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Perceptions of Hyflex in Genetic Counseling Training

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PERCEPTIONS OF HYFLEX LEARNING IN GENETIC COUNSELING TRAINING

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ABSTRACT

The COVID-19 pandemic necessitated rapid shifts in educational methodologies, notably the adoption of the Hybrid-Flexible (HyFlex) model in higher education. This model combines in-person, real-time online, and recorded class participation options, offering students multiple modes of participation that cater to diverse needs and preferences. This study investigates the perceptions and experiences of genetic counseling students regarding the HyFlex model to understand its implications on educational outcomes and student well-being. A qualitative study was conducted with 30 participants from the Joan H. Marks Graduate Program in Human Genetics at Sarah Lawrence College who experienced the HyFlex model between 2020 and 2024. Data were collected through semi-structured interviews and analyzed using thematic analysis with the aid of Dedoose software. The study identified three major themes: Implementation and Experience of the HyFlex Model, Student Adaptation and Engagement, and Educational Outcomes and Student Well-Being. Key findings highlight the model's flexibility and adaptability to individual student needs but also reveal challenges in maintaining social connectivity and ensuring consistent technological integration. The study also gathered feedback and recommendations from both current and previous students to inform future enhancements to the HyFlex model. These contributions emphasized the need for improved communication strategies, enhanced technological support, and more inclusive community-building efforts. The HyFlex model demonstrated significant potential in accommodating diverse student needs by providing various participatory options. However, it also presented challenges in social interaction and technological efficacy. These findings suggest that while the HyFlex model can enhance educational accessibility, robust technological support and strategic interventions are crucial to foster community and enhance engagement to fully realize its benefits.

Keywords: Hyflex, flexible learning, graduate school, genetic counseling education

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Background

The onset of the COVID-19 pandemic in March 2020 marked a critical juncture for higher education worldwide, prompting a swift pivot to alternative instructional models to maintain academic continuity amidst unprecedented global health challenges. The HyFlex model, blending 'hybrid' and 'flexible' learning, surfaced as a significant adaptation during this period, offering a nuanced approach that merges face-to-face teaching with online components. This model grants students the autonomy to engage with their courses in a manner that best suits their individual circumstances, preferences, and safety considerations, embodying an instructional strategy that is both adaptable and student-centered (Beatty, 2007; 2019).

This educational shift was propelled by the urgent need to transition to online and remote learning environments, driven by social distancing mandates and a commitment to community well-being (Centers for Disease Control, 2022). The HyFlex model's capacity to accommodate varied learning scenarios made it a particularly attractive option, supported by an array of Learning Management Systems (LMS) like Brightspace, Blackboard, and Google Meet, which enabled the seamless integration of synchronous and asynchronous learning experiences (Fathema, Shannon, & Ross, 2015; Raza et al., 2021).

Nonetheless, the implementation of the HyFlex model was met with its own set of challenges, including technological hurdles, diminished peer and instructor interactions, and increased demands on student self-discipline and motivation (Amir et al., 2020; González-Ramírez et al., 2021). Despite these obstacles, the model was well-received for its flexibility, offering students the freedom to tailor their learning experiences and engage with course materials on their terms (Eduljee et al., 2023).

As the post-pandemic era ushers in ongoing changes in higher education, the lessons gleaned from the deployment of the HyFlex model underscore the critical importance of robust technological support, comprehensive digital pedagogy training, and an acknowledgment of the diverse needs within the student population. These insights highlight the potential for innovative educational models to foster enhanced accessibility, engagement, and academic outcomes, charting a course for future advancements in teaching and learning strategies.

Introduction

In the evolving landscape of higher education, the HyFlex model has emerged as a transformative educational strategy, enabling students to choose between in-person, real-time online, or recorded class participation. This approach, designed to accommodate diverse learning preferences and life circumstances, has garnered significant attention, especially highlighted during the COVID-19 pandemic as a resilient teaching method. Its promise of enhanced accessibility and adaptability makes it a focal point for investigation, particularly within specialized fields such as genetic counseling programs. This research sets out to explore the experiences and perceptions of students engaged in these programs, aiming to shed light on how the HyFlex model impacts their educational journey. This study seeks to contribute meaningful insights into the effectiveness of the HyFlex approach in genetic counseling graduate training, providing guidance for educators and institutions navigating the complexities of contemporary higher education.

