

Scholarly Video Journals to Increase Productivity in Research and Education

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Recorder

The Journal of Visualized Experiments (JoVE) was born digital in 2006 as an open access journal and the first journal to utilize video production as the primary mechanism to convey scholarly content. Today there are over 395 institutional subscribers of which the majority are top-tier research institutions. Moshe Pritsker, Ph.D., CEO and co-founder of JoVE, presented an overview of this unique journal that is produced to meet the specialized needs of laboratory researchers working in biological research and education.

KEYWORDS visualization techniques, online videos, scholarly communication, research productivity

The inspiration for the *Journal of Visualized Experiments* (JoVE) began with a Princeton researcher performing experiments utilizing embryonic stem cells. The researcher was asked to reproduce a complicated new technology used by researchers in the United Kingdom in Edinburgh labs and found it extremely difficult. The need to learn new techniques by working directly with an expert has been long recognized in research laboratories due to the difficulty of replicating complicated laboratory procedures by relying on text documentation. Most researchers fail to replicate experiments successfully due to the inadequacy of relying on reading print articles to learn necessary techniques. According to a recent study published in *Nature Reviews Drug Discovery*, over 60% of published research in high-impact science journals is not reproducible.¹ Researchers believe that part of the blame lies in the prohibitive cost of sending researchers to other, often geographically remote, locations to receive skills training.

JoVE developers recognized that the basic structure of the scholarly article has changed very little in several hundred years. Today we have the sophisticated technology to produce online articles, add interactive

components, and shape the content delivery to user preferences and needs. Why not harness the power of video technology to replicate the experience of watching and listening to an expert in person who is demonstrating the proper techniques to successfully replicate an experiment? The text content need not be omitted but rather used as an enhancement to the primary format of the journal—visual and audio content. All content, video, audio, and text content would be subjected to print scholarly publishing standards, including peer review, supporting bibliographic documentation, acknowledgments, and a prestigious governing editorial board. Out of this vision the creators began publication of JoVE.

JoVE articles are constructed according to a consistent format. Each article has four components: abstract, introduction, experimental procedure, and discussion of results. Each of these components includes audio narration as well as text captioning displayed on the screen. The articles are produced on location within each author's laboratory—a significant cost savings to the author. Submissions from researchers are made voluntarily in some cases and are solicited in others. On average, fifty new articles are published each month. Internal statistics indicate that 80% of visitors accessing the articles on their platform originate from academic institutions and averages for unique visitors hover close to a staggering 275,000 per month. Yale alone accounts for an average of 450 unique accesses per month, providing substantial evidence for the value that their researchers place on the relatively expensive content provided.

JoVE began as an open access title. It quickly became evident that it was an unsustainable model due to production costs. Each article averages close to \$8,000.00 USD to produce and publish, which is an unaffordable price for most authors. The expertise required to produce high quality videos depends on professional videographers skilled in filming and editing technically challenging sequences. Each experiment requires at least an hour of filming and then must be distilled to a ten-minute video. To facilitate filming in as many labs as possible, a network of videographers is now in place across fifteen countries, including twenty-seven centers across the United States.

What is involved in producing a scholarly article in JoVE? A researcher submits an abstract and text protocol proposal. The protocol is peer reviewed before proceeding to filming. The researcher is filmed giving an introduction to the experiment and then demonstrates the procedure. The article concludes with a discussion of the results. Every portion of the procedure includes text translation of the audio production. The filming and editing generally requires several days. The article is once again peer reviewed prior to publication. Completed articles are added to the journal after the final review. As of July 1, 2012 there are now six specialty portions of JoVE, each available individually or through a subscription bundle with an average of ten new articles added to each section monthly. The six sections are:

- JoVE
- JoVE Neuroscience
- JoVE Immunology and Infection
- JoVE Bioengineering
- JoVE Translational and Clinical Medicine
- JoVE Applied Physics

A subscription to all six specialties within JoVE is expensive. In these days of declining library budgets, librarians are frequently asked to justify purchases of expensive resources. A compelling argument for purchase might consist of an analysis of the costs incurred by the traditional model used to train researchers in new experimental methods. Trips to outside facilities incur an average of two months leave time for the traveling researcher, cost for travel (frequently to other countries), and associated materials expenses. A single trip could easily cost as much as \$10,000 USD. If one hundred trips were incurred by a research institution over the course of a year, the institution would be faced with training expenses of \$1,000,000 USD. The majority of researchers do not have the funds for such travel, so instead they may spend six months or so attempting to replicate the experiment in their own labs. If a researcher makes \$2,000 USD per month the cost to the institution would be \$12,000 USD. Multiply this number by the number of researchers in the institution attempting similar replications and there is a very significant cost. Access to the journal could remove the necessity for training travel or multiple attempts at replicating procedures in the home lab and would therefore be substantially less expensive. The subscription prices are tailored toward the type of institution with the highest price toward large Ph.D. institutions. Prices range from \$5,000 USD per section to much less for undergraduate institutions and are negotiable based on institutional circumstances.

JoVE is the first video journal to be fully indexed in PubMed. PubMed Central preserves the content and makes it open to the public after two years. To the date of the North American Serials Interest Group (NASIG) conference, the journal had produced approximately 2,000 video articles.

In conclusion, JoVE is a pioneering journal that has the potential to enhance significantly the dissemination of experimental techniques to researchers, foster greater collaboration among research scientists worldwide, and to change the way that we perceive scholarly publication.

NOTE

1. John Arrowsmith, "Trial Watch: Phase II Failures: 2008–2010," *Nature Reviews. Drug Discovery* 10, no. 5 (May 2011): 328–329. doi:10.1038/nrd3439

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