

EDIT Workpackage 5 – Model 4 Detail

This model depicts the work of a Phycologist / Algeologist working in the Natural History Museum of Hungary (HNHM). Her area of study is the diatoms, a widespread group of eukaryotic algae comprising some 200 genera and an estimated 100,000 species.

The taxonomist's activities can be divided into two parts; biomonitoring work, and maintaining the collections of the HNHM. The biomonitoring work revolves around the environmental impact of the construction of the Iron Gate dam in 1972, a Romanian-Yugoslavian project designed to generate hydro-electric power for the region. The biomonitoring work is a significant source of funds for the taxonomist, and she is able to combine these efforts with collection maintenance to her advantage.

The following table describes the individual steps of the process model in detail.

Activity	Collect Specimens	The specimens are collected in plastic containers from flowing bodies of water. The containers are left in the field in order to gather a large enough sample. Trips take place once a week, seasons permitting, and about 60-80 sample are collected each year.
Activity	Preliminary examination	Visual examination of uncleaned (organically intact) specimen with a light microscope. Though most of the morphological features of diatoms can only be seen when the organic material has been removed, some features can be discerned at this stage to provide early useful information.
Activity	Prepare Specimens	Preparation of the specimen involves first cleaning. This is the process of stripping away the organic material from the diatoms to allow the silicon structures to be clearly seen. This is done by a series of chemical washes. The morphological structures that this process reveals form the basis of diatom taxonomy.
Action	HCl wash	The first wash, with hydrochloric acid
Action	H ₂ CO ₃ wash	The second wash, with carbonic acid
Action	H ₂ O ₂	The third and final wash, with hydrogen peroxide
Action	Heat and wash	The process continues with heating the sample
Action	Mount slides	The samples are mounted on to glass slides for light microscope examination, or onto a 1 forint coin for examination with the electron microscope
Activity	Examine Specimens	The specimens are examined using the light microscope, electron microscope, and other methods, and results recorded in a comparison table
Action	Perform microscope analysis	The cleaned specimens are examined. The resulting image can also be seen on a computer screen.
Decision	Slides adequate?	The image is assessed for capturing. If it is unsuitable the analysis continues, if suitable progress to image capture.
Action	Capture microscope image	The image is captured to computer
Decision	Image suitable?	The image assessed for it's suitability as a permanent record. If suitable, it is saved to directory.
Action	Store images in database	The 'database' is a standard Windows directory, organised by the location of sample, and date of collection.
Decision	Other examinations required?	

Action	Arrange for other examinations	
Action	Search literature	
Action	Get images from other institutes	Contact colleagues in other institutes and arrange for images of specimens to be sent electronically. In the case of phycology images rather than specimens are sufficient, as specimens can not be seen with the naked eye.
datastore	Literature	This 'datastore' represents the body of literature accessed by the taxonomist as part of her research. It does not represent a physical or electronic database. It's presence in the diagram is to illustrate that a body of information is collated and subsequently contributes to a number of actions and activities.
Action	Compare slides with gathered images	Compare the images from the prepared slides with type images gathered together from other institutes
document	Comparison table	Observation of the specimens results in physical measurements being taken. Typically, a large number of specimens will be examined (min ~ 300) and averages and other statistical calculations are made, and it is largely from these calculations that taxonomic decisions are made. The measurements are collated and analysed using CANOCO, Syntax 2000, and MS Excel.
Decision	Taxonomic review justified?	Does all of the information collated indicate that a review of the current taxonomic theories would be justified? If so, proceed to developing a new theory, if not, continue examining specimens
Activity	Develop theory	The process by which a decision is reached on whether the specimens under study indicate a review of the current taxonomic theories.
Action	Review images	Final examination of the images and measurements.
Action	Prepare photo-plates	Photo-plates are collections of images and diagrams mounted together in one image. The taxonomist then prints out images and physically arranges them on a A3 paper. She then re-scans the image. Photo-plates can be used for publication and presentations.
Action	Consult colleagues	Informal consultation with colleagues in own and other institutes, to ask their opinion of the new theory.
Decision	Publish paper?	Does the emerging theory warrant publication? If so, publish, if not continue with further examination of specimens.
Activity	Publish Paper	Producing and compiling a paper and arranging for publication in a suitable journal
Action	Prepare illustrations and photo-plates	Images and photo-plates used in the final paper may differ from those previously produced, in order to highlight certain features or to satisfy editorial guidelines
Action	Write description	Prepare the taxonomic description, fully describing in text the main distinguishing features of each taxonomic group.
Action	Prepare statistical analysis	Prepare the various statistics that are used in the paper. The taxonomist prepares these statistics herself using MS Excel.
Action	Prepare comparison tables	Prepare a table illustrating the major distinguishing features of the taxonomic groups under review
Action	Acknowledgements and references	Compile a list of all references cited in the paper and prepare the acknowledgements, using MS Word
Action	Compile paper	Put all the sections of the paper together in a suitable

		format for publication, using MS Word and according to the editorial guidelines of the journal
Action	Send to colleagues for review	The taxonomist sends the paper to colleagues for informal review
Action	Revise paper	Incorporate colleague's comments into the paper if necessary. This step also reflects reviewing the paper if it is returned by the journal for further editing
Action	Send to journal	Send the paper to the editorial board for pre-publication review
Decision	Accepted or returned	The journal will review the paper and most likely return it for revision prior to publication. Occasionally papers are published without return, but this is uncommon
Action	Add slides to collection	Label the slides and store them in the HNHM diatom slides collection
Action	Update web database	Upload any suitable images onto the web database along with any associated information
Decision	More samples remaining?	If more samples remain from the collection, proceed with examining them. If not, process ends.