HyFlex / BlendFlex Abbreviated Literature Review

Questions Addressed  (All links are internal to this document.)

This report outlines the results of an abbreviated literature review designed to address the questions:

- What is the state of knowledge about student success in HyFlex / BlendFlex education versus traditional classroom-based education?
- What is known about any differences in academic performance related to student demographic profiles?
- What instructional strategies enhance the effectiveness of HyFlex / BlendFlex learning?

Searches Done

This was an abbreviated literature review, not a systematic review. The following is a list of the searches performed.

- ERIC database for HyFlex, BlendFlex, Flexible Learning
- Google Scholar for HyFlex, BlendFlex, Flexible Learning
- Web of Science database search for HyFlex, BlendFlex, Flexible Learning
- Consultation with CSU librarian, Jimena Sagas, on search technique and results
- Personal communication with authors of cited articles

Findings

Key Takeaways

- Students love HyFlex
- Faculty don’t
- Appears best suited for specific courses and situations where a three-mode design solves particular problems (e.g., a graduate-level business program when participants cannot consistently be on campus or a course taken when students are simultaneously completing an internship or undergraduate research experience)
- In HyFlex faculty often are lecturing Face to Face (F2F) to an empty classroom
- HyFlex does not appear to be suitable for general application across a department, college, or campus
- BlendFlex, or other hybrid solutions, appear to be more generally applicable and easier to implement and manage (Such as F2F with a synchronous stream to online students)
- Teaching Assistants (TA’s) or Learning Assistants (LA’s) who monitor/administer the chat and breakout rooms during synchronous, streamed sessions appear to be invaluable if not essential for successful/equitable classroom/remote sessions. More detailed info on this below in the implementation section
- Students tend to perform equally well between modes, though asynchronous online students tend to perform slightly, non-significantly, worse. However, an influential 2010 review of prior empirical studies sponsored by the U.S. Department of Higher Education found that students in blended courses typically achieved stronger attainment of course learning outcomes than did students in fully online or fully F2F classes (Means, Toyama, Murphy, & Bakia, 2013; Means, Toyama, Murphy, Bakia, & Jones 2009). Similarly, earlier studies of hybrid learning found that it is possible for hybrid learning to lead to stronger
achievement of learning outcomes than did F2F instruction, hence leading to questions about what features effective hybrid courses share (Bernard et al., 2014; Schneider & Preckel, 2017).

- There is minimal research into differing effects on student outcomes for minoritized populations
- As with traditional Face to Face classrooms, instructional strategies that increase student engagement and communication tend to enhance the student experience within multi-modal designs
- Without specific faculty incentives – e.g., stipends, grants, TA/LA support, Instructional Design (ID)/Instructional Technology (IT) support, course release, etc. – any chance of success in the implementation of HyFlex seems minimal
- Other combinations of flexible learning / teaching, such as BlendFlex, may be more appropriate for the situations / issues CSU faces in undergraduate education.
- It may be most effective to take a strategic approach to integrating hybrid, blended, BlendFlex and/or HyFlex courses:
  - First, CSU may wish to identify courses where one of these alternate delivery modes would be particularly useful. Examples might include courses frequently taken when students are also completing an internship or undergraduate research experience or summer courses taken by students who are working more hours than during the academic year.
  - In addition, courses identified by the Curricular Analytics platform used in Academic Program Review as potential roadblocks to timely graduation if not completed at a particular point in the student’s curriculum (taking into consideration the academic readiness of students to adapt to an alternative course delivery mode; ie: Freshman might not be as ready as Juniors or Seniors)
  - Next, it may be useful to provide appropriate financial incentives and other support to engage faculty in designing and teaching high-quality hybrid, blended, BlendFlex, or HyFlex courses.

“With a HyFlex format) faculty have to manage a multimodal learning environment with three participation modes, deal with a heavier workload, ensure a reliable and productive student-instructor interaction, and assess students’ learning progress regardless of the learning mode they choose” (Naffi, 2020)

Summary
The limited research to date on HyFlex and student performance suggests that it promotes learning as effectively as traditional classrooms do. However, implementing it successfully is demanding for instructors and institutions. Further, students often gravitate to fully remote learning, undermining the face-to-face component of HyFlex courses. The time and expense involved may mean that HyFlex is viable only in specific situations where high student as well as faculty commitment is combined with circumstances that prevent students from consistently attending class in person. Alternate modes, such as BlendFlex, may provide a more scalable approach to meeting students’ desires for increased flexibility and use of educational technology to effectively support learning. More research is needed on the effects of the HyFlex model on student academic performance.

Few studies exist on the efficacy of HyFlex / BlendFlex learning in regards to student performance. More than a few studies have shown that student attitudes and engagement in these formats are positive and most students appreciate the flexibility and availability of choices for learning inherent in these models (Abdelmalak & Parra, 2016; Miller et al 2013). There also appears to be evidence that student grades were minimally impacted by their choice of attendance (Miller et al., 2013, Mirzaie and Griffy, 2016).

It has been observed (Lui and Rodriguez, 2019) that F2F attending students perform better than students attending other modes early in their exposure to the HyFlex model. But, this enhanced performance fades after several semesters of student’s enrollment in HyFlex courses. In addition, Lakhal et al. (2014) found that
exclusively synchronous online students outperformed asynchronous online attending students in a large enrollment (376) undergraduate management information systems course.