Methodology

This study uses a qualitative research design to explore the experiences and perceptions of current students and recent graduates regarding the HyFlex educational model. This approach was chosen to gain in-depth insights into participants' personal experiences, attitudes, and reflections, which quantitative methods may not fully capture. By focusing on qualitative methods, the research aims to understand the complex dynamics of students' interactions with the HyFlex model, including the nuances of their learning experiences, challenges faced, and the strategies employed to navigate their educational environments.

Data Collection Methods

The primary data collection method for this study involves semi-structured interviews conducted with a purposive sample of 30 individuals recruited from one genetic counseling graduate program. These participants are either current students or recent graduates who have engaged with the HyFlex model between the years 2020 and 2024. To accommodate participants' schedules and geographical locations, interviews were conducted via Zoom, following an interview guide developed as part of the research protocol. This guide ensures that all interviews maintain a consistent structure while allowing for the exploration of topics that emerge spontaneously during the conversation. Each interview is recorded with the participants' consent and then transcribed upon completion to facilitate detailed analysis.

Data Analysis

The transcribed interviews were analyzed using Dedoose (Sociocultural Research Consultants, 2024), a software tool designed for qualitative data analysis. This process begins with open coding the transcriptions, a step that involves identifying and categorizing key phrases, ideas, and topics mentioned by the participants. Coding allows for the systematic

organization of the data, enabling the researcher to identify patterns, themes, and relationships within the dataset.

Following the initial coding, a thematic analysis is conducted to distill overarching themes from the excerpts derived from the codes. This analysis seeks to uncover the underlying concepts and narratives that characterize participants' experiences with the HyFlex model. The thematic analysis is iterative, requiring repeated reviews of the data to refine the themes and ensure they accurately represent the participants' perspectives (Peel, 2020).

Ethical Considerations

This research adheres to strict ethical guidelines to protect the dignity, rights, and welfare of all participants. Prior to conducting the interviews, participants were provided with detailed information about the study's purpose, the nature of their involvement, and the confidentiality measures in place to safeguard their privacy. Informed consent was obtained from each participant, emphasizing their right to withdraw from the study at any point without penalty. The consent form can be found in Appendix C.

All interview data is anonymized, with identifiers removed to ensure participants' confidentiality. The study's methodology, including the recruitment process, informed consent procedure, and data handling practices, received approval from Sarah Lawrence College's institutional review board in January 2024. This approval confirms that the study meets the ethical standards required for research involving human subjects, ensuring that the research is conducted responsibly and with integrity.

Recruitment Process

A total of 108 current and previous students across four graduating classes (2022, 2023, 2024, and 2025) were contacted via email. These specific classes were targeted because they

represent the genetic counseling cohorts that experienced the HyFlex system at Sarah Lawerence College, starting with the class of 2022, which was the first to be fully immersed in the HyFlex model due to the adjustments necessitated by the COVID-19 pandemic.

The recruitment email, which can be found in Appendix B, detailed the study's purpose, what participation would involve, and the voluntary nature of their involvement.

Participant Demographics

Out of the 108 students contacted, 30 students agreed to participate in the study. The distribution of participants from each class year was as follows: 6 from the class of 2022, 5 from the class of 2023, 10 from the class of 2024, and 9 from the class of 2025.

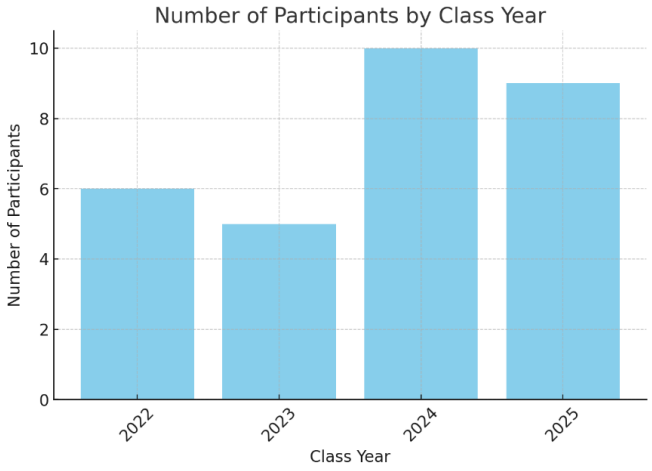

Chart 1 – Participants by Class Year

Results

The study encompassed a diverse group of 30 current and recent students from one genetic counseling program reflecting on their experiences with the HyFlex model's implementation and impact. The participants, varying in enrollment status from the class of 2022 to the class of 2025, provided a wide lens on the HyFlex model's execution and reception. Their

insights were distilled into three overarching themes, each with associated subthemes, capturing the multifaceted nature of hybrid-flexible education:

