A Faculty Learning Community for Building Sustainable Open Educational Resources: Creating a Departmental Video Tutorial Library

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1. Background – ME Online video library

California State Polytechnic University, Pomona (Cal Poly Pomona) is a primarily undergraduate institution and part of the 23-campus California State University system. In 2013, the Mechanical Engineering Department at Cal Poly Pomona started a video tutorial library on YouTube named CPPMechEngTutorials that has grown to over 600 videos across 16 courses (https://www.youtube.com/channel/UCZScjkZuVuvwa-JVA3mHO3w). The video library was a collaborative effort that involved over half of the department's full-time faculty who either created videos, allowed their lectures to be recorded, or contributed ideas and feedback during the planning of videos. The videos have accumulated over 11 million views and the YouTube channel has over 100,000 subscribers as of May 1, 2022, making the video library one of Cal Poly Pomona's largest outreach efforts. Since the YouTube platform provides limited options for the organization of videos, links to the videos are organized in a user-friendly manner at a website named ME Online (www.cpp.edu/meonline). A detailed discussion of the creation of ME Online and how its videos have been used to experiment with novel pedagogies is presented in Nissenson et al. (2019) [1].

The authors previously conducted two studies exploring the potential impact of ME Online on mechanical engineering students at Cal Poly Pomona. Nissenson et al. (2019) administered a survey to 340 mechanical engineering students across sophomore, junior, and senior levels, which revealed the majority of participants watched ME Online videos at least a few times per month, 88% felt the videos have had a positive impact on their education, and 79% felt the videos improved their grades in at least one class. Fuqua et al. (2021) administered a survey to 110 senior level mechanical engineering students and conducted focus groups [2]. They found at least 80% of the students rated the videos as "moderately" to "very" helpful, useful, satisfying, confidence-inducing, and enjoyable. Additionally, 96% of the students provided favorable ratings about the trustworthiness of the video library, most students trusted the ME Online videos more than other videos available online, and 88% of the students reported they expect to use ME Online to study for licensing exams, graduate school, professional work, and/or just to learn new things. Students preferred videos made by known faculty members at Cal Poly Pomona rather than videos made by faculty at other institutions.

Fuqua et al. (2021) also explored the potential for video libraries like ME Online to help address achievement gaps among historically disadvantaged groups. Latinx students and first-generation students used ME Online more frequently than other students, and generally rated the resource more highly than other groups. They noted the importance of being able to pause and control the pace of delivery, which is especially useful for non-native English-speaking students. The authors provided suggestions for improving video libraries such as focusing on courses that have higher failure rates, frequently reminding students about the resource, being aware of differences between the topics emphasized in a course and topics covered in the videos, and adding videos for non-major core courses such as physics.

Both Nissenson et al. (2019) and Fuqua et al. (2021) demonstrate the potential of a departmental video library to positively impact students. However, there are many potential barriers to creating a video library such as lack of training in making high-quality accessible videos, insufficient time to make videos, lack of institutional incentives to create videos (especially at universities where tenure and promotion is tied heavily to research), insufficient funds to purchase hardware and obtain accurate captioning, and lack of knowledge regarding website development. Additionally, a faculty member may feel unmotivated if they are the lone person in their department interested in creating videos – having multiple colleagues involved in creating a video library can increase motivation for others to join their efforts. The creators of ME Online encountered many of these challenges over the years and gradually learned how to overcome them, as discussed in Nissenson et al. (2019).

During the past two decades, there has been an explosive growth of free video resources by universities and individual faculty. The most well-known video databases were created by prestigious universities with large endowments, such as MIT [3] and Harvard [4]. These universities sometimes partner with the Coursera [5] and edX [6] platforms to offer massive open online courses (MOOCs). However, primarily undergraduate institutions (like Cal Poly Pomona) and community colleges, which are less well-known and have smaller endowments, are at a disadvantage when trying to develop similar resources – Coursera's and edX's university partners are mostly well-known Ph.D.-granting institutions [7], [8], and Hollands & Tirthali (2014) estimate the cost of a producing a typical MOOC at $39,000 to $325,000 [9]. ME Online is unique in that it was created from the ground up at the department level in a low cost and sustainable manner (no operational costs, minimal maintenance, and can be expanded as needed). This study describes an effort to apply the ME Online blueprint to four other departments at Cal Poly Pomona in order to create their own video libraries through a faculty learning community (FLC). The lessons learned from this FLC may be used to expand these efforts more broadly in the future.