In one instance, the HyFlex model appeared to be more effective in large enrollment courses that include group work with synchronous student interactions than in traditional F2F sections (Miller et al., 2013). The Face to Face component of HyFlex should have interactive interludes between lecturing as well as checks for understanding which engage students to prevent a flight to exclusive online attendance (Chin-Yen Liu and I.A Mirzaie, personal communication, July 16 and 19, 2021). There appears to be a distinct and somewhat problematic student preference for the asynchronous online mode at the expense of the F2F classroom (Blankson, et al., 2014) to the point that one group of faculty complained “we’re always lecturing to an empty classroom” (Chin-Yen Liu, personal communication, July 16, 2021).

A number of challenges to faculty and institutions have been identified (Malczyk, 2019):

- Additional planning, preparation and development
- Additional classroom and remote technologies
- Additional coordination with campus units including: Teaching and learning centers, online course developers, academic computing, the Registrar’s Office
- Difficulty in planning specific in-class activities, including group work, when F2F attendance is uncertain for any given class session
- Development of online course materials in the Learning Management System (LMS, which at CSU is Canvas)

“In order to make the program work (in a HyFlex environment), all parties (school, IT support, faculty, and students) have to do their shares. It takes a lot of preparation and effort.” (Chin-Yen Liu, personal communication, July 16, 2021)
Lakhal et al. (2014) define HyFlex learning as: The Hybrid-Flexible (HyFlex) design model is a course design model that combines Hybrid learning in a Flexible way, such that students can either attend face-to-face class sessions, participate online or do both (i.e. alternate between face-to-face mode and online mode), according to their needs and availability, without learning deficits. Each class session and learning activity is offered in-person, synchronously online, and asynchronously online. Students can decide how to participate. Beatty (2019) provides four fundamental principles of HyFlex:

- Student Choice: The primary reason for using a HyFlex is to give students a choice in how they complete course activities in any given week or topic
- Equivalency: Provide equivalent learning activities in all participation modes
- Reusability: Utilize artifacts from learning activities in each participation mode as learning objects for all students
- Accessibility: Equip students with technology skills and access to all participation modes

BlendFlex, on the other hand, takes a different tack and its characteristics vary. According to Miller et al. (2020): BlendFlex (blended + flexible)—differs slightly in that instructors pre-assign student face-to-face attendance on certain days and students may choose how to participate on other days (e.g., attend remotely, watch a recorded session, complete an online module).

The Ohio State University defines BlendFlex differently: BlendFlex combines elements of HyFlex and flipped classroom models with asynchronous and synchronous online components. Here are the core recommendations of BlendFlex according to OSU:

- Deliver all core content and assessment measures online.
- Hold any synchronous meetings involving the full class online.
- Devote in person class time to activities that enhance, but do not replace, online components (students may

Reasons to offer flexible participation options:

1. Ensure continuity of course delivery through future crises
2. Allow high degree of customization
3. Give learners more control over time, pace, and place
4. Address learning preferences
5. Provide mobile learning opportunities
6. Support student wellness through accommodation of physical, mental, and emotional needs

Instructor / department responsibilities and issues

- Course redesign
  - Create the modes that don’t exist yet (e.g., online synchronous and asynchronous course activities)
  - Modify course materials for low-resolution digital display
  - Ensure equity between the different modes in activities, assignments and assessments so that each shares equal rigor and content.

- Student orientation to new model (Blankson et al. 2014 held 6 separate orientation sessions for a 22-student section)

- Technology survey and monitoring. Many instructors have an aide (TA or LA) to handle online chat during synchronous lectures, (Julien, 2019)

- Special focus on attendance (Many faculty complain: “I was lecturing to an empty classroom” Chin-yen Liu, personal communication, July 16, 2021)

- “Faculty also have to manage a multimodal learning environment with three participation modes, deal with a heavier workload, ensure a reliable and productive student-instructor interaction, and assess students’ learning progress regardless of the learning mode they choose” (Naffi, 2020)

- Instructors of labs, studio based courses, recitations, and seminars face specific and challenging obstacles to multi-modal delivery (HyFlex Research Summary, 2021), (Gobeil-Proulx, et al. 2019), (Mirzaie & Griffy, 2016),

- Coordination across multiple campus units is essential. Particularly between the registrar, upper administration, the online learning unit, and departments. (Hinck & Burke, 2019)

- “Our greatest obstacle to implementation: finding and developing faculty to support this model across an entire curriculum or degree program.” (Hinck & Burke, 2019), (G. Hink, personal communication, July 21, 2021)

Design, Implementation, and Instructional Strategies for Success with HyFlex Learning

- Many US universities and colleges experimented with a Flex approach Fall 2021. Much can be learned from their experiences and much info will come out in the next year that could be useful to our efforts. Much of the information for this report was received from faculty and staff working on these pilots. Schools such as: University of Nevada, Las Vegas (UNLV), Northern Arizona University, California State Universities, Florida State University).

- Offer faculty incentives for development: stipends, additional paid hours, course offsets, faculty course development grants, limiting enrollment in sections, and paying faculty to facilitate any additional sections. (HyFlex Research Summary, 2021; Hinck & Burke, 2019)

- Leverage instructor COVID experiences with online teaching, resource development and LMS usage.