Theme 1: Hyflex Model Implementation and Experience

- Theme 1a Technological Integration and Usability
- Theme 1b Flexibility and Accessibility
- Theme 1c Social Connectivity and Community Building

Theme 2: Student Adaptation and Engagement

- Theme 2a Learning Style and Preferences
- Theme 2b Self-Discipline and Responsibility
- Theme 2c Instructor Support and Engagement

Theme 3: Educational Outcomes and Student Well-Being

- Theme 3a Academic Performance
- Theme 3b Emotional Well-being and Support

Emerging Theme: Suggestions for Improvement

- Enhanced Communication and Clear Expectations
- Standardized Training and Technological Enhancements
- Equitable Activity Design and Chat Engagement
- Accessibility of Educational Materials
- Adaptive Course Delivery
- Interactive Engagement Tools

Theme 1: HyFlex Model Implementation and Experience

This theme delves into the overarching structure and procedural nuances of the HyFlex model, focusing on its execution and how it was received by students and faculty.

Theme 1a Technological Integration and Usability

Participants discussed the varying degrees of technological integration within their years at Sarah Lawrence, pointing out the significant reliance on digital tools for the HyFlex model's success. The emphasis was on the necessity for reliable technology and instructors' proficiency with these digital resources. Technical challenges were common, yet many appreciated the technological solutions that facilitated a smoother learning experience.

> *"It depends on the instructor that's trying to set things up. God bless her but [the instructor] cannot set up a Zoom to save their life. So, we had a couple of classes that she said would be recorded but then weren't recorded because they forgot. Most of the classes have been doing pretty well, especially the ones that [staff] pops in on and fixes the zoom. But certain classes don't work out so hot."*
>
> *"A pattern that I noticed was a challenge with speakers and there being delays in our classes. Because they struggle with setting up technology or utilizing the technology in the physical classroom setting. I rarely notice those issues with classes that were only virtual."*

Many participants noted that mixed modalities often had the most technological issues, with those online or attending asynchronously suffering the most – potentially negating the benefits of a HyFlex environment.

> *" I attend asynchronously some classes, and in the recording, I can't hear what someone is saying. Or it's super choppy. I remember one class the instructor was writing something on the board, and it was super unclear, and the recording was very choppy. I gave up, I told myself I'm not going to finish this recording. I'm just going to get notes from someone else."*

Theme 1b Flexibility and Accessibility

The adaptability of the HyFlex model to meet diverse student needs was highlighted, especially for those juggling health concerns, work commitments, and personal responsibilities. Participants valued the model's ability to provide options that catered to their unique circumstances, allowing for an educational experience that respected their personal lives and schedules.

> *"Yeah, I think it was really helpful. There were a couple of times, where my cousin got married and I had to go take an extra day or two off of school to go fly to the wedding. And I was still able to attend class live which was really nice to be able to do that virtually."*

While many participants only attended in person and did not utilize the online or asynchronous aspects of Hyflex, they still appreciated its presence.

> *"I do appreciate it. I wouldn't say it's too high on my priorities list, but I do kind of like that it's like a safety net that I can fall back on say I can't go to class one day or if I'm sick, it's nice to have the option to stay home and be able to experience class online."*

Recent graduates in particular noted valuing HyFlex more upon reflection after completing their education.

> *"I think looking back on it, I would have been more in trouble if there wasn't Hyflex at the school, because Hyflex did allow me to join stuff virtually when personal circumstances came up."*

Theme 1c Social Connectivity and Community Building

Hyflex's impact on social relationships and community dynamics was often commented upon. Some participants felt the model enabled interactions and allowed for conversation through different mediums.

> *"I feel like I have better conversations when I'm in person on campus, but it's nice being able to have conversations via zoom."*

Others noted the challenges in maintaining a cohesive community feeling, with the potential for fragmentation in student relationships due to some individuals being online or asynchronous.