2. FLC formation and activities

FLCs are a transformative practice in which faculty participate in groups of usually between six and 15 members, to generate an actionable goal or product [10],[11],[12]. They are based on the premise that universities are places of learning for all, including faculty, and can be a way to foster collaboration [12]. FLCs have been demonstrated as valuable for cross-campus collaborations [12],[13], faculty development [14], curriculum development [15], generating teaching resources [16], and scholarship of teaching and learning [14],[17],[18]. Additionally, FLCs have been shown to reduce the isolation among faculty [12],[19].

FLCs are generally either "topic" or "cohort" based [10],[11], and the project's organizers (the authors) chose the topic of creating shared departmental video libraries. Videos have been a key feature in other FLCs as a supplement for participants [20], as a tool for self-evaluation of teaching [21], for communicating in online communities [22], and as a component of course redesign efforts which often primarily help individual faculty members. This FLC was unique in that the creation of shared departmental video libraries was the central goal.

Fundamentally, the quality of participant engagement is essential to the success of a FLC [23], and the recruitment process was designed to identify participants who would be highly engaged throughout the project. A call for proposals was issued to Cal Poly Pomona faculty in Fall 2019, followed by mandatory informational sessions to ensure participants understood the requirements of the program. Faculty were asked to apply in teams of 2-4 members from the same department rather than solo because support from departmental colleagues was expected to be important for the success of the video library, as was the case with ME Online. Applicants were required to describe their prior experience creating videos for educational purposes, affirm their ability to dedicate sufficient time to participate in the FLC, and discuss how participating in the FLC is part of their team's long-term goal of enhancing student success and accessibility in their department. Additionally, the teams were required to obtain a letter of support from their department chair to ensure their efforts were consistent with the expectations of the department.

The applications were evaluated by the project's organizers using a rubric that included categories for the team's technical expertise, ability to participate in the FLC, and long-term vision of enhancing student success and accessibility in their department (with extra consideration for teams who addressed foundational courses). Ten teams applied, with four ultimately selected:
- English & Modern Languages Department (4 members)
- Civil Engineering Department (4 members)
- Library (3 members)
- Chemistry & Biochemistry Department (2 members)

A FLC of 13 members is a size within the ideal range suggested by Cox and Richlin (2004) [11]. The FLC members entered the program with a wide range of video production experience – some members had been making videos for several years, while others were novices. Each team had at least one member with significant video production experience.

Prior to the start of the FLC meetings, a lunchtime event was held with campus leadership, including the President and Provost of the university, to illustrate the importance of the program and inspire the FLC members. Afterward, the FLC met biweekly during Spring 2020 in seven two-hour sessions. The sessions were organized and run by the lead developer of ME Online (a faculty member in the Mechanical Engineering Department) in collaboration with staff from Cal Poly Pomona's Center for the Advancement of Faculty Excellence (CAFE). The community was divided into two cohorts because it was too difficult to find a common time to meet among the 13 members and allowed for more personal attention and feedback. The first cohort consisted of the English & Modern Language and Civil Engineering teams, while the second cohort consisted of the Library and Chemistry & Biochemistry teams. Meetings #1-4 took place in person and Meetings #5-7 took place online via Zoom due to the coronavirus pandemic. Despite the sudden change in format, the authors do not believe holding some meetings through Zoom impacted the quality of the FLC significantly.

During the meetings, FLC members participated in seminars and small group discussions on the following topics:

- Free on-campus resources for creating videos
- Importance of accessibility
- Best practices in video design
- Creating and measuring learning objectives for videos
- Search engine optimization to boost viewership
- Miscellaneous technical sessions such as editing in Camtasia Studio and improving audio quality

Additionally, three Cal Poly Pomona faculty guest speakers shared their experiences developing videos and using those videos to experiment with various pedagogies.

