2024 Technology Fee Full Proposal

Title: Enhancing Student Learning in STEM with JoVE

Proposer: Emma Brady, Assistant Director of Academics, UF Online (vida@ufonline.ufl.edu; 2046 NE Waldo Rd., Suite 3201, Gainesville, FL 32609; 352-294-3698)

Sponsoring Organization: UF Online

Purpose and Specific Objectives:

Research shows that high quality visual explanations improve learning outcomes[1]. However, because high quality instruction of complex STEM phenomenon and processes, whether taught online or in-person, requires a level of animation, videography, and technical skill, as well as a considerable time investment, it is often outside the scope of possibilities for many University of Florida scholars and scientists. Based on the results of surveys of faculty and scientists at Florida universities, as well as comprehensive review and discussion among the UF Online-led Florida State University System (SUS) STEM Lab Task Force, the Journal of Visualized Experiments (JoVE) was identified as an invaluable and sustainable resource for STEM teaching across the board.

In 2020, UF Online negotiated an unlimited use institutional license for JoVE access for all UF faculty, staff, and students, both via the Libraries (as a journal) and within UF's Canvas LTI (as a teaching tool easily added to any course). Since then usage at UF has seen a 67% year-over-year growth. With 19,000 and growing videos captioned in ten languages and video textbooks in thirteen STEM disciplines created by scientists and practitioners in their fields, JoVE's education libraries are useful to courses across many colleges and disciplines. Faculty have access to a dedicated JoVE representative who will align a playlist of videos to any submitted syllabus, saving faculty the time it takes to locate or create videos, and ensuring that all videos delivered to students are high quality and fully ADA compliant. In addition to core course content, the JoVE repository of videos and its services include "remediation playlists" to enable students with a range of pre-existing knowledge to review and reinforce specific foundational concepts not covered in, but related to, the course content to help them succeed in advanced topics.

From 2020 through December 2023, UF Online has continued to fund the unlimited use of JoVE content, which is now fully integrated into online and residential courses and accessed by over 7,493 UF accounts with 210,816 subscribed views in 39 titles. Given the widespread use of this tool within residential courses and its clear benefits based on faculty testimonials, we are seeking tech fee grant funding to offset UF Online budgetary constraints and enable continued unlimited, university-wide access to JoVE in 2024 and 2025. Access to JoVE supports a significant number of residential courses and yet the cost is borne solely by UF Online, at the expense of other online student-focused initiatives and resources that would otherwise be supported.

As an existing approved LTI at UF, there are three outstanding aspects of JoVE's content and service that make supporting continued institutional access a sound investment that aligns with UF's pursuit of excellence, innovation, and inclusion: the potential to improve student learning[x] in even more disciplines than are currently engaged; the potential for STEM textbook cost reduction for students; and the potential to reduce burdens on instructors and instructional designers in sourcing, creating, and quality checking ADA compliant videos.

Objectives

- Expand JoVE utilization and integration across disciplines and courses to improve student learning[2].
- Reduce student-borne costs of textbooks and associated online content.
- Improve efficiency and quality of instructional videos focused on STEM content.
- Generate research on the impacts of JoVE resources on student learning in STEM fields.

Impact/Benefit:

The primary beneficiaries of continued access to JoVE libraries and services are students in STEM courses. Students have the opportunity not only to learn the content of their courses via high quality, accessible videos produced by JoVE, but also to brush up on concepts in preparation for hands-on work in labs and advanced topics. In one chemistry course in which they were surveyed, only 5% of students who utilized JoVE videos did not feel their

understanding had been enhanced. Access to high quality, ADA compliant video content in STEM courses is important for optimal learning.

Faculty who must develop courses and content videos--and the instructional designers who support them--are the secondary beneficiaries. Enabling faculty to include resources from the existing JoVE library eliminates the need for high-effort duplication of video content that is time consuming and difficult to produce at a comparable quality. This improves instructors' capacity to focus on more direct aspects of teaching and student interaction within their courses, rather than on the creation and updating of videos. UF faculty have reported on the benefits of JoVE:

> "I use JoVE extensively. My students are required to watch several JoVE videos before class so that they are prepared for class. I have watched them all myself and enjoyed the succinct manner in which material was presented. I like the animation that goes with it." *Dr. Martina Sumner*

> "We use them...as pre-lab videos to demonstrate techniques to help students prepare for their in-lab activities...the simple, animated videos are exactly the kind of resource that we want to have for our students." *Dr. Tammy Davidson*

> "We like it because they align with OpenStax (nice when we use OER) and because they aren't typical lecture videos, they're more animation based which is very useful for chemistry." *Dr. Melanie Veige*

Discussions with JoVE users resulted in faculty and librarians expressing the burden and cost that losing the tool would present; beyond that, students studying disciplines that are not currently utilizing JoVE could benefit from its inclusion within their courses.

In 2021-2022, schools estimated that books and supplies cost first-year, full-time undergraduate students roughly $1,000-$1,250 on average[3]. When used in combination with Open Educational Resource (OER) textbooks, JoVE's targeted content gives instructors another option to offer their students. Funding support for JoVE Unlimited access would allow UF Online to expand our support of the Affordable UF Initiative in continued partnership with UF Libraries through their curated JoVE Library Guides and support of JoVE Research.