> *"I think we would be a lot closer if class was only in person because in person, you know, you have all these moments just for small talk. Especially in the way that our classes are structured where it's two hours and you typically have a little bit of a break in between. That's a way to get closer with people and just talk about each other's weekends or days and that can help build those bonds. When people are online, they're not doing that with other people online. You just mute so I feel like it negatively hinders that sense of community overall."*

Some participants attributed an extra layer of technology as the reason why it is more difficult to interact with peers in a Hyflex environment.

> *"There's definitely a handful of people I've seen way less in person and that has impacted my social interactions with them. It sometimes feels like a burden to include one virtual person if the majority of your group is together in person. You can't move as quickly. It's inconvenient when you're like looping one person in and then there's breakout rooms and there's so much to coordinate and people are talking over each other because you're already in that room. It definitely impacts social interactions with certain people."*

Several participants suggested that the mixed modality inherent to Hyflex is what caused a disconnect within their cohorts. This was discussed in all the cohort years that were interviewed.

> *"I think some classes should be all in person and some classes be all virtual or virtual should be an option solely for the purpose of students who are unable to attend in person."*
>
> *"I don't think the Hyflex model is as conducive to those social interactions and peer learning. You know, kinda like becoming a cohesive cohort? I don't think it does as well as being in person or alternatively everybody being on zoom."*

Theme 2: Student Adaptation and Engagement

Exploring students' personal journeys within the HyFlex model, this theme covers the learning strategies they employed and the obstacles they encountered.

Theme 2a Learning Style and Preferences

Individual learning preferences, including the choice between in-person and remote participation, were discussed. Participants reflected on how these preferences aligned with their personal learning styles and how the HyFlex model accommodated or challenged these preferences. Many participants indicated a strong preference for being in person synchronously to minimize distractions and interact with their peers.

> *"I think everybody has their own personal learning style. I get really distracted when I'm at home. I'm on my phone, I'll do other things. It's hard when I'm remote in class. I think it helped me focus to be in person."*
>
> *"I prefer in person. I really appreciate having the other options available, but I feel that I learn most effectively when it's in person. If it's virtual, I already know I'm not paying quite as much attention, just because my mind tends to wander more. And knowing that*

they can't necessarily see me on alternate tabs or not paying so much attention makes it harder for me to force myself to focus."

Having the option of being asynchronous with recordings was viewed as a benefit because it let individuals, especially those that are neurodivergent, go at their own pace with the material.

"I really liked being able to rewatch the lectures. That's a huge benefit of it. I like being able to pause to take notes. I am a handwritten note person. Being able to pause the lecture, go at my own pace, take notes on it. And then a big part of my studying would be to rewatch all of the lectures and fill in any gaps in my notes that I might have missed while in person."

And some participants opted for being asynchronous due to extenuating circumstances, not basing the decision on learning style at all.

"I did my entire first year asynchronously. And it was really nice because I actually had the ability to work full time during the day and just do my classes at night. So that model worked really well."

Theme 2b Self-Discipline and Responsibility

The importance of self-regulation and proactive learning environment management was a focal point. Participants noted the necessity for heightened self-discipline to navigate the HyFlex model effectively.

"I appreciated the flexibility [Hyflex] provided. But I also think it kind of put me in a tough spot sometimes of my own doing, of not watching lectures earlier because I knew that they were there sitting for me. So that was a little tough."

"I think you have to put in effort. You know, if you're going to choose to be remote, you still have to make the effort to engage. You can't just turn on the screen and check out… I

think if you do well with an online kind of learning style and you put the effort in, I think you'll get the same benefits as in person."

Individuals with an awareness of self-directed learning reported enjoying the freedom that Hyflex offers, while many noted this as a potential pitfall.

Theme 2c Instructor Support and Engagement

The role of instructors in supporting an inclusive and engaging learning environment was emphasized. The need for instructor preparedness to adapt to both in-person and online formats was identified as key to student engagement.

"I feel like maybe the HyFlex environment allows professors to be more virtual, which makes them harder to reach. Because when you're in person, you can obviously just go to their office and ask some questions. But it's a bit harder to get them to answer emails."