FLC members received a small stipend and hardware consisting of a microphone headset, webcam, and writing pad to facilitate video production. Each FLC member was required to produce four videos during the program and were encouraged to share ideas and resources with teammates. Some teammates worked rather closely, sharing ideas outside of FLC meetings as they developed their videos, while others worked more independently. Participants had two weeks to make a video and share it with teammates, other FLC members, and CAFE staff, who reviewed the video and provided anonymous written feedback. At the next meeting, verbal feedback was provided to each member, and this constructive criticism was used to improve the quality of the subsequent video. As a result, the quality of videos improved significantly from the first video to the fourth video. The project's organizers recognized that sharing videos could make people feel vulnerable, so they tried to create a safe, encouraging environment for experimenting with video production.

At the conclusion of the FLC, each team created a departmental YouTube channel to host the team's videos. YouTube was selected because it is free, has unlimited storage space and streaming capability, it is easy to add captions for accessibility, and has a built-in worldwide audience. However, YouTube has limited formatting options, making it difficult to organize video content in a user-friendly manner. In order to improve the user experience for students, each FLC team received a departmental video website template where links to the videos can be organized by subject area. A supersite titled CPP Video Tutorials was created that contains links to each of the departmental subsites (www.cpp.edu/videotutorials). The websites were created using the university's content management system, Cascade.

Each FLC team assigned two of its members to be administrators for their departmental YouTube channel and video website. Having two administrators per department ensures redundancy in case an administrator is unable to perform their duties. Many of the administrators did not have prior experience working in Cascade, so a training session was held with CAFE staff to share best practices in managing their websites.

The style and management of the departmental websites is based on the ME Online model, and the websites are both sustainable and scalable.

- Sustainable: The videos are hosted on YouTube, so there are no operating costs for the departments. It only takes a couple minutes to add a video and captions to YouTube, then place the link on the departmental video website. No routine maintenance is required.

- Scalable: The departmental YouTube channel and website are managed by faculty in those departments, so the workload of growing this university-wide resource is dispersed among many faculty. Additionally, it is easy to add new departments to the supersite and provide them with a template for their subsites.

3. Assessment of the FLC

The assessment was performed by faculty and undergraduate research assistants from the Cal Poly Pomona Sociology and Psychology Departments. An evaluation of the FLC was conducted to explore its efficacy and determine how it could be improved in future iterations. Participants completed a survey prior to beginning the FLC to gauge expectations, then completed a similar survey following the final FLC meeting. They also completed short surveys at the end of each FLC meeting and participated in qualitative interviews at the end of the entire FLC. The post-test survey and interviews also included questions about the transition to online learning due to the coronavirus pandemic.

The FLC members had very positive opinions of the overall experience, with 12 of 13 participants giving the highest rating possible when asked how worthwhile the FLC had been. Participants saw the experience as valuable and worth continuing in the future. One participant stated, "*I think it's really important that the administration supports this again… do something like this more than once.*" Another said, "*If [the administrators] care about students (and I know they do), they should provide support for these initiatives. This really helps our students.*" One member who had a great deal of experience running teaching professional development workshops noted:

> "*I've run all these workshops and review[ed] stuff for the last several years, and I personally have gained a lot of professional development from all that. But to actually be a participant and not be the orchestrator … is very different. And so from a participant point of view … this was very amazing what I was able to accomplish in 15 weeks! … I feel like this was a really cool environment.*"

Faculty mentioned that being provided with recording equipment was important for both the FLC and making the transition to remote instruction due to the coronavirus pandemic. As one participant explained, "*I think one of the most helpful things was getting the headsets and microphones and cameras.*" A second FLC member highlighted that the equipment was more of an incentive to participate than the stipend even though the equipment was less expensive than the stipend. Another member that greatly appreciated the FLC said, "*Now, let me tell you a secret: I would have done this without the stipend.*"

Overall, participants reported feeling more knowledgeable, prepared, confident, resilient, and "*better off than colleagues*" about making accessible videos. One FLC member commented, "*I think the faculty learning community took away a lot of fear of creating the videos and I think receiving feedback early on [was] pretty good.*" The experience was described as "*revitalizing*" with one FLC member mentioning:

> "*… the learning community, got me excited about being a professor again… I think the [feeling of revitalization] was noticeable in the other FLC teams. We*

had three full professors, a handful of associates, a handful of assistant professors… [The people on all teams all showed renewed enthusiasm.] I think every few years you need to get revitalized about teaching. And this was a really neat way to be revitalized… This is the first time [in years that] I [felt] revitalized."