- Build courses within the online learning management system organized into an eight-module course shell with two live sessions per module with two attendance choices: F2F & Asynchronous. Online to begin. Add synchronous online as needed (Rhoads, 2020)

- Utilize LMS functionality to facilitate the streamlining of grading, organization of course content, student-student and instructor-student communication (HyFlex Research Summary, 2021)

- In addition to lecture capture, produce short, targeted videos expanding on key concepts and muddiest points (Binnewies, et al., 2019)
● Incorporate TA or LA support for monitoring / responding to sync and async online chat and forums (Gobeil-Proulx, et al., 2019), (Hinck & Burke, 2019)

● Robust use of polling software and chat as well as assistance conducting and monitoring both (Miller et al. 2013, Julien, 2019)

● Journaling and other reflective activities (Binnewies and Wang, 2019)

● “Course organization with weekly flexible-synchronous activities, which included regular opportunities for interaction and were video-recorded, fostered student engagement and supported them in their learning.

● The most effective strategies were open and trustful interactions for behavioral engagement of students, links with practice and learning support for emotional engagement, (Emotional engagement refers primarily to students’ sense of belonging in the course). as well as links with practice, learning support and instructor’s facilitation role for cognitive engagement.” - As represented by the instructional strategies observed below (Heilporn, et al., 2021)

● Be very intentional about supporting chat and interactions with remote students in the synchronous streaming environment. Here are best practices (Weisman,T., UNLV, Personal communication 12/09/21):

1. Be proactive - the classroom assistant or individual responsible for the chat should be initiating contact with remote students and not waiting for them to simply add to the chat or provide responses

2. Plan your interactions - just as you would in an in person classroom, have questions or activities planned that require the remote students to engage in the chat or breakout sessions

3. Set ground rules - make it clear from the start that there is an expectation of participation for the online students, similar to how you would expect in person students to participate

4. Maintain contact - try to ensure that there is a continuous flow of contact including checks for understanding, questions about what was discussed or reviewed, etc.

5. Treat them like in person students - just because they are online, especially if you have the technology similar to RebelFlex classrooms, the online students have the very similar abilities to participate in discussions and interactions as in person students. Promote that high level of engagement and interaction via chat, breakout sessions, and ongoing classroom discussions.

6. Use Technology - Google docs/sheets/slides and products like Jamboard are assets to your online classroom and can help online students integrate into the fabric of the classroom much more seamlessly if they are working on shared documents that are visible to all students.

Interaction with Student Demographics

Only one article examined differences in achievement between men and women in a flexible learning model (Snelgrove et al., 2020). It found that the course success rate for women in online instruction was significantly lower than in BlendFlex and F2F modes. No articles examined interactions with other traditionally marginalized populations.

Challenges with the Question

As was the case for comparing Hybrid learning with F2F instruction, it is a difficult task given the number of confounding variables. In addition, as Binnewies and Wang note in their 2019 paper: “Having received widespread recognition only recently, little research on the effectiveness of HyFlex exists to date”. The majority of the papers found addressed qualitative variables such as student satisfaction and engagement. Few actually address student learning and performance.

Another complication in comparing the efficacy of the different HyFlex (or any multi-modal model) modes
involves the enhancements developed for one mode are commonly utilized by the other modes; Lecture capture video being the most common enhancement that ends up being used across modes.

References with Notes


- The purpose of this study was to examine graduate student perspectives on HyFlex Learning.
- The study consisted of a qualitative analysis of: Six F2F interviews with students, class observations, recordings of class meetings, students’ course work, and relevant online course artifacts.
- The paper highlights the alignment between HyFlex learning and the Andragogy theory of learning, thus giving HyFlex credence through this alignment with educational theory and the literature.
- The authors identified three areas their findings pointed to for further study:
  - Use of HyFlex in large undergraduate courses
  - Impact on student learning and achievement
  - Comparison study between F2F and online student learning engagement


- “One of the persistent questions that DE, OL, and BL [Distance Education, Online Learning, and Blended Learning] research literature has focused on during the course of the late twentieth century and now into the twenty-first century involves comparisons of these emerging patterns of instruction with CI (e.g., Abrami & Bernard, 2006; Bernard et al., 2004). On the surface it is a natural question that presumably was intended to help educators decide whether or not to invest time, energy, and finances in a move toward what was considered to be a controversial way of delivering education (i.e., separating the teacher and student in space and/or time). But a closer inspection reveals severe problems with the research question itself—there are many confounds that cannot possibly be disentangled. For instance, if DE and CI are levels of the independent variable, is it possible for pedagogy (e.g., methods and materials) to be held constant? The two instructional patterns invariably require different teaching methodologies, depending on the medium of communication used to bridge the distance. If instructor is held constant (i.e., the same instructor in both conditions), is it likely that this teacher will have equal proficiency in each approach? Even if different instructors are selected based on qualifications relevant to the pattern used, there is a confound with levels of the treatment. Clark (e.g., 1983, 1994) has frequently exposed these flaws, many of which cannot be overcome, even with an impeccable design. The question always remains, “What makes the difference?”—the distance, the medium, the instructional method, the teacher, or some complex combination of all or some of these? From a scientific perspective, this kind of question (i.e., DE vs. CI [Classroom]) is as inappropriate as it is outdated. However, from a practical perspective, a substantial number of professionals may still need at least some form of an answer to this question.”