"You know, the people on Zoom, I think we're often neglected and not really checked in on as much if there was an in-person activity in the class. It just kind of felt like there wasn't as much focus or monitoring of the chat, for example. The burden was placed on the students to do that rather than the person leading the class.

At times, student engagement is very directly affected by a professor's technological competence and willingness to engage with those who are attending in different ways.

"I think sometimes it's how much the instructor has bought into the model, I would say. I think there are times when you're online and you're completely disregarded, not engaged at all."

Theme 3: Educational Outcomes and Student Well-being

This theme examines the perceived impacts of the HyFlex model on academic achievements and emotional well-being.

Theme 3a Academic Performance

Discussions around academic performance under the HyFlex model revealed mixed experiences. The accessibility of asynchronous resources was praised for enhancing learning, though distractions associated with remote learning posed challenges for some. Many participants reported feeling like their learning outcomes improved because of the flexibility and accessibility that Hyflex provided.

> *"I would often attend the lectures in person and then watch the asynchronous recording later. And I think that really, really enriched my learning and made it a lot easier for me."*
>
> *"I think the fact that I had access to the asynchronous recordings benefited my learning and my studying techniques. I also think I overall felt more supported by the school with the fact that they understood that I can't go every day or that I have to go back [home] sometimes for family reasons, etc."*

Several participants reported feeling like the Hyflex environment had no effect on their learning outcomes.

> "*I don't feel like it made a huge difference for me because I was still attending mostly in person. But for the days that I did miss, like for a [religious] holiday or if I was sick, I utilized the remote or asynchronous options. I think that having the Hyflex model was beneficial. But I'd still prefer an in person traditional modality."*
>
> *"It didn't really affect me. I mean, the option was there, and I could use it if I wanted to, but I never had the desire. So, it didn't affect me."*

Participants reported feeling that the Hyflex environment potentially altered their social relationships negatively, but of the 30 interviewed, none reported feeling like their learning outcomes were affected negatively directly because of the Hyflex environment.

Theme 3b Emotional Well-being and Support

The flexibility offered by the HyFlex model was seen as beneficial to students' emotional well-being, accommodating personal circumstances, and reducing long term stress after graduate school.

> *"My grandma was sick in the hospital, so I had to go home… multiple times in the first semester. And throughout that I was able to join class virtually and they also let me do [a] test virtually. That was what was really helpful for me."*

The ability to utilize remote options freely also made several participants feel better about job prospects as they were able to secure clinical rotations near the areas where they were from or where they wanted to end up working.

> *"I felt well supported. I knew I was going to come home… to work here. And it was important to me to have placements… that would let me work in that system. It's easier to get jobs when you have that connection. I proposed the idea to come back and do half a semester at home and was able to because of the remote and asynchronous options."*
>
> *"I think overall I appreciate it. My… rotation is in [another state], so I will be appreciating the Hyflex model this spring semester because I will be fully remote, based in specialty clinics, maybe participating asynchronously sometimes. I appreciate the flexibility it provides in terms of the other aspects of our education. I think the first year I found it more frustrating sometimes, but now I feel better about it."*

One participant noted that the Hyflex environment more accurately matches the current genetic counseling landscape, in which genetic counselors often see patients through different modalities. Entering the workforce after experiencing a Hyflex environment was an easier transition than it would have been otherwise.

> *"I think that it's necessary, you know, it's become part of society, right? Like almost every job that I've had or all of my friends' jobs are these hybrid models now where people work. A little bit remote and a little bit in person and so I think schooling should mirror that. It helps to have already experienced that. I think that the learning process should keep up and should really be similar to what we're all going into."*

Emerging Theme: Suggestions for Improving the Hyflex Model

Throughout the assessment of the HyFlex model's effectiveness in the Human Genetics Program at Sarah Lawrence College, students provided feedback on what they feel could improve the Hyflex experience. The core areas for enhancement, distilled from student input, revolve around improving communication, elevating technological proficiency, ensuring instructor readiness, and fostering inclusivity in educational engagements. The recommendations for these improvements are detailed as follows:

Enhanced Communication and Clear Expectations

Participants stated that establishing explicit guidelines in course syllabi about attendance protocols, online participation rules, and the accessibility of asynchronous resources would be helpful. They believe that clear communication could alleviate confusion about the protocol for notifying instructors of changes in participation mode.

