Using training to strengthen a node’s stakeholder community

Fatima Parker-Allie, Anabela Plos, Carole Sinou, Laura Russell
Session objectives

- Develop a training approach
- Plan and implement training
Develop training approach
What does ‘training’ mean?

- Workshops
- Online tutorials
- Video tutorials
- Blog posts
- Documentation
- Webinars
- Helpdesk
- ...
Identifying the needs

YOU know your network/community BUT ASKING for feedback on what stakeholders are struggling with, or need, could be really informative.

You will NOT be able to answer to all the needs at the same time, so PRIORITIZE and ORGANIZE, in order to make your training agenda LOGICAL.
Towards a Curriculum for Biodiversity Informatics, perspectives from the GBIF Community

Fatima Parker-Allie
Towards a Curriculum for BDI

• A GBIF Nodes thematic group was established prior to the GBIF Nodes Meeting in Oct 2015

• The aim was to get a clear idea of how the global BDI community, is contributing to the dev and/or implementation of BDI curricula, to support both work-based training of BDI professionals, as well as academic teaching at tertiary level with academic institutions

• Specifically, it was intended to get an idea of how the GBIF community can contribute to the growing the field of BDI science going forward.
An initial assessment of the academic teaching activities highlighted that a number of countries were already engaged in the conceptualisation, development and implementation of formal academic programs in BDI; including:

- **Benin** - Masters programme in BDI
- **Colombia** - The GBIF Node is working with at least 4 universities that are willing to adopt courses on this topic
- **Costa Rica** - INBIO is in the process of reinstating a UNESCO Chair in BDI, at the Technological Institute of Costa Rica. Here, a one semester graduate level course called "Introduction to Biodiversity Informatics" is taught annually
- **India** - one week BDI course taught in a larger module of Landscape Ecology; part of 2 year Masters in Wildlife Science
- **Norway** - BIODATA
- **South Africa** – Developing a Centre for BDI; Curriculum, bursaries, postdocs, efforts towards a Research Chair
- **Sweden** – 3 week BDI course as part of a Masters programme at the Nordic Academy of Biodiversity and Systematic Studies (Sweden, Denmark, Norway)
- **Asia** - Taiwan - Through BIFA, the Taiwanese Node and Japan Node implemented a workshop for BDI (2016) resulting in a draft of a Cookbook for BDI with some teaching slides
- A number of the NM’s have also indicated they are engaged in Master, PhD and Postdoc student supervision or management and/or had developed projects to support students. This includes Norway, Benin, Ghana, South Africa & the Netherlands.
Needs expressed by the BDI Community

1. **Formal academic training in BDI is critical** to move from the short course nature of work-based training.

2. A prioritized list of training for work based professionals is needed.

3. Training should be holistic, sequential & modular, speaking to the needs of different countries, are at diff. stages of development.

4. There was a large interest in implementing **e-learning platforms**, with more Nodes currently utilising the Spain e-learning platform.

5. Resources are required to facilitate the interchange of high level academic expertise between countries. Eg. Professors.

Recommendations and Outcomes from the Thematic Breakout Group

1. Develop a **GBIF-TDWG interest group**, to support the curriculum (Global Nodes Chair and GBIF Secretariat rep for the training)

2. The survey should be **redistributed** to capture information on work–based training and academic teaching needs more globally, as well as capture the resources/materials and expertise. The survey time should be extended as well as the target audience.

3. A list of available training resources should be developed. A GBIF task group should be developed to take this forward. The list should be dynamic, and a platform should be identified to upload and maintain this list.

4. It was identified that a **standard modular curriculum** should be developed, which integrates all the existing curricula that already exists, as well as the results of the survey, as a reference for new ones.
## High Level Curriculum Framework

<table>
<thead>
<tr>
<th>Data Generation</th>
<th>Biodiversity Information Management</th>
<th>Data Use and Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Biodiversity and Data</td>
<td>Databases and their design</td>
<td>Statistical Analysis of biodiversity data</td>
</tr>
<tr>
<td>Basics of Taxonomy, Taxonomic Databases, checklists</td>
<td>Programming/Scripting/Software Engineering</td>
<td>Species and Ecosystem Assessment</td>
</tr>
<tr>
<td>Biodiversity Data Capture and Data Quality Enrichment (eg. Geo-referencing), Data Mobilization</td>
<td>Biodiversity Data Assessment and Cleaning</td>
<td>Ecological Niche Modelling</td>
</tr>
<tr>
<td>Science Methods</td>
<td>Biodiversity Data Standards, Publishing and Licensing, Data policy and frameworks</td>
<td>Conservation Planning</td>
</tr>
<tr>
<td>Genetics and Molecular Data</td>
<td>Geographic Information Systems (GIS)</td>
<td>Public Health Applications</td>
</tr>
<tr>
<td>Global Change Ecology (Climate, Invasive Aliens, Natural Resources)</td>
<td></td>
<td>Data-Science-Policy Interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Building Biodiversity Informatics Institutions</td>
</tr>
</tbody>
</table>
What does BDI Curriculum implementation mean?

