

HyFlex Instruction: The Leatherman Tool of Makerspace Learning - Active, Engaging, and Adaptable

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INTRODUCTION

The COVID-19 pandemic was the catalyst for revamping workshops so that they could be delivered not only face-to-face (F2F) but also via video conference [1]. Now that students are mainly back on campus we are offering updated Multi-Access, Hybrid-Flexible, or HyFlex, workshops so that both on-campus and remote learners can participate in active learning workshops F2F in our library-based makerspace, remotely via video conference, or remotely on their own schedule using self-directed online learning resources [2][3].

It was anticipated that HyFlex workshops would be offered short term and that there would be a return to offering only on-campus workshops in the Spring 2022; however, so many students are taking advantage of video conference and self-directed options that we will continue to offer HyFlex workshops indefinitely. Feedback from learners indicates that this strong demand for HyFlex is not only due to COVID-19, but also because HyFlex instruction helps them more easily attend to family responsibilities, manage mental health issues, and support remote learners [3][4]. During the fall of 2021, 75% of HyFlex workshop learners participated via video conference and 25% participated F2F.

HYFLEX MAKERSPACE WORKSHOPS

A. WHAT IS A HYFLEX WORKSHOP?

The hybrid-flexible, or HyFlex format is an instructional method that combines F2F, video conferencing and self-paced online learning [5]. For example, a HyFlex workshop could be offered in the following formats:

- F2F in the makerspace or classroom
- Online with the F2F participants, via video conferencing software
- Online using self-directed learning resources *not* at the same time as F2F learners

Learners can choose how they would like to participate in a workshop given their specific needs at the time it is being offered (illustrated in Fig. 1).

David Rhoads, a HyFlex researcher, recommends that when creating or converting a workshop to a Hyflex format to also consider implementing universal design for learning principles and flipped learning design to maximize active learning time and minimize lecturing during F2F and video conference workshops [8].

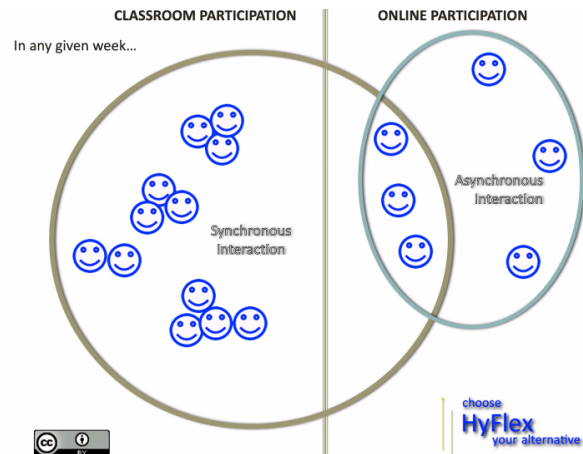


Fig.1 HyFlex instruction: F2F, video conference, & asynchronous [6]

B. WHY HYFLEX?

HyFlex workshops “provide students autonomy, flexibility, and seamless engagement, no matter where, how, or when they engage in the course [5].” The need for flexibility may be due to family responsibilities, health issues, transportation challenges, or work scheduling [3][4].

In a recent HyFlex workshop, learners participated from around the world, including F2F in Victoria, BC, via video conferencing software from cities across Canada, Chicago, IL, Lagos, Nigeria, and from Sao Paulo, Brazil. Global participation like this is a beneficial side effect of the work done to make workshops accessible to learners from their dorm rooms during COVID-19 lockdowns.

Not only can HyFlex benefit learners, but it can also benefit instructors. For example, if an instructor cannot be present in the classroom for a HyFlex class, they can lead the workshop remotely, while students join from the makerspace and online [6]. Professors can also incorporate self-directed online learning resources into their for-credit classes.

Hyflex workshops do not have to include a video conference option. If desired, a HyFlex workshop can offer only F2F and self-paced instruction and activities. This version of HyFlex is recommended for use by instructors who do not have access to hardware for live video, or who do not have a teaching assistant to help support online participants [8].

C. CREATING HYFLEX WORKSHOPS

Central to the HyFlex model is the principle that no matter which instructional path a learner pursues—whether it be F2F, video conference, or self-directed—HyFlex workshops should lead to the same learning outcomes, regardless of the path

[7]. Here are some high-level steps that instructors can follow to create a new HyFlex workshop:

- Create SMART (Specific, Measurable, Attainable, Relevant, and Time-bound) learning objectives for the workshop [2]
- Create a self-paced, or asynchronous, workshop with online multimedia instruction and hands-on activities that anyone can complete, anywhere in the world with internet access [2]
- Create F2F instruction. Also create additional hands-on workshop activities if the asynchronous curriculum is not ideal for F2F instruction [2]
- Put as much instruction as possible into pre-workshop assignments so that the vast majority of F2F time is spent doing hands-on activities
- Create video conference based workshop activities if the other activities do not translate well [2]

In the author's experience with creating HyFlex workshops for software and electronics tools, F2F instruction and hands-on activities can be effectively used for video conference participants usually without modification.

D. LEADING HYFLEX WORKSHOPS - BEST PRACTICES

A key ingredient for effective HyFlex workshops that are taught via both F2F and video conference is for the instructor to be supported by a teaching assistant (TA). The TA can monitor and support the online participants during the instructional portions of the workshop so that the instructor can focus only on the F2F participants. In the experience of the author, the cognitive load on instructors who split their attention to teach both F2F and video conference participants is tiring or overwhelming. TA's can let the instructor know if there are online questions.

During the hands-on portion of the workshop, learners work through the activities they've chosen at their own pace, with the instructor circulating through the makerspace to check in with learners. Time should be taken by the instructor to check in with each video conference participant to see how they are doing and offer assistance.

For self-paced participants working through the workshop instruction and activities on their own, instructors should check-in with them periodically via chat or email to see how they are doing, and offer support.

E. EQUIPMENT TO FACILITATE HYFLEX WORKSHOPS

There is a wide range of equipment that can be used to facilitate HyFlex workshops offering F2F and video conference instruction. If equipment has not already been purchased for your makerspace, the following is a list of low cost, but effective HyFlex video conference enabling tools:

- Computer for instructional presentations and video conferencing
- External camera that is more easily directable than a built in laptop camera
- Wireless microphone so that online participants can hear the instructor and F2F classroom learners (the Rode Wireless Go system is a good option)

- Sound system connected to the computer so that F2F classroom participants can hear online learners

F. WHAT ARE THE DOWNSIDES OF HYFLEX?

Every teaching method has strengths and weaknesses, and HyFlex is no different. Some HyFlex challenges include:

- Remote participants must have internet access and a computer fully to participate
- Hands-on activities for some tools or technologies can be difficult or impossible to do without access to the physical makerspace
- It takes extra time to create HyFlex workshops including time and effort to create equally effective online activities [5]
- Leading HyFlex workshops can be difficult to do well without practice
- Teaching without a TA can be very difficult

CONCLUSIONS

The HyFlex or Multi-Access workshop format has been an excellent framework that has allowed our makerspace to transition from fully online workshop delivery during COVID-19 lockdowns to a Hybrid F2F/online model. HyFlex also allows us to effectively and efficiently serve many learners who in the past could not attend workshops in our physical makerspace due to sickness, family responsibilities, mental health issues, or physical distance. Pandemic or no pandemic, we will continue to offer our workshops in a HyFlex format to serve our community.

For more information, please view the companion [video](#), [infographic](#), & [presentation slides](#) for this extended abstract.

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