There were several questions that appeared on both the pre-FLC and post-FLC surveys to gauge how the participants' attitudes changed over time. Figures 1 and 2 demonstrate that most participants initially reported a low level of knowledge regarding accessibility requirements for videos and possessed low confidence in their ability to implement those requirements when making videos. By the end of the FLC, there was a dramatic shift in their perceived knowledge and abilities, and most felt confident about teaching others about accessibility. Figure 3 shows that FLC members also experienced a large increase in confidence regarding knowledge of on-campus resources between the beginning and the end of the FLC. Figures 4 and 5 demonstrate that most FLC members entered the program with low levels of knowledge about making videos and video libraries in general, but left the program feeling much more confident.
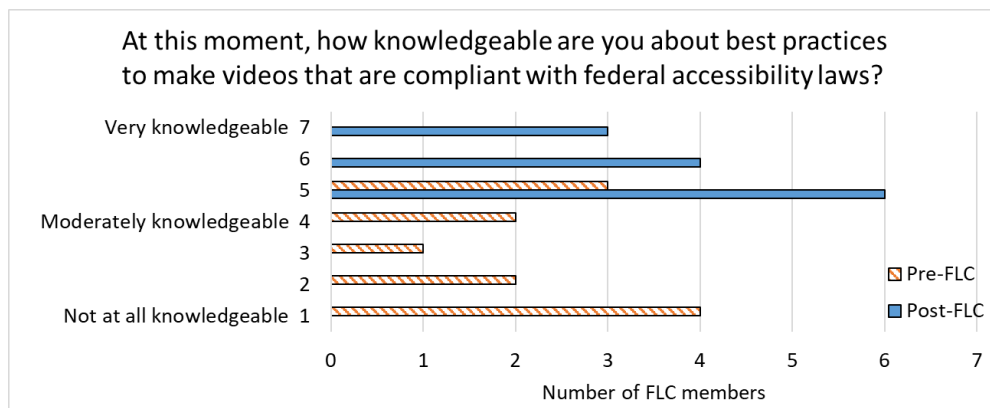

Figure 1: Pre-FLC (orange) and post-FLC (blue) survey results for perceived knowledge of accessibility requirements for videos. The average score improved from 2.6 (Pre-FLC) to 5.8 (Post-FLC) out of possible 7.0 points.
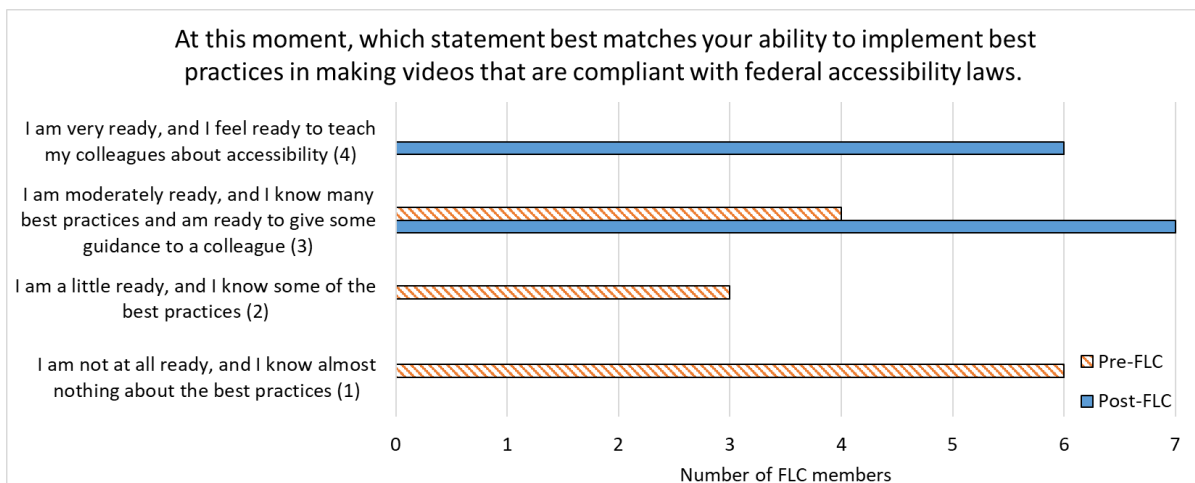