• What does a biodiversity informatics curriculum mean for Higher education?
  a) To grow this field of science, resources are required for an increase in **high level expertise**, eg the interchange of professorships.
  b) Travel grants for visiting scientists, maybe a worthwhile mechanism for the exchange of expertise.
  c) Through the establishment of research chairs academics hubs of activity can develop

• What does a biodiversity informatics curriculum mean for the Science-Policy Interface and Heads of Delegation to GBIF?
  a) The GBIF research infrastructure (RI) has great potential to enhance outputs for STI, through the use and application of data, platform development, workflows and methodologies, & the implementation of tools and techniques for enhanced STI outcomes.
  b) The impact of the GBIF RI and its potential for STI can be seen in the research showcased in the GBIF science review, with a steady increase in peer-reviewed publications (related to thematic areas), using GBIF mediated. This **reflects an increase in use and impact of the data** for invasive species, impacts of climate change etc.; which has implications for the **bio-economy**
  c) HoD have a roll to play in strengthening efforts to grow BDI as a field of science and in turn support STI. This includes generating/supporting buy-in with: 1.) national research foundations, funding agencies and policy/decision makers.

• What does a biodiversity informatics curriculum mean for Node Managers?
  a) An established curriculum, with a set of teaching resources will enable the roll-out of a multitude of different BDI level courses. Such a curriculum will provide the basis for CD for students and WB professionals at institutions and universities globally.
  b) NM expressed their willingness to support training and teaching. They are therefore an excellent resource as trainers, and for university level teaching.
  c) Since 2016, the GBIF Secretariat and NM has actively been working on the development of curriculum components/modules, to support the BID programme. The reusable online modules produced as well as others, will have systemic impacts for the BDI curriculum teaching and training as a whole.
Developing a training strategy

Best if training plan is integrated to the strategic plan.

Think about a curriculum (but take advantage of resources already available!)
Develop a strategy

- Target Audience
- Topic(s)
- Medium/Format
- Strategic Priority

Training Strategy
GBIF approach
GBIF Secretariat training approach

Activity 1a - Focus on people
Activity 1b - Strengthen skills
Activity 1c - Equip nodes
Activity 1d - Equip data publishers

Provide enhanced capacity for effective mobilization and use of biodiversity information through a strengthened community of practice

https://www.gbif.org/strategic-plan
GBIF capacity enhancement framework

- Capacity self-assessments
- Core capacity enhancement programme
- Supplementary funded programmes
- Capacity enhancement workshops
- Community of practice

https://www.gbif.org/document/80954/gbif-capacity-enhancement-framework
Goal: develop reusable curriculum

Develop a blended learning course comprised of **online** (elearning) and onsite modules with documented learning objectives and measures by which to assess and certify student learning.
Goal: develop reusable curriculum

Evaluation rubric

eLearning platform

Instructional design
Goal: provide language support

Within the context of the curriculum, provide language support via language groups, mentors, and translated documents.
Result: GBIF and community developed curriculum

- Nodes development
- Biodiversity data mobilization
- Biodiversity data use
Result: GBIF community developed curriculum

- Foundations for Biodiversity Informatics
- Planning a data mobilization project
- Data capture and intro to data quality
- Data management
- Data publishing

- Intro to earth observations, biodiversity policy and workflow mgmt
- Data mainstreaming
- Data processing
- Mapping standards and methods
- Assessing conservation status
**Goal:** certify knowledge of participants

**Evaluation rubric**

<table>
<thead>
<tr>
<th>PERFORMANCE LEVELS</th>
<th>Minimal performance - 1</th>
<th>Basic performance - 2</th>
<th>Sufficient performance - 3</th>
<th>Outstanding performance - 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> Knowledge about data management principles</td>
<td>Understand basic principles of data management and its importance in scientific research</td>
<td>Understand the general principles of data management and can identify key components of a well-structured data management plan</td>
<td>Understand the detailed principles of data management, can implement data management plans, and can evaluate the effectiveness of these plans</td>
<td>Understand the advanced principles of data management, can design complex data management plans, and can assess the impact of these plans on research outcomes</td>
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<td>Understand the criteria for selecting biodiversity information for decision making</td>
<td>Understand the criteria for selecting biodiversity information for decision making, and can justify their choices</td>
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</table>
Result: skilled participants