> *"Going forward, if we keep this system, it would help if each course set clear standards in the first week that could be adjusted as needed. This would make sure everyone knows*

how to interact in the HyFlex model. For example, some instructors engage with the chat for interaction, but others don't. Communication rules don't have to be the same across all classes, they just need to be clear."

"I would say that the syllabus for each class should set clear expectations for what students need to do if they have to miss a class, need to attend online, or need to complete work asynchronously. For example, should they notify the instructor or not? Sometimes I was left guessing whether I should send an email or not bother. Including this in all the syllabi would be helpful."

Standardized Training and Technological Enhancements

Participants expressed a need for uniform training for instructors, focusing on the effective delivery of HyFlex courses. This standardized training could cover techniques for improving audio quality, managing Zoom efficiently, and using interactive tools to foster student engagement. Participants also suggested conducting dry runs to anticipate and rectify setup issues. Software and hardware used within the Hyflex environment could also be standardized to promote a more inclusive learning environment.

"Yeah, I feel like all the instructors should have uniform training on how to run an optimal HyFlex class. Maybe at the beginning of each semester, there could be a review session on how to enhance audio quality for a class, or how to effectively use microphones and speakers. It might be helpful to have something like a Zoom check-in or just a refresher on using Zoom."

Equitable Activity Design and Chat Engagement

Crafting educational activities that engage both in-person and online attendees equally was highlighted as important. Participants also suggested designating someone to monitor chat interactions would ensure that online participants are integrated into the discourse.

> *"I think it would be helpful if we used something like Poll Everywhere, like I did in undergrad. Stuff like that keeps everyone engaged because we can see everyone's opinions without having to wait your turn to speak. Using interactive tools like that would make it easier for everyone to communicate and participate in quizzes or activities."*

> *"Having someone present whose job is just to make sure that everything is set up would be good. So, it's not on the class or the instructor to make sure everything's going well. I think that's one layer that could help, just having someone who's maybe like a HyFlex coordinator, making sure everything's working while monitoring the chat."*

Accessibility of Educational Materials

Participants noted extending the availability of lecture recordings on easily accessible platforms could aid in continuous learning. A centralized repository for these resources could significantly benefit students for review and reference purposes beyond the course duration.

> *"I'm a practicing genetic counselor now, but I've noticed the zoom recordings from my time as a student have all expired. I think they should be available for an extended period after we graduate or on a drive where they don't expire. I think that would really help with continued learning and act as a useful resource."*

Adaptive Course Delivery

Several participants suggested that choosing between hybrid, entirely in-person, or online delivery modes should depend on the specific content and objectives of each class. Some subjects, particularly those requiring high levels of interaction, may not be well-suited to a hybrid approach, indicating the necessity for adaptable delivery strategies based on educational requisites.

> *"I'd say, if the goal is to make the HyFlex environment fully accessible and effective for all modes of delivery, then it's important to consider what content suits each mode best. Sometimes it's better to be in person, sometimes it's better to be online, and sometimes a recording works just fine. Doing all of them at once leaves too much room for error."*
>
> *"I think if people were more open to modern technology, being online synchronously or asynchronously would be a better alternative for a lot of the material we learned. Forcing an in-person modality just because it's how things were traditionally done hampers the Hyflex experience."*

Discussion

The investigation into the HyFlex model within genetic counseling education aimed to unravel how this teaching strategy affects technological integration, student engagement, flexibility, social connectivity, and communication. This inquiry is set against the backdrop of the dramatic shifts in educational practices triggered by the COVID-19 pandemic, marking a significant contribution to the discourse on flexible learning environments.

Student adaptation and engagement within the context of the HyFlex model is indicative of the HyFlex model's capacity to offer a spectrum of engagement options—ranging from in-

person attendance to synchronous online participation and asynchronous content access. According to the feedback from participants in our study, these modalities are vital in accommodating diverse learning styles, preferences, and life circumstances. For instance, participants noted, “the flexibility to choose how to attend class depending on life circumstances takes off a lot of pressure on learning.” This highlights the model's potential to democratize access to education by accommodating a diverse student body. However, these findings also indicate a critical point: the mere presence of multiple learning options does not automatically translate into effective learning or enhanced student engagement. As one participant expressed, “just because we have different ways of attending doesn't mean they’re all equal. It’s harder for me to be asynchronous because you can’t ask questions or engage directly.” This indicates the success of these options is contingent upon students' willingness and ability to engage proactively with the chosen format. Active engagement – characterized by participation in discussions, timely completion of assignments, and interaction with peers and instructors – emerges as a pivotal factor in maximizing the educational benefits of the HyFlex model. This requires students to not only select the learning modality that best suits their needs but also to adapt their study habits and engagement strategies to thrive within that modality.