Figure 2: Pre-FLC (orange) and post-FLC (blue) survey results for perceived ability to implement best practices in making accessible videos. The average score improved from 1.8 (Pre-FLC) to 3.5 (Post-FLC) out of possible 4.0 points.
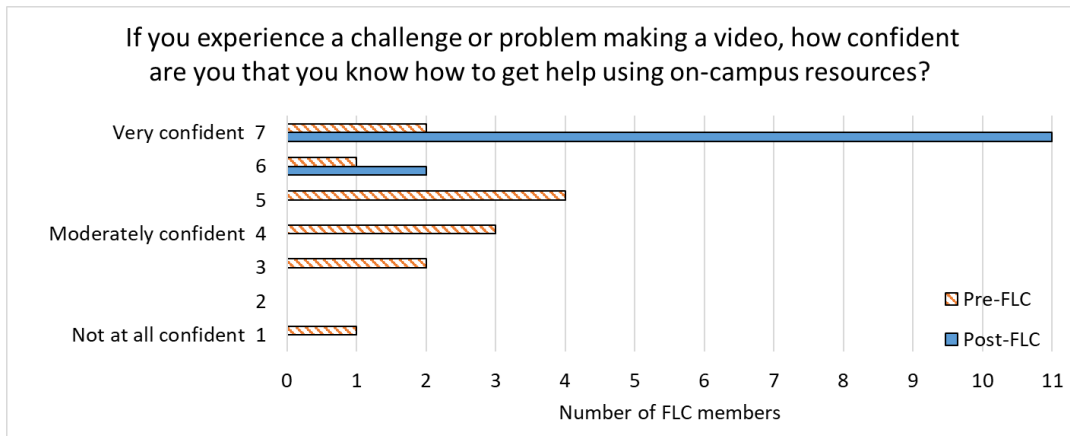
Figure 3: Pre-FLC (orange) and post-FLC (blue) survey results for knowledge of on-campus resources. The average score improved from 4.5 (Pre-FLC) to 6.8 (Post-FLC) out of possible 7.0 points.
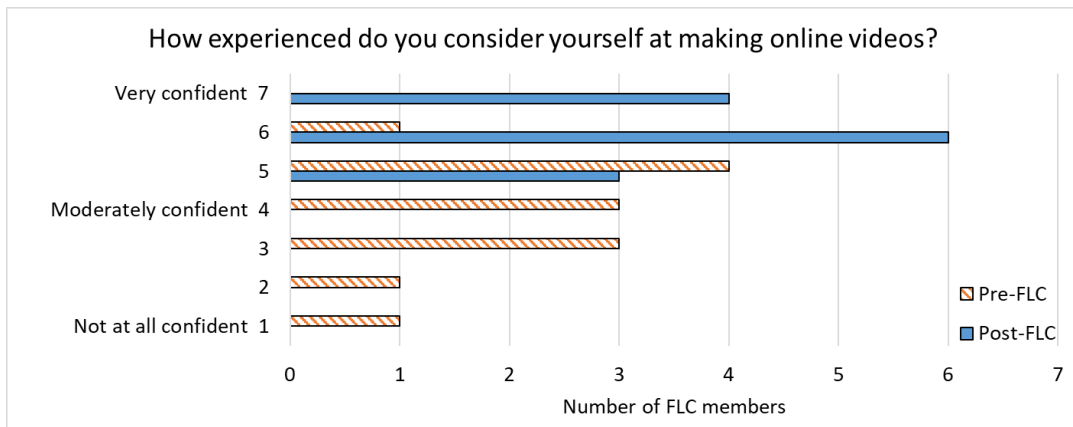