- “For now, we can suggest the following answers to general questions based on this review of 15 meta-analyses. Do DE and OL work compared to CI? Yes, modestly, but there is so much variability that it is hard to provide an unqualified recommendation. BL appears to work marginally better, with the expression “the best of both worlds” sometimes used to explain this. Can DE and OL be improved significantly? Yes, certainly, but so can CI. How can DE and OL and/or CI be improved? These meta-
analyses do not tell us that and they cannot—it is the question that is the problem. The difficulty with this question is that we are setting CI as the standard to which DE and OL should aspire. DE and OL, and CI are not opposites—both have pros and cons, appropriate and inappropriate applications, and should be investigated separately.”


- This study examined a HyFlex IT course with the following questions in mind:
  - What methods can be employed to ensure equity and enhance engagement in a practice-oriented HyFlex course?
  - What are students’ perceptions on the choice and implementation of these methods?
- They encountered two issues regarding equity in their study:
  - Finding equivalent practical content for both online and F2F. They had labs which were hard to duplicate online.
  - Providing timely support for students in the practical aspects of the course
- Increased and equitable engagement across different learning modes
  - Reflective Questions – Used Vizia to embed Q’s into lecture vids
  - Learning Journals: low stakes, up to 10 entries
  - Practice: identical, scaffolded labs
- Results:
  - Majority of students found video lectures most helpful in their learning (these were short videos recapping important topics as opposed to “in-person lecture recordings“)
  - Piazza discussion board was useful but, not overwhelmingly used: 65% visited the forum, 22% contributed
  - Learning Journals were utilized and popular
  - No noticeable difference in grades between f2f and online students
- Further study: Closer look at student choices of modality. Closer look at the use of different teaching methods, strategies.


- This study focuses on three items related to HyFlex learning: Student choice, Student experience, and Level of student satisfaction.
- Mixed methods study where students completed an online survey and responded to a structured interview protocol.
- Heick 2012 identifies six types of blended models: “Face-to-face Driver (content mostly delivered traditionally), Rotation (students rotate between online and traditional content on a fixed schedule), Flex (content delivered online with traditional sessions provided as needed), Online Lab(sessions offered online at a traditional location), Self-Blend (students choose to take online course to supplement traditional learning), and Online Driver (lessons delivered mostly online with some voluntary or mandatory traditional applications)”.
The authors cite two studies that support the idea that Flexible learning can improve student performance, they acknowledge that empirical data is needed. The idea is supported by theory, not data.

The section of 22 started split 12 f2f and 10 online. By the middle of the term 2 students were f2f and 20 were online.

Asynchronous mode consisted of recorded lectures only.

Results:

- Student choice driven by: Flexibility, weather conditions, convenience.
- 71% appreciated the choice to blend on a class by class basis
- Student experience generally favorable with caveats
- Students particularly liked dealing with assignments, exams online and interacting via online forums
- Technology issues were common
- Students felt there was equity between modes of teaching/learning
- High level of satisfaction (95%)
- A properly designed HyFlex course offers: 1. Active learning 2. Freedom of choice 3. High levels of satisfaction

Study limitations

- Small sample size
- Students were all in service teachers
- No student performance data


- 311 students in 9 HyFlex courses responded to a survey regarding their experiences and preferences.

Research Questions:

- What are the factors that influence a student's choice to take a co-modal course?
- What are the comments made by students about co-modal training?
- How does student satisfaction vary in co-modal lessons depending on the type of training and teaching strategies deployed?
- Which mode do the students choose according to the type of training offered and the strategies of teaching deployed?
- Does the method chosen by the students influence their perception of the chances of success?

Three major findings emerged:

- Students like the format (95%, the students say they are completely or somewhat satisfied with the format)
- Most students chose distance learning (60% of students didn’t enter classroom during semester)
- Students tended to stay with the modality they began with (28% changed modes during semester)

The authors acknowledge that traditional lecture courses lend themselves to HyFlex as opposed to smaller, seminar style courses, labs, or studio courses which pose particular challenges.

Instructors had an aid to respond to the online chat except for the smallest sections

Negative comments were overwhelmingly related to technology and access during remote synchronous sessions.

- This study examined the implementation of a variety of engagement strategies into a HyFlex, large enrollment, graduate level business course and asked the following research questions:
  - According to students’ perceptions, what components of a HyFlex course modality are related to student engagement?
  - What are effective instructional strategies for fostering the behavioral, emotional and cognitive engagement of students in a HyFlex course?
- Initially students completed an open-ended questionnaire on their perceptions of engagement. Then students completed mixed open-ended and closed questions with a 5-point Likert scale for rating engagement and their perceptions of the engagement strategies used.
- Results
  - Components of HyFlex related to engagement:
    - Weekly HyFlex sessions
    - Organization of the course
    - Level of interaction – student to student and student to instructor
    - Class session recordings
    - Consistency of group work structure: students worked with same team all year
  - Correlations between instructional strategies and engagement. Summary of Table 3:
    - Course organization with weekly flexible-synchronous activities, which included regular opportunities for interaction and were video-recorded, fostered student engagement and supported them in their learning.
    - The most effective strategies were open and trustful interactions for behavioral engagement of students, links with practice and learning support for emotional engagement (i.e: sense of belonging), as well as links with practice, learning support and instructor’s facilitation role for cognitive engagement.