Data Mobilization
  BASIC - 41
  ADVANCED - 47
Data Use for Decision Making
  BASIC - 12
  ADVANCED - 7
Result: strengthened community of practice

- engaging individuals as mentors and ambassadors
- establishing regional knowledge networks

https://www.gbif.org/article/5SExsCf7UaUkMCsuc6Oec/capacity-enhancement-mentoring
https://www.gbif.org/article/6dNF1d0tqc4cmgeoS2sQ4/biodiversity-open-data-ambassadors
Plan and implement training
## Plan a specific training

<table>
<thead>
<tr>
<th>Refer to your training plan</th>
<th>Outline the details</th>
<th>Outline the implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key audience</td>
<td>Possible partners</td>
<td>Communicate</td>
</tr>
<tr>
<td>Topic(s)</td>
<td>Required resources</td>
<td>Launch</td>
</tr>
<tr>
<td>Delivery method</td>
<td>Budget</td>
<td>Follow-up</td>
</tr>
<tr>
<td></td>
<td>Materials</td>
<td>Evaluation/reporting</td>
</tr>
<tr>
<td></td>
<td>Logistical planning</td>
<td></td>
</tr>
</tbody>
</table>
Refer to training strategy

Target Audience

Medium/Format

Topic(s)

Strategic Priority
Outline the details and the implementation

- **Timing**
- **Target**
- **Communicate**
- **Collaborate**
- **Realistic funding**
Tip: 8 steps to effective training

1. Perform training needs assessment
2. Keep adult learning principles in mind
3. Develop learning objectives
4. Design training
5. Develop/reuse materials
6. Implement the training
7. Evaluate the training
8. Repeat any of the above as necessary

https://www.convergencetraining.com/blog/how-to-create-an-effective-training-program-8-steps-to-success
Tip: Adult learning principles

- Are self-directed
- Bring a lifetime of knowledge and experience to training
- Are goal-oriented
- Want training to be relevant and task-oriented
- Learn when they are motivated to learn
- Like to be and feel respected

https://www.convergencetraining.com/blog/putting-adult-learning-principles-to-work
Develop or reuse materials?
What are the main topics for training?

Differents nodes, different needs!
Trainings can be designed around many different topics:
- Data Mobilization
- Data cleaning and data enrichment
- Data publication
- Data use
- Node management
- Communication
- Facilitation
- ICT training
- ...

GBIF
Where can I find training material?

Project pages from:

- CESP
- BID
- BIFA
Where can I find training material?

eLearning platform available from GBIF Spain, but also used by the Secretariat

http://elearning.gbif.es/
Where can I find training material?

Biodiversity Informatics Training Curriculum website

http://biodiversity-informatics-training.org/
Where can I find training material?

Data Carpentry workshops and lessons (check also software carpentry website)
Where can I find training material?

IDigBio Workshop Documentation

https://www.idigbio.org/wiki/index.php/IDigBio_Workshops
Where can I find training material?

Darwin Core Hour webinars organized by iDigBio

...and many more other resources!

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**Darwin Core Hour series**

<table>
<thead>
<tr>
<th>Announcement</th>
<th>Slides</th>
<th>Video</th>
<th>Adobe Connect Recording</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Darwin Core Hour</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-02-07</td>
<td>Chapter 0</td>
</tr>
<tr>
<td>Introduction to Darwin Core</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-02-07</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Even Simple is Hard</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-03-07</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>Thousands of Shades for “Controlled” Vocabularies</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-04-04</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Evolution of Darwin Core Terms and Extensions - two extant examples for community input. Part 1. Preparations Part 2. occurrenceStatus and establishmentMeans</td>
<td>Part1 Part2</td>
<td>Vimeo</td>
<td>2017-05-02</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>Darwin Core in Practice: Introduction to the GBIF PT</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-06-13</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Darwin Core in Practice: IPT Live Demo (excerpt of DwC Hour #5)</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-06-13</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Where am I, exactly? Darwin Core Georeferencing Terms</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-07-11</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Aggregators - a Darwin Core View GBIF &amp; iDigBio</td>
<td>Slides</td>
<td>Vimeo</td>
<td>2017-08-15</td>
<td>Chapter 7a</td>
</tr>
</tbody>
</table>

How to use material?