Figure 4: Pre-FLC (orange) and post-FLC (blue) survey results for perceived ability to make videos. The average score improved from 3.8 (Pre-FLC) to 6.1 (Post-FLC) out of possible 7.0 points.
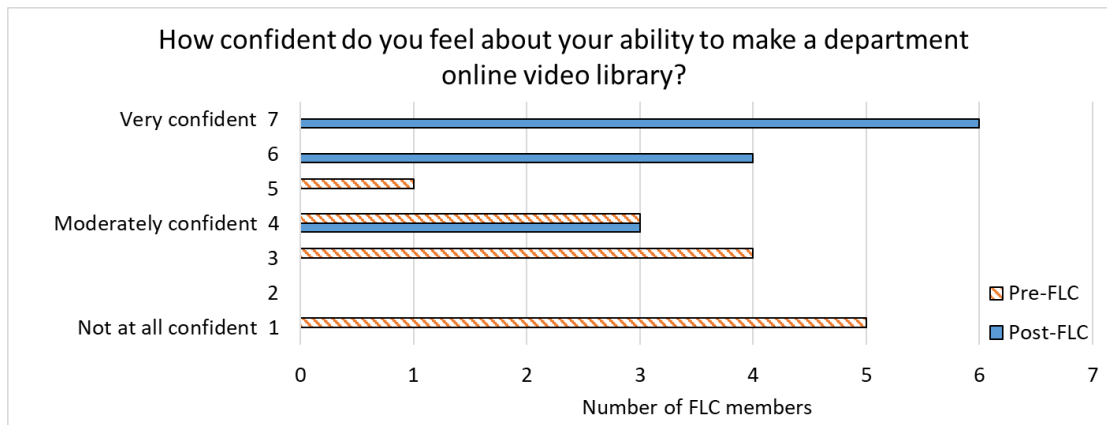

Figure 5: Pre-FLC (orange) and post-FLC (blue) survey results for perceived ability to develop a video library. The average score improved from 2.6 (Pre-FLC) to 6.0 (Post-FLC) out of possible 7.0 points.

FLC members rated their favorite activities of the program. Receiving feedback from peers was the most highly rated activity of the FLC, followed closely by presentations on best practices and accessibility. The faculty guest speakers and presentations on captioning were rated highly as

well, while other activities were rated as at least moderately useful. However, as one participant noted, "*all of [the activities] are almost equally important to me. They all contribute to making accessible instructional videos of good quality to students.*" Other aspects of the FLC were impactful to faculty as well, such as a strong feeling of camaraderie – all participants gave the highest or second highest possible rating in this category.

The timing of the FLC coincided with the transition to remote instruction in March 2020 due to the coronavirus pandemic. The authors acknowledge that this additional variable complicates the interpretation of the results. For example, it is unknown whether the shift in FLC members' attitudes and skills shown in Figures 1-5 were impacted significantly by their experience with remote instruction and related trainings offered by Cal Poly Pomona. However, the university's faculty development efforts during Spring 2020 focused primarily on developing basic skills for platforms like Zoom and Blackboard, not creating accessible video tutorials and video tutorial libraries. Therefore, the authors feel that the shift in attitudes and skills probably were mostly due to the FLC.

Although the FLC results are complicated by the onset of the pandemic, the FLC members generally felt the timing was highly fortuitous, and some members reported being resources for colleagues. One member highlighted using several of the video production skills developed during the FLC when transitioning to remote instruction:

> "*[When COVID arrived] ... a lot of [what we did and skills we learned in the FLC] ... were very easily used for my asynchronous course.*"

Ultimately, all 13 FLC members completely fulfilled the requirements of the FLC despite the coronavirus pandemic greatly disrupting everyone's lives midway through the semester. The biweekly meetings also provided an environment where members could share the difficulties of homeschooling while working, transitioning to remote instruction, and dealing with sick family and personal loss.

Several additional themes emerged that provide insight into what made the FLC experience successful.