- Business school leadership interested in supporting instructional innovation. A finance instructor agreed to try HyFlex in an undergrad course. Model was expanded based upon this experience. This article describes this process.

- Moving the entire MS in Business Analytics to HyFlex was proposed. Few faculty were interested due to the demands for updating the asynchronous online materials.

- Instructor materials for FINC321

<table>
<thead>
<tr>
<th>Technology</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>SmartBoard</td>
<td>Display PowerPoints and allow live annotation</td>
</tr>
<tr>
<td>Zoom</td>
<td>Highly interactive virtual conferencing tool</td>
</tr>
<tr>
<td>Panopto</td>
<td>High quality video recording of class lectures</td>
</tr>
<tr>
<td>VoiceThread</td>
<td>Content and video creation / sharing tool</td>
</tr>
<tr>
<td>Proctorio</td>
<td>Online proctoring service ensuring exam integrity</td>
</tr>
<tr>
<td>Canvas LMS</td>
<td>Organizes and helps ease use of technology</td>
</tr>
</tbody>
</table>

- Provost has supported this work with faculty course dev grants, though no formal directives have come down.
- TwoTA’s were hired to assist with technology and chat monitoring.
Learning modes:

Learner Choice

<table>
<thead>
<tr>
<th>Live in Classroom</th>
<th>Live Remotely via Zoom</th>
<th>Asynchronously Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participate in live lecture</td>
<td>Participate in live lecture</td>
<td>View recorded lecture</td>
</tr>
<tr>
<td>Participation points through Class Discussion</td>
<td>Participation points through Class Discussion</td>
<td>Participation points through VoiceThread Discussion</td>
</tr>
<tr>
<td>Same Homework</td>
<td>Same Homework</td>
<td>Same Homework</td>
</tr>
<tr>
<td>In-class Exams</td>
<td>Online Proctored Exams</td>
<td>Online Proctored Exams</td>
</tr>
<tr>
<td></td>
<td>Same Day</td>
<td>Same Day</td>
</tr>
</tbody>
</table>

Coordination across multiple campus units was essential. Particularly between the registrar, upper admin, online learning, departments.

Asynchronous online was the preferred mode for students.

Greatest Challenge: finding and developing faculty to support this model across an entire curriculum or degree program.


This study examines student satisfaction and learning outcomes in a HyFlex course.

“Four groups of students are compared according to the mode they chose: face-to-face, online synchronous, online asynchronous and hybrid” N=376

Q’s: Is satisfaction the same regardless of mode chosen? Is academic performance the same regardless of mode chosen, based upon results of: Multiple choice test, written exam, continuous assessment.

Results: No sig diff in satisfaction between any of the groups. No sig diff in grades on multiple choice and written exam scores between modes. There was a significant difference between different modes and continuous assessment. Synchronous online outperformed asynchronous online among a sample size of 376 students in an undergraduate management information systems course.


The study evaluates the impact of HyFlex learning on student performance.

Texas A&M San Antonio COB has offered HyFlex sections since 2013.

Research questions asked: 1. Does the trend of class attendance change over time in the HyFlex course offered by Texas A&M University – San Antonio? 2. Is there a correlation between student attendance
The relationships between student performance and their decision on mode of “attendance” were examined. The authors found no significant differences between students' performance across modes.

Compares attendance options from various blended and HyFlex studies:

Table 1  Preliminary comparison with the previous studies on attendance option

<table>
<thead>
<tr>
<th></th>
<th>Attend class in person</th>
<th>Attend the class online synchronously</th>
<th>Attend the class asynchronously via posted recording</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>HyFlex by A&amp;M – San Antonio</td>
<td>X (100%)</td>
<td>X (100%)</td>
<td>X (100%)</td>
<td>Bernard et al. (2004), Beatty (2008), Kyei-Blankson and Godwill (2010), Kyei-Blankson et al. (2014)</td>
</tr>
<tr>
<td>HyFlex model</td>
<td>X (100%)</td>
<td>X (100%)</td>
<td></td>
<td>Scherrer (2011), Farley et al. (2011), McGee and Reis (2012), Bowen et al. (2013)</td>
</tr>
<tr>
<td>Hybrid</td>
<td>X (50%)</td>
<td>X (50%)</td>
<td></td>
<td>Scherrer (2011), Farley et al. (2011), McGee and Reis (2012)</td>
</tr>
<tr>
<td>Blended online</td>
<td>X (50%)</td>
<td>X (50%)</td>
<td></td>
<td>Martinez-Caro and Campuzano-Bolarin (2011), Farley et al. (2011), McGee and Reis (2012), Bowen et al. (2013)</td>
</tr>
<tr>
<td>Traditional</td>
<td>X (100%)</td>
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Primarily Non-traditional students were taking this course

Limitations of the study:

- Degree of presence of both online modes not monitored.
- Random reasons for changing attendance mode ignored. All changes assumed to be due to decline in academic performance in the course.
- Assumed that f2f and synchronous did not watch lecture videos.

Future Directions

- Does HyFlex model produce a unique individual learning curve and contribute to autonomous learning compared to f2f courses
- Do different online meeting technologies yield differences in levels of effectiveness of the model
- Does the role of technology influence the HyFlex model's adoption and success with decision makers, instructors, and students.