Self-discipline and responsibility within the context of the HyFlex model bring to the forefront the role of student initiative and self-management in the successful navigation of flexible learning environments. Participants in this study described the need to marshal their resources, including time management, organizational skills, and self-motivation, to utilize the full potential of the HyFlex model's offerings (Athens, 2023). This echoes the sentiments found in the broader educational literature which posits that the autonomy afforded by flexible learning environments, while liberating, also demands a heightened level of self-discipline from learners

(Zimmerman, 2000). The emphasis on self-discipline and responsibility highlights the reality that the effectiveness of the HyFlex model is contingent not just on the technological infrastructure or the pedagogical strategies employed by instructors, but significantly on the students' capacity to self-govern their educational journey. This includes setting a structured schedule for attending or reviewing lectures, dedicating specific times for study and coursework, and seeking out interactions with peers and instructors to enrich their learning experience. Participants in this study discussed needing to create a sense of accountability for their own education, through either study schedules or study groups, thereby creating internal or external pressures to engage with the material. Moreover, the imperative for proactive engagement highlights the importance of students taking the initiative to actively participate in their learning process, whether by contributing to discussions, seeking clarification on complex topics, or collaborating with classmates on projects. Such engagement is critical not only for the acquisition of knowledge but also for the development of a sense of belonging within the academic community, which can be challenging to foster in a hybrid-flexible learning environment (Beatty, 2019).

Regarding social connectivity, this study found mixed impacts of the HyFlex model on community building. While the HyFlex model presents a paradigm shift towards accommodating diverse learning needs and preferences, it inadvertently poses challenges to the traditional dynamics of community building. Participants navigating the HyFlex model experienced tiered levels of social connection, with some indicating difficulty in developing the same depth of relationships that might emerge more naturally in a fully in-person setting. This finding echoes broader concerns within the academic literature about the potential for online and hybrid learning models to dilute the strength of social ties that are pivotal to the collegiate experience (Amir et al., 2020), suggesting a critical need for educational strategies that intentionally bridge this gap.

The disparity in experiences among students is particularly pronounced between those attending in person versus those participating online or asynchronously. In-person students often benefit from direct, spontaneous interactions that foster a sense of community and belonging, whereas online and asynchronous students may feel isolated, missing out on the informal social interactions that occur naturally in physical settings. The mixed modality inherent in the HyFlex model, while offering unparalleled flexibility, may inadvertently segment the student body, creating unequal and separate experiences. As reported by many of the participants in this study, this division can inhibit the social interactions and shared experiences that contribute to a sense of belonging and community cohesion, aspects of student life known to positively impact academic success and personal well-being (Walton & Cohen, 2011). Many of the participants in this study reported preferring in person attendance due to the opportunity to interact with their peers, ultimately increasing their willingness to engage with the material.

The efficacy of the HyFlex model in delivering a high-quality, flexible educational experience hinges significantly on instructors' technological proficiency and their ability to integrate various teaching modalities—synchronous, asynchronous, in-person, and online (Eduljee et al., 2023). This study underscores the importance of comprehensive instructor training in digital tools to address challenges like poor audio quality and video conferencing setups, which can disrupt the learning process and alienate remote participants. Echoing Beatty (2007) and Eduljee et al. (2023), these findings highlight the need for technological readiness and a deep understanding of leveraging technology to engage students, facilitate collaboration, and assess performance effectively across participation modes. To further enhance student engagement and sense of belonging, it is necessary to integrate adaptive activities that cater to diverse student needs and promote inclusivity. This could involve using technology to

personalize learning paths, provide various interaction opportunities, and ensure all students, whether remote or in-person, are fully integrated into the classroom dynamics. Instructors' preparedness and adaptability are also crucial in maintaining the HyFlex model's inclusive ethos, ensuring all students feel valued and motivated regardless of their