Peer engagement and peer feedback: Timely feedback from peers was highly valued and considered essential to the success of video improvements. Several members noted how much they appreciated exchanging feedback with those in different disciplines because receiving feedback from someone outside their field was closer to what a student might experience. Additionally, people found that receiving critiques in a safe space was more palatable, and they appreciated the way in which feedback was delivered. One member commented that, no one was "Simon Cowell" (the abrasive judge on *American Idol*). Hence, as suggested by previous research, high-quality participant engagement is essential [23].

Accountability: Faculty highlighted the importance of accountability to peers and to the meeting moderator for ensuring completion of their videos. As one participant noted:

> "*... one positive thing with working in a group is the peer pressure and ... halfway through the program, I was like ready to give up and focus on other*

things. But then I didn't want to be the one guy that did not do his video and everybody else did."

Hands-on learning: Hands-on learning with real-time assistance for improving videos and trouble-shooting problems during the FLC meetings was highly regarded. Members said they greatly appreciated learning and implementing strategies to improve their videos, often during FLC meetings. Participants noted that teaching workshops (not affiliated with this FLC) often seem more conceptual and often reserve little or no time for faculty to perform hands-on activities that would improve their courses. They mentioned that more time should be devoted to creating resources for class improvements in FLC meetings and campus workshops:

> "*Usually teaching events like workshops or FLCs don't allow instructors enough time to do the FLC work in the group. It was great to do the work in meetings.*"

Creation of an informal community of support across campus for quick questions: Faculty said they appreciated how they "*now have a group of peers for helping with quick questions*" or more complicated tasks. They asked each other questions like, "*How do I add sound in Camtasia?*" and "*What's the link to free non-copyrighted material?*"

Faculty relied on each other as well as CAFE staff. While CAFE staff are knowledgeable and helpful, they may not fully understand the unique challenges of being a faculty member and their response time varies based on demand and time-of-day.

Creating an environment for "aha" moments: CAFE and other campus entities can provide good technical assistance, but faculty usually turn to these entities when making specific requests (e.g., how to add webcam footage to a Camtasia video). Several members highlighted learning about things at the biweekly meeting they did not know existed or were possible, and therefore would have never inquired about. FLC members noted that other faculty were more likely to suggest new ideas when helping with video production challenges. For example, during one FLC meeting members discussed how to deal with undesired background noise. One FLC member suggested adding background music, which made a notable impact on another member who had never realized that she/he had audio issues that were distracting and problematic for students:

> "*[Our discussion of how problematic background noise is…and discussion of the solution was eye-opening]. Background music was an aha moment. I …[realized that sound is very important and my video had distracting noise.] There's a lot of noise in the background, and you hear various clicks. Now that I'm …doing these at home, the sound environment is less than optimal. So you're hearing every click and other things. And even what I edit out, you're still going to hear some of it … So the nice thing about this [music] as the background, music does tend to get rid of some of that [frustrating background noise]. Overall, I've tried to incorporate in a bunch of little things I learned …[like sound improvement].*"

One of the most basic, yet vitally important, skills in video production is ensuring students can hear the content in videos clearly. Poor audio quality and distracting sounds were common problems for faculty at the start of the FLC, but they soon realized the need for decent audio in order for videos to be usable by students. Members spent a lot of time talking about audio quality

during FLC meetings and outside of meetings. They noted high quality audio quality can be difficult to produce, but is essential for asynchronous videos. If students cannot hear the content of a video clearly, students' ability to learn from the videos would be impacted. When members struggled with audio quality, they did not feel ready to move on to learn other aspects of creating high-quality videos.

Ideas for improving this FLC: Members appreciated the biweekly meetings, but wanted more opportunities to receive constructive feedback during the video creation process. Shared work sessions themed around developing specific skills such as audio quality, audio editing, and background noise reduction were suggested. Peer mentors with advanced skills could potentially work with FLC members who require help with specific challenges. These suggestions highlight how FLC members found that learning from each other was a key source of improvement.

4. Suggestions for running a FLC

Based on the authors' experiences from this FLC, we provide the following suggestions to the reader who is interested in creating a successful FLC at their institution.