- Check the license, and respect it
- Contact the creator(s), ask about collaboration, existing updates, etc.
- Even if not required by the license, list your sources
- **When license granted you the permission:**
  - Customize the material to your needs and your network
  - Mix and match different sources
Where to share my training material?

- Share to benefit the community
- Share it with open licenses!
- Share it in standard format (i.e. font, size, type of file, size of file, etc.)
- Share in multiple places! It increases the probability that your material will be discovered and reused
- Ideas of where to share:
  - Node/Community website
  - Project pages (CESP, BID, etc.)
  - Through Twitter or FB
  - Article in a journal
  - eLearning platforms
  - Open sharing platforms
  - etc
Resources

Abstract: Writing a strategic training plan (PDF)
Template: Training plan (MS Word)
Template: Training plan schedule (MS Word)
Template: Training and education implementation schedule (MS Word)
Template: Training folder structure (Google Drive)
Using training to strengthen a node’s stakeholder community

Fatima Parker-Allie, Anabela Plos, Carole Sinou, Laura Russell
Developing a training module in ASEAN network

Kit Elloran | GBIF GB26
OCT. 17-21, 2019 | LEIDEN, NETHERLANDS
5 Years Strategic Plan
2016-2020

Biodiversity Information Management (BIM)

Mandates and objectives is to Provide training and technical assistance to AMS in biodiversity data management

Biodiversity conservation and Mainstreaming biodiversity
THEMATIC concerns

- Access and Benefit Sharing
- Biodiversity Information Management
- Ecotourism, Business and Biodiversity
- Climate Change and Biodiversity
- Taxonomy and Invasive Alien Species
- Species Conservation and Wildlife Law Enforcement
- The Economics of Ecosystems and Biodiversity
- Public Awareness

GEOGRAPHIC concerns

- ASEAN Heritage Parks and Protected Area Management
- Coastal Marine Biodiversity
- Wetlands and Peatlands
- Transboundary Protected Areas
- Agriculture Biodiversity
- Urban Biodiversity
We recommend follow-ups, provide contact persons for FAQ

Always simplify and provide examples and demonstrations of what you are discussing in training, provide online materials to download e.g. GBIF web services

The more clearly and simply a process is taught, the more likely you will have a successful trainee when done

The subject of the training must be standardized, i.e., there should be a clear definition of how the process or task is done correctly e.g. publishing biodiversity data using IPT Darwin core standards

Value the trainee, Always provide technical assistance, updates and feedback. Benefits for both trainee and trainer

Biodiversity Information Management (BIM) objectives is to Provide training and technical assistance to ASEAN Member States
Thank you!
REGIONAL MASTER PROGRAM IN BIODIVERSITY INFORMATICS

Dr. Jean C. GANGLO

Professor of Forest Sciences (University of Abomey-Calavi, Benin)

Coordinator of the master program in Biodiversity informatics

Node manager of GBIF Benin

Regional Representative of GBIF Africa
Africa is home to a rich biodiversity that provides critical ecosystem services (provisioning, regulating, cultural, and supporting ecosystem services).

However, most ecosystems in the continent are facing threats (land use change, overexploitation, environmental pollution, invasive alien species, and climate change etc.).

Africa is also a continent where evidence to support decision making on biodiversity conservation is critically insufficient or lacking.

Insufficient or lack of capacities are among the priority bottlenecks to overcome in order to enable data publishing and data uses to inform decisions in Africa.

In order to achieve this, we need sound knowledge in biodiversity informatics through a full master degree program at university.
REGIONAL MASTER PROGRAM IN 
BIODIVERSITY INFORMATICS

• Historic events (Curriculum elaboration and validation process)

• Creation of the program at the Faculty of Agricultural Sciences of the University of Abomey-Calavi

• Objectives
  – We intend to create a cohort of data scientists with sound knowledge in biodiversity informatics to use data and derive relevant research products to inform decisions on biodiversity conservation and sustainable uses
  – Teaching languages are French in the first year and English from the second year of the program
REGIONAL MASTER PROGRAM IN BIODIVERSITY INFORMATICS

- Courses content (adapted from Peterson and Ingenloff (2016)).

- Professor Peterson is the adviser of the master program

- The master program is a permanent two-year program structured in teaching units with the following main contents:

  1) Introduction to biodiversity informatics; 2) Basics concepts of biodiversity; 3) Biodiversity data capture; 4) Biodiversity data formatting, cleaning, and publishing; 5) GIS and Applications to biodiversity data analysis; 6) Biodiversity inventories; 7) Climate change and biodiversity; 8) Ecological niche modeling and strategies for biodiversity conservation; 9) Data-science-policy interface; 10) Public Health and Applications of biodiversity data; 11) Building biodiversity informatics institutions; 12) Internships of students in institutions working in the field of biodiversity, etc.

