book Survey Results to Identified Knowledge Areas

<table>
<thead>
<tr>
<th>Knowledge area</th>
<th>Awareness</th>
<th>Knowledge</th>
<th>Skills</th>
<th>Apply solution</th>
<th>Select Solution</th>
<th>Design solution</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDI component: data and metadata</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDI component: standards and specifications</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDI component: web services</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SDI component: institutional agreements</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
## Matching Book Survey Results to Identified Knowledge Areas

<table>
<thead>
<tr>
<th>Knowledge area</th>
<th>Matching content category from the survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value of spatial information for their respective purpose or job in SASDI</td>
<td>GISc, Economics</td>
</tr>
<tr>
<td>Spatial data and the principles of geographic information systems (GIS)</td>
<td>GISc, Technical</td>
</tr>
<tr>
<td>Overview of SDI, SDI principles and its benefits</td>
<td>Combination</td>
</tr>
</tbody>
</table>
## Matching Book Survey Results to Identified Knowledge Areas

<table>
<thead>
<tr>
<th>Knowledge area</th>
<th>Matching content category from the survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDI component: data and metadata</td>
<td>Data and information</td>
</tr>
<tr>
<td>SDI component: standards and specifications</td>
<td>Standards</td>
</tr>
<tr>
<td>SDI component: web services</td>
<td>Technical</td>
</tr>
<tr>
<td>SDI component: institutional agreements</td>
<td>Policies and legislation</td>
</tr>
</tbody>
</table>
Matching Book Survey Results to Identified Knowledge Areas

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Research</th>
<th>Understanding and ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>GISc</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Data or Information</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Standards</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Technical</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Policies and legislation</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Economics</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Combination</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>
Conclusion

The survey shows that educational books on SDIs are available, but a more in-depth study of books is necessary to establish whether they meet the needs of the specific target audiences identified for SDI education and training in South Africa.

The survey results further show that numerous SDI publications are available in a variety of formats. This material is full of relevant information, but needs to be synthesized into material that is useful for education and training purposes: the focus needs to move from research finding to knowledge for practical application.
Conclusion

In future work we plan to review the 39 books identified in this survey in more detail to evaluate their appropriateness for the specific target audiences identified in South Africa.
Acknowledgements

I would like to take this opportunity to thank:

- **Members of South Africa’s Committee for Spatial Information (CSI),** members of the CSI sub-committee on Education and Training, as well as selected individuals from the GIS industry, contributed to the workshop in November 2011 and July 2012 on the strategy of SDI education and training needs.

- This research was supported by a **GSDI Small Grant Award**, titled ‘Developing a framework for South African SDI education and training’.

- My travel to the conference was supported by a South Africa / Namibia bilateral grant.

- The 26<sup>th</sup> **ICC conference organizers** for their hard work in organizing this event.

Thank you.
Thank you!

Victoria Rautenbach
victoria.rautenbach@up.ac.za

University of Pretoria
Centre for Geoinformation Science
http://www.up.ac.za/cgis