- “Findings/Results: The meta-analysis found that, on average, students in online learning conditions performed modestly better than those receiving face-to-face instruction. The advantage over face-to-face classes was significant in those studies contrasting blended learning with traditional face-to-face instruction but not in those studies contrasting purely online with face-to-face conditions.”
- “Conclusions/Recommendations: Studies using blended learning also tended to involve additional learning time, instructional resources, and course elements that encourage interactions among learners. This confounding leaves open the possibility that one or all of these other practice variables contributed to the particularly positive outcomes for blended learning. Further research and development on different blended learning models is warranted. Experimental research testing design principles for blending online and face-to-face instruction for different kinds of learners is needed.”
- The meta-analysis findings do not support simply putting an existing course online, but they do support redesigning instruction to incorporate additional learning opportunities online while retaining elements of face-to-face instruction. The positive findings with respect to blended learning approaches documented in the meta-analysis provide justification for the investment in the development of blended courses.
- Cases in which all or substantially all of the instruction on the content assessed in the outcome measure was conducted over the Internet were categorized as “purely online,” whereas those in which 25% or more, but not all, of the instruction on the content to be assessed occurred online were classified as “blended.”
- In this study, blended learning did not necessarily involve any reduction in traditional face-to-face time or resources.
- Only studies of web-based learning have been included (i.e., eliminating studies of video- and audio-based telecourses or stand-alone, computer-based instruction).
- Only studies with random-assignment or controlled quasi-experimental designs have been included to draw on the best available evidence.
- All effects have been based on objective and direct measures of learning (i.e., discarding effects for student or teacher perceptions of learning, their satisfaction, retention, attendance, etc.).
- The types of learners in the studies in the meta-analysis were about evenly split between students in college or earlier years of education and learners in graduate programs or professional training. The average learner age in a study ranged from 13 to 44.
- No conclusion/data regarding student demographics.


- Four research questions: 1. How does the effectiveness of online learning compare with that of face-to-face instruction? 2. Does supplementing face-to-face instruction with online instruction enhance learning? 3. What practices are associated with more effective online learning? 4. What conditions influence the effectiveness of online learning?
- Limit the search to studies of Web-based instruction (i.e., eliminating studies of video- and audio-based telecourses or stand-alone, computer-based instruction); Include only studies with random-assignment or controlled quasi-experimental designs; and Examine effects only for objective measures of student learning (e.g., discarding effects for student or teacher perceptions of learning or course quality, student affect, etc.).
A systematic search of the research literature from 1996 through July 2008. Studies that (a) contrasted an online to a face-to-face condition, (b) measured student learning outcomes, (c) used a rigorous research design, and (d) provided adequate information to calculate an effect size. 

51 independent effects were identified that could be subjected to meta-analysis. On average, students in online learning conditions performed better than those receiving face-to-face instruction; the difference was larger in those studies contrasting conditions that blended elements of online and face-to-face instruction with conditions taught entirely face-to-face. Blended conditions often included additional learning time and instructional elements not received by students in control conditions. This finding suggests that the positive effects associated with blended learning should not be attributed to the media, per se.

Most of the variations in the way in which different studies implemented online learning did not affect student learning outcomes significantly. Analysts examined 13 online learning practices as potential sources of variation in the effectiveness of online learning compared with face-to-face instruction. Of those variables, (a) the use of a blended rather than a purely online approach and (b) the expansion of time on task for online learners were the only statistically significant influences on effectiveness. The other 11 online learning practice variables that were analyzed did not affect student learning significantly. However, the relatively small number of studies contrasting learning outcomes for online and face-to-face instruction that included information about any specific aspect of implementation impeded efforts to identify online instructional practices that affect learning outcomes.

The search encompassed the research literature on K–12 education, on career technology, medical and higher education, as well as corporate and military training. The most common subject matter was medicine or health care. Other content types were computer science, teacher education, mathematics, languages, science, social science, and business.

The effectiveness of online learning approaches appears quite broad across different content and learner types. Online learning appeared to be an effective option for both undergraduates (mean effect of +0.35, p < .001) and for graduate students and professionals (+0.17, p < .05) in a wide range of academic and professional studies.

Studies in which analysts judged the curriculum and instruction to be identical or almost identical in online and face-to-face conditions had smaller effects than those studies where the two conditions varied in terms of multiple aspects of instruction (+0.20 compared with +0.42, respectively). Instruction could differ in terms of the way activities were organized (for example as group work in one condition and independent work in another) or in the inclusion of instructional resources (such as a simulation or instructor lectures) in one condition but not the other.

No mention of student demographics.