Mrs. Justine KOTIN, during her internship phase in CREDI NGO
Origins of students in the program
- We have actually five nationalities of students. They are from DRC, Côte-d'Ivoire, Togo, Madagascar, and Benin
- Our hope is that the number of students will increase with years

Category of teachers involved in the program
- National trainers (10 teachers)
- International trainers (at least two teaching missions per year)

Sustainability of the program
- Internships to strengthen capacities of national trainers in Laboratories abroad (USA mainly) in order to carry out the program

Financial supports
- National level
- International level
REGIONAL MASTER PROGRAM IN
BIODIVERSITY INFORMATICS

Research works in the program

- Three thematic areas are concerned with the research activities of the first batch of students
  - Public health (Lassa fever and Buruli ulcer)
  - Least concern and threatened animal and plant species (Sitatunga, Tragelaphus spekii; dwarf crocodile, Osteolaemus tetraspis; African Mahogany, Afzelia Africana; Monkey with red belly, Cercopithecus erythrogaster erythrogaster etc.)
  - Invasive Alien species of Hyptis and Mesophaerum genera (Lamiaceae family)
- The master theses will be defended from December 2019

Main challenges

- Building of infrastructure / classrooms to lodge students of the program
- Scholarships to students to limit students abandonments in the program

Reusable materials

- Curriculum adapted from Peterson and Ingenloff (2016)
- Recorded courses
Hi Jean:

Rather thank YOU ... Gabriel was a great student, and indeed a nice person with whom to interact. He is smart and insightful, and consistently was following the material and understanding it deeply. Indeed, we had three "competitions" during the course ... challenges to see which student could complete an analysis first (and most elegantly). Gabriel won TWO of the three challenges!

Once again, Gabriel was a complete pleasure to have involved in the course. All the best, ATP

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Dear Town,

Gabriel is well back home and I tell you my profound gratitude for accepting him in that course.

Many thanks for your support of all kinds. You are quite helpful for me in the management of the master program on which you kindly offer your advices and supports. God bless!

I hope that Gabriel has been respectful and did not disappointed you.
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Biodiversity Data for Internationalization in higher education
GOALS

Offer professional training in data skills to biodiversity researchers

Promote open data and open science to foster international collaboration

Involve partner countries in international biodiversity networks like GBIF

64 students (16 x 4) and 16 staff (mentors) trained on biodiversity informatics skills

Organize a total of 8 events during the project period 2018 to 2021
PROJECT PARTNERS

University of Oslo (ForBio & GBIF Norway)

National Academy of Sciences of Belarus

V.N. Karazin Kharkiv National University, Ukraine

Armenian National Agrarian University

Academy of Science Republic Tajikistan & Zan va Zamin

GBIF Secretariat, Copenhagen
ROLES

ForBio based in Oslo provides the central coordination team and financial center of operation

Local project partners in Tajikistan, Belarus and Armenia – responsible for organization of project events in Minsk, Dushanbe and Yerevan
BioDATA is re-using the training curriculum developed for the EU-funded GBIF Biodiversity Information for Development (BID) program.

And the e-learning platform hosted by GBIF Spain.

Successful students are awarded a digital certification badge from GBIF – which will qualify them to contribute as mentor in the wide GBIF network.
ACTIVITIES

Kick-off meeting
(Oslo, Norway)

Train-the-mentors course
(Minsk, Belarus)

4 regional training courses
(Tajikistan, Belarus, Armenia, Ukraine)

Final symposium
(Oslo, Norway)
Participants from Belarus:
National Academy of Science of Belarus
Baranovichi State University
Belarusian State University
Gomel State University
Grodno State University
Vitebsk State University
National Park “Braslavskie Ozera”
National Park “Pripyat”

Regional training | November 2019 | Białowieża, Belarus

Including students from Latvia and Lithuania
CHALLENGES

Language barriers – all training materials were translated to Russian (by the GBIF.ru team)

Internet connectivity – the course IPT and all course training materials was provided from a small Raspberry Pi server installed in the classroom
SUCCESS

Belarus joined GBIF as associate country July 2019

Armenia and Tajikistan prepare to join GBIF

Ukraine prepare data publication in GBIF
Funded by the Eurasia program of the Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education (Diku)

Budget 3M NOK | € 300 000 Euro

Project period 2018 to 2021 (3 years)
Biodiversity Data for Internationalization in higher education