HOW AN ELECTRONIC LAB NOTEBOOK SUPPORTS SCIENTIFIC KNOWLEDGE MANAGEMENT IN R&D

Use Case

The ability to link key pieces of data and mine experiments captured in BIOVIA Workbook moves a top pharmaceutical organization toward true scientific knowledge management.

R&D organizations are always looking to streamline knowledge management. The ultimate goal of predictive control over research processes will only occur when feedback flows freely across this knowledge continuum. For many organizations, achieving this flow means implementing and managing the following types of software solutions:

- Visualization and predictive modeling tools for placing retrieved data into a decision-oriented context
- Electronic systems for managing materials registration and inventory
- Scientific applications for capturing instrumental data
- Management systems for tracking samples, procedures, and results across the experimental workflow
- Logistics/planning software for manufacturing activities

One tool, however, holds a unique position among R&D informatics systems. Unlike other systems, electronic laboratory notebooks (ELNs) both produce data and consume information. An ELN's ability to capture data, observations, experiences, and context is particularly powerful when combined with other data pipelining tools. The ability to link key pieces of data and mine experiments captured in the ELN for insights fuels true scientific knowledge management.

This use case describes the broad organizational benefits that BIOVIA Workbook made possible for a global pharmaceutical company, highlighting how the system is supporting efforts to gain predictive control over key processes in Research and Development.

THE ROLE OF AN ELN IN RESEARCH AND DEVELOPMENT

Not that long ago, scientists and their organizations actively questioned the utility and applicability of ELNs. Many initial ELN deployments were in Research with ELNs centered on data security and the generation and defense of intellectual property. Today, ELNs have become a common fixture in chemistry and biology research labs.

As in Research, ELNs in Development are primarily used to capture experimental data, but that captured data ultimately plays a different role. Research, which is focused on candidate selection, uses data in an ELN to generate and defend intellectual property. Development, on the other hand, is focused on candidate progression. Consequently, data from Development-centered experiments is primarily used to efficiently develop a formulation, a process, a method, and inevitably, a drug. Electronic signatures and audit trails validate what work was done, when, by whom, how, and for what purpose. The advantage of an electronic system is that much of this work is automated so that at every point in the process information is collected and stored in the system.

STREAMLINING SCIENCE

This BIOVIA customer, one of the top global pharmaceutical companies, provided BIOVIA Workbook to about 1,000 scientists across their R&D division. Of these, about 90% generate content with the system; the remaining 10% include quality assurance staff and managers who primarily review data already entered in the system by others. Content generators add between 2,000 and 3,000 experiments to the system each month. Of most significance, greater than 70% of these new experiments are created by cloning an existing experiment. This shows scientists are able to easily search the system to find experiments and leverage work already done by colleagues. And looking at the time it once took to ask employees to pull a notebook, scan the index, and flip through the pages, it's readily apparent that the electronic system is much more streamlined and saves enormous resources—time, people, and money.

ELN AS DATA PRODUCER, INFORMATION CONSUMER, AND KNOWLEDGE DRIVER

In addition to streamlining scientific workflows, BIOVIA Workbook aggregates data in a way that enables organizations to better understand existing processes and retool operations to be more efficient. By leveraging consistently captured information and processes in the ELN, organizations can identify bottlenecks and inefficiencies or employ load sharing to optimize processes.

The ability to link key pieces of data and mine experiments captured in BIOVIA Workbook moves organizations toward true knowledge management. The ELN assists in converting data to information when they are configured to consume quality data sources and pull together data, metadata, and experiential context. This produces information that, in turn, can be transformed into knowledge when exposed to data pipelining tools. Facilitating this transformation requires ELN data to be consistent, structured, accessible, well defined, and open.

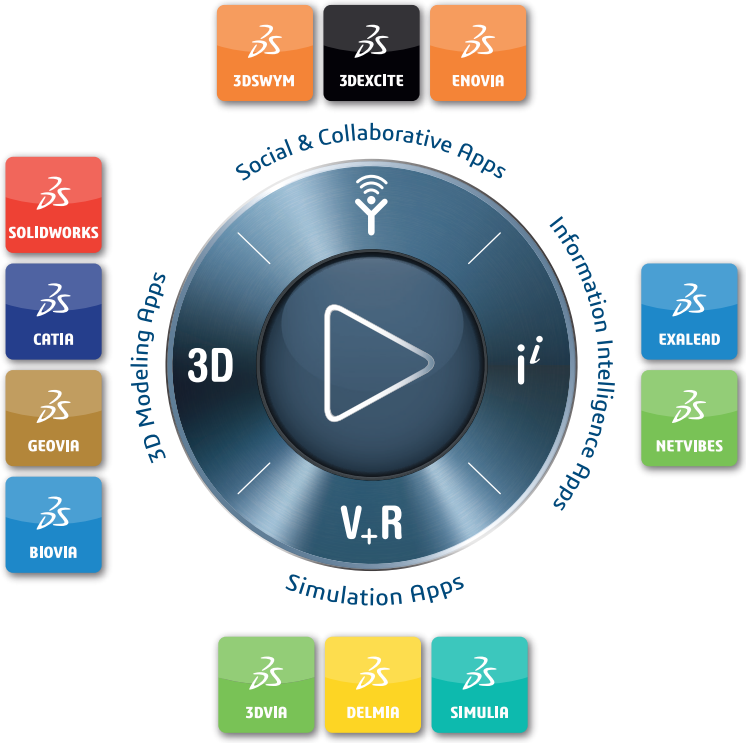
How did BIOVIA Workbook support this data transformation? A well-structured ELN is a perfect source for an analysis or reporting tool to mine, provided that critical fields are available for searching. In a Development setting, that might mean collecting data describing materials (e.g., reactants, products, impurities, or solvents) and properties of those materials (e.g., name, structure, sample/ lot ID, or protocol). Any number of experiments may ultimately contain the information needed to facilitate development decisions, reports, or dossiers, and this information can be used by pipelining tools to create detailed, actionable reports that collate data from multiple sources across disciplines. What was previously a manual, error-prone and laborious paper-based task can be streamlined through electronic workflows or processes— scientists simply enter a structure or product name and receive back a contextualized view of desired data. Reports of this type provide the knowledge to focus or justify further experimentation or summarize project progress in presentations or team meetings.

Experimental information in BIOVIA Workbook can also be used to compile results from sets of experiments governed by certain protocols. For instance, scientists could create a clinical stability report to support regulatory filings by specifying a particular protocol and set of stability time points. In this case, the benefit comes from automation of the data aggregation, rather than justification for further experimentation. These are just two examples of the endless possibilities available to organizations that take advantage of the solid data structure and robust data pipelining tools of the BIOVIA solution.

CONCLUSION

BIOVIA Workbook was able to deliver broad organizational benefits to the customer by reducing cycle times in document creation, improving experimental efficiency and throughput, codifying best practices to ensure the quality and consistency of data and documentation and streamlining collaboration and communication. More importantly, the ELN was able to help the organization move beyond "paper-on-glass" to maximize the utility of their scientific data. By linking, sharing, and reusing electronic data whenever possible, scientists can ensure that their organizations leverage higher levels of data quality, alignment, and standards. BIOVIA Workbook is at the hub of this activity. Its unique ability to act as both a producer and consumer along an organization's knowledge continuum is what ultimately defines its value for this customer.

To learn more about the benefits of electronic lab notebooks, go to **3dsbiovia.com/eln.**



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