Instructors redesigned an Intro to Macro Econ course (600+ students) in HyFlex modes. Effort was supported by a grant from their distance and e-learning office and their ID’s. Two main goals:

- Use tech to give students more learning choices
- Reduce course logistical load to allow more student focus

Strategies to attain goals:

- Flexible lectures – In person or streamed
- Redesign of the LMS side of course to QM standards by IDs
“Offer new problem-solving options for students”
  ▪ Revised the existing problem sets to encourage even more consistent interaction among students.
  ▪ Refined TA role to more of an LA role
  ▪ Low stakes weekly online quizzes & biweekly mastery auto-graded problem sets

- Online quizzing allowed more recitation time with students (quizzes usually happen in Rec)

- HyFlex recitations of 35-40 students didn’t work, and aren’t recommended.
  - HyFlex modes didn’t facilitate consistent groups.
  - Online group work on documents was cumbersome
  - It required significant additional effort, and it had both low participation and negative student evaluations

- Results
  - Students used the various modes

Table 1. Attendance Breakdown

<table>
<thead>
<tr>
<th>Category</th>
<th>Autumn 2014</th>
<th>Autumn 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>High attendance, in class</td>
<td>144</td>
<td>38</td>
</tr>
<tr>
<td>High attendance, online</td>
<td>63</td>
<td>16</td>
</tr>
<tr>
<td>Low attendance, in class</td>
<td>140</td>
<td>36</td>
</tr>
<tr>
<td>Low attendance, online</td>
<td>37</td>
<td>10</td>
</tr>
</tbody>
</table>

- Grades: “found no statistically significant difference in grades among those who primarily attended online versus in class. This suggests that students are appropriately self-sorting into the correct learning option, resulting in similar scores among high attenders”

- Student Satisfaction:
  - 85 percent agreed that "having course lectures available to me via Adobe Connect helped me learn,"
  - 80 percent agreed that "instructional technology used in this course helped me learn,"
  - 77 percent agreed that "listening to recorded lectures helped me to understand the concepts better," and
  - 75 percent agreed that "the use of [student response] to ask questions during lectures helped me learn."

- Online quizzes:
  - Majority of students took the quizzes
  - Total quiz grade and total exam grade positively/significantly correlated

- This article reports on a 5 week experiment in the HyFlex model in an undergraduate social welfare policy course.
- Qs:
  1) Given the opportunity to participate in various modalities, will students' preferences for different instructional modalities change?
  2) When given an opportunity to participate in a HyFlex blended learning course, will students blend varying modalities to meet their unique and changing needs?
  3) When given a choice of modality, which format will students actually select?
  4) What benefits and challenges did students experience with each modality?
  5) What are students' overall attitudes toward HyFlex blended learning?

- Results:

<p>| Table 3. Correlation between quiz completion, quiz grade, and total exam grades |
|---------------------------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Autumn 2014</th>
<th>Spring 2015</th>
<th>Autumn 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation: number of quizzes completed and total exam grades</td>
<td>0.2705***</td>
<td>0.3787***</td>
</tr>
<tr>
<td>Correlation: total quiz grade and total exam grades</td>
<td>0.4627***</td>
<td>0.5419***</td>
</tr>
</tbody>
</table>

- Most students (61%) felt the rigor/quality of online was equal to F2F
- “Overall, students expressed a positive view toward the HyFlex model and felt it yielded favorable results.”

- Article examines the setup and testing of a modified HyFlex design in large enrollment undergraduate classroom (two modes: sync online and f2f + lecture capture videos).
- One Pilot section along with two Control sections made up the study
- Only required f2f attendance were recitations and examinations
- Results show no negative impact on overall learning or individual grades due to the HyFlex model

- Students enjoyed the flexibility and choices and the integration of technology
- Students overwhelmingly felt the IT increased their participation (Poll Anywhere, Adobe Connect, clickers)
- Most students stated they would prefer the f2f lecture with enhanced IT to other modes:

  ![If given a choice, I would most likely attend](image)

  - online lectures. 38%
  - face-to-face lectures that use instructional technology. 57%
  - face-to-face lectures that have limited to no use of instructional technology. 5%

- For Future Research:
  - Better ways to monitor attendance
  - Better ways to develop classroom climate/community
  - Better technology: lecture capture/streaming, student response, “back channel” chat, “main channel” chat.
  - Better way to monitor all chats – currently it takes two people in the classroom to manage the technology


(The Hyper-Flexible Course Design Model (HyFlex): A Pedagogical Strategy for Uncertain Times)

- Author examines her 26 student graduate Ed Tech course which uses the HyFlex model
- As with other authors, she encountered tech problems throughout the semester.
- She thought that having an “Owl 360” camera would have solved some of the tech issues
- Conclusion: “this design involves certain challenges that need to be considered when it is first adopted. For instance, effective Internet connections and stable bandwidth are necessary for students to engage synchronously. Another challenge is the additional workload involved in designing and developing different learning paths and in supporting students and facilitating their learning regardless of the path they choose. For faculty members who adopt this approach, it is demanding”
Top 5 tips for design of HyFlex:

1. Design your course as if it will be solely facilitated asynchronously. Once this is done, gradually add synchronous and in-class elements to create optional paths. Two things to remember: 1) the pandemic has augmented inequity and digital divide as never before. Not all students will be able to access classes synchronously, and no one should be penalized for failing to do this; and 2) the HyFlex course design model is a complex one, so give yourself permission to experiment the first time you venture into it and to learn from any unforeseen miscalculations;
2. Accept that technology is unreliable. It can break down. Make sure to alert the students and to reassure them as of day one that if this happens during a synchronous meeting you will figure out a plan B to make sure their learning experience is not affected by technical issues or lack of access;
3. Include asynchronous activities that will foster a sense of belonging to a community of learners. Discuss the difference between a conversation and a monolog in a forum, be explicit when it comes to quality versus quantity in asynchronous discussions and explain the difference between engagement and last-minute posts;
4. Facilitating inclusive, equitable and quality learning through different modes requires effective and efficient collaboration, both between students and faculty, and among students themselves. Empower your students to become proactive, to have a voice, to take control of their learning experience, and make them aware of the importance of supporting those who struggle.
5. Above all, listen to your students and be attentive to their requirements and needs and to the solutions they might come up with. Their formative feedback could give you great insight on what works and what should be avoided, especially in uncertain times.