Prior to the FLC:
- While recruiting potential FLC members, ensure the applicants understand the deliverables and time commitment required.
- Untenured faculty should be aware about whether their participation aligns with their department's retention, tenure, and promotion requirements. For example, teaching-related faculty development may not be as highly valued at a R1 institution compared to a primarily undergraduate institution or community college. Asking FLC members to obtain a short letter of support from their department chair can help prevent untenured faculty from accidentally participating in an activity that would not benefit their career significantly.

During the FLC:
- Require specific deliverables throughout the FLC to keep FLC members constantly engaged. The last deliverable should be due before the stipends are distributed to help ensure compliance. Holding a showcase event at the end of the FLC also can help ensure faculty complete the deliverables in a timely manner.
- Tap into existing experts on campus to give talks and demonstrations, and to provide feedback. The experts can be staff (e.g., from the university's faculty development center) or other faculty.
- FLC members should receive feedback throughout the entire FLC by experts and peers, and the person running the meetings should create an environment where everyone is comfortable giving and receiving feedback.
- Create a system where FLC members feel accountable to each other in order to complete the tasks in a timely manner. One way to accomplish this is to have peers provide feedback to each other frequently.
- When creating assignments, deadlines, and meeting times, be mindful that many faculty already have a heavy workload of teaching, research, and service. Consider asking the FLC members for deadlines and meeting times that work best for them.

- FLC deadlines and meeting times should be consistent and predictable (e.g., meet every other Friday at 9:00-11:00am, deliverables are due every other Saturday at 11:59pm, etc.). This makes it easier for faculty to fit the FLC into their schedule.
- Dedicate a significant amount of meeting time to hands-on activities and discussing concrete examples.

5. Future work

The coronavirus pandemic required faculty across Cal Poly Pomona and the world to prioritize instructional continuity over creative projects such as the development of video tutorial libraries. While the timing of the FLC was fortunate for its 13 members since they learned relevant skills just prior to remote instruction, the pandemic prevented the project's organizers from building upon the successes of the FLC immediately upon its conclusion. Significant funding for such an endeavor was scarce, and many faculty (including the authors) and university staff simply did not have the mental bandwidth for such an undertaking.

However, in the wake of the pandemic the baseline level of technological competency for faculty has improved significantly. The pandemic resulted in perhaps the greatest concentration of technology-related faculty development in the history of higher education, and there may be an opportunity to capitalize upon this by making a renewed push for expanding existing video libraries and creating new libraries in other departments, possibly using FLCs. Indeed, the university's video library has already grown with the addition of the Industrial & Manufacturing Engineering Department's videos, and many other departments have expressed interest in the library.

If expanded and supported, this project has the potential of greatly benefiting all students at Cal Poly Pomona and beyond for years to come. It also has the benefit of building resiliency in the university in case of a future pandemic, and will give faculty tools to attempt new pedagogies (e.g., flipped classroom). As stated by one FLC member:

> *"I hope they [administration] continues this [FLC]. There are a lot of things the campus does, and, I think learning communities… we should do more… [The] faculty development office [CAFE], does a great job but … I wish we could just do more learning communities in general, because faculty are less and less willing to just come to one-hour workshop [and this FLC was so useful]."*

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video websites and led a workshop on managing the websites. Carla Tetreault managed the budget, ordered equipment, and reserved rooms. In MediaVision, Director Trevor Henderson provided a meeting space and technical support when the FLC sessions met in person, and gave a seminar on campus resources. Web Development Team members Dr. Jason Beers and Alvin Godoy played a key role in developing the video website templates. Seminars were given during FLC meetings by Ann Loomis (Disability Resource Center Associate Director), Dr. Felicia Friendly-Thomas (Psychology), Dr. Shokoufeh Mirzaei (Industrial & Manufacturing Engineering), and Jodye Selco (Chemistry & Biochemistry). Undergraduate research assistants – Elizabeth Fajardo, David Dimas, Tyler McGee, Kayla Pavlinac, Krusha Patel, Shikha Gupta, and Briana Rodriguez – helped design new measures, develop and execute the procedure, communicate with participants and instructors, run focus groups, conduct data management and analysis, and contribute to report-writing.

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