The list below reflects the UF courses that have had the highest JoVE utilization since Spring 2022. Even as they span disciplines, these are often general education courses which reach large audiences of students and thus have a greater impact on educational quality as compared to specialized, major specific courses.

- CHM2045 and CHM2045L
- CGS2531
- GEB3213
- ENC3246
- IDS1121
- CEN3031
- AST1002
- EEL3003
- PSY2012
- COP5615
- MMC3254

As a peer-reviewed journal, JoVE videos are vetted by scientists who are generating the primary literature in their fields. The continued availability of JoVE will allow UF Online to collaborate with faculty to generate research for internal and external dissemination regarding how the use of JoVE can be integrated into courses to save students, faculty, and administrators money and time while ensuring high quality, ADA compliant course materials that are easy to source and integrate into Canvas.

Sustainability:

UF Online has been funding unlimited access to JoVE since 2020 for faculty, courses, and students that extend far beyond the scope of UF Online. At the current time, we are experiencing budgetary constraints and are seeking university-level support to ensure the continued availability of this important teaching resource. If tech fee grant funding is awarded, UF Online will collaborate with stakeholder units across campus to establish ongoing cost sharing that mirrors the user base and distributes the investment in this resource across a wider section of campus.

In short, the 2024-2025 period of tech fee funding will enable wider dissemination of JoVE, increased utilization and buy-in, and will allow time for planning future budgetary shifts allowing UF Online to continue to solely support JoVE as needed.

Timeline:

Because JoVE is an integrated LTI within UF's Canvas, there is no required lead time for the project to begin; faculty and students in select courses are currently utilizing JoVE. Thus, the timeline below is focused on dissemination and evaluation of usage.

Timing	Activity
May 2024	Work with stakeholders to develop a campaign aimed at STEM colleges and programs that benefit from access to JoVE tools and services.
May 2024	Targeted outreach to Fall 2024 courses that might benefit from remediation playlists.
June 2024 (begin)	Obtain regular usage data from UFIT-AT and JoVE directly.
July 2024 (begin)	Submit IRB for research on JoVE's impact on student outcomes at UF.
August 2024	Enlist and assist current instructors that depend on JoVE for their STEM course instruction to write testimony outlining their use of JoVE.
October-November 2024; March-April 2025	Survey students engaging with JoVE materials to obtain direct feedback on video quality and impacts.
December 2024; April 2025	Assess the impacts on student textbook and associated materials costs for JoVE-enabled courses.
February 2025	Develop and deliver a presentation of testimony, student data, and usage specific to each college or unit including proposals for cost sharing.
May 2025	Assess outcomes and disseminate findings related to tech fee grant project objectives.
November 2025	Publish research with faculty and/or instructional designers regarding impacts of JoVE.
Ongoing	Connect faculty with JoVE representatives to encourage discussions of customized solutions for specific courses/disciplines.
Ongoing	Continued research and publication with faculty regarding impacts of JoVE.

Budget:

Below is the requested budget for continued unlimited access for all faculty, staff, and students at UF for the next two years. There are no startup costs and the unlimited contract for the entire University of Florida to access JoVE journal publications, growing video library/repository, and free access to expert support for peer-reviewed video playlist curation and creation is included.

January 2024 through December 2024 - Unlimited JoVE license for UF, full cost: $50,052

January 2025 through December 2025 - Unlimited JoVE license for UF, full cost: $50,052

Total for two years: $101,105

UF Online is committed to the continued availability of this resource for faculty and students and yet, as noted previously, will struggle to meet the burden of the full cost in 2024 and 2025.

References

[1] Bobek, E., Tversky, B. Creating visual explanations improves learning. *Cognitive Research 1*, 27 (2016). https://doi.org/10.1186/s41235-016-0031-6

[2] Ramachandran, R., Sparck, E. M., & Levis-Fitzgerald, M. (2019). Investigating the effectiveness of using application-based science education videos in a general chemistry lecture course. *Journal of Chemical Education, 96*(3), 479-485.

[3] Jaggars, S. S., Rivera, M. D., & Akani, B. (2019). College Textbook Affordability: Landscape, Evidence, and Policy Directions. Midwestern Higher Education Compact.

Technology Fee Full Proposal Template Sponsor Signature Form

Title: Enhancing Student Learning in STEM with JoVE
Proposer's Name: Emma Brady

Note: By signing this form the sponsor is making a commitment to support the project. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of sponsor: College Dean, or Unit Director, or VP for Student Affairs.

Rhiannon Pollard

Name and Title	3/18/2024	1:16 PM EDT
Interim Director, UF Online	**Date**

Note: By signing this form the UF IT unit is making a commitment to manage the project if selected for submission of a full proposal. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of unit UFIT Director of a core unit:

Mark McCallister

Name and Title	3/18/2024	1:27 PM EDT
Director of Academic Technology	**Date**