- Like RebelFlex (see UNLV citation below), NAUFlex allows students to access a synchronous classroom stream.
- Appears to be tight LMS connection: The course activities, assignments, and assessments are loaded into the LMS, so students across modes are accessing the same materials.
- Posting of lecture capture recommended to faculty
- Appears to be a Fall 2021 pilot
- Student engagement is supported by using:
  - Polling sites or smart phone apps
  - Google Docs for real time collaboration
- No repetition of class sessions
- recommend rotating attendance between f2f and remote
- Faculty Toolkit provided

- “In the current study, we provide a systematic review of meta-analyses on the variables associated with achievement in higher education.” “In our systematic literature review, we included 38 meta-analyses investigating 105 correlates of achievement, based on 3,330 effect sizes from almost 2 million students.”
- “The results highlight the close relation between social interaction in courses and achievement. Achievement is also strongly associated with the stimulation of meaningful learning by presenting information in a clear way, relating it to the students, and using conceptually demanding learning tasks.
Instruction and communication technology has comparably weak effect sizes, which did not increase over time. Strong moderator effects are found for almost all instructional methods, indicating that how a method is implemented in detail strongly affects achievement. Teachers with high-achieving students invest time and effort in designing the microstructure of their courses, establish clear learning goals, and employ feedback practices.”

- “Which characteristics of students, teachers, and instruction are associated with higher learning outcomes than others?”

- In an older synthesis of meta-analyses (not higher ed, not online vs. hybrid vs. F2F), Wang, Haertel, & Walberg, 1993b created “a rank order of six broad groups of variables according to the strength of their association with student achievement. The strongest association was found for (a) student aptitude followed by (b) classroom instruction and climate, (c) home and community educational contexts, (d) curriculum design and delivery, (e) school demographics and organization, and (f) state and district characteristics.” (Note demographics is not high on the list. This is not directly the purpose of this current lit review on hybrid ed, but it is some indication that demographics might not be a key variable in how effective hybrid courses are.)

- Finding: Blended learning ranks #52 out of 105. Blended learning “Instructional conditions in which at least 50% of total course time is face-to-face [classroom instruction,] and students working online outside of the classroom spend the remainder of [the] time [. . .] online” (Bernard, et al. 2014). Online learning ranks #88 out of 105 (Means, et al. 2013).

- Purpose of study: Examine academic performance in a BlendFlex model at a large (~6000 students/term) two-year tech college in Georgia compared to F2F and online learning.
- The mechanics of how the BlendFlex model was implemented was not described.
- Research Questions: 1. Were there any differences in course success rates between BlendFlex, face-to-face and online instructions? 2. Was gender a significant factor influencing course success rates between BlendFlex, face-to-face and online instructions?
- 2749 students enrolled in a Math course were divided:

<table>
<thead>
<tr>
<th>Delivery Method</th>
<th>Male</th>
<th>Female</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>BlendFlex</td>
<td>49 (27.5%)</td>
<td>129 (72.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>FTF</td>
<td>543 (36.6%)</td>
<td>941 (63.4%)</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Online</td>
<td>274 (25.2%)</td>
<td>812 (74.8%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Total</td>
<td>866</td>
<td>1882</td>
<td>1</td>
</tr>
</tbody>
</table>

Online students’ grades were significantly lower than BlendFlex or F2F. No significant difference between BlendFlex and F2F.
- There were no significant differences in course success rates for male students between BlendFlex, face-to-face and online instructions.
- The course success rate of online instruction for female students (50.5%) was significantly lower than BlendFlex (65.9%) and face-to-face instructions (64.2%).
- The course success rate of BlendFlex was higher than the other two instructions for all student.
- The course success rate of online instruction was significantly lower than BlendFlex and face-to-face instructions.

• Authors selected items from the College Student Opinion Survey to measure student perceptions of teaching presence in BlendFlex vs. F2F and online instruction
• Perceptions were significantly higher in BlendFlex than either of the other learning/teaching modes. The intuitively obvious take away: “The results showed that the student perception scores of teaching presence were significantly higher in face-to-face instruction than online instruction for all survey questions.”

UNLV IT Classroom Tech. “RebelFlex.” UNLV Information Technology, April 21, 2021.
• Fall 2021 Pilot Program: A set of faculty are volunteering to teach this way
• 2 set sections: one synchronously online, one f2f (no “flex” other than this)
• No online course fee
• plans for technology borrowing and discounted home internet service
• Provide a Planning Template

Old, peripheral, or cited but not reviewed
Baran, E., Correia, A.P., & Thompson, A. (2013). Tracing successful online teaching in higher education: voices of exemplary online teachers. Teachers College Record, 115(3).


Bogdan, David R. “Combining Asynchronous and Synchronous Distance Learning to Simulate a New ‘Blended’ Classroom,” 2020, 12.


https://www.dropbox.com/s/ab51t2rwdjnn32f/HyFlex%20Research%20Summary%202021-03-01%20Complete.pdf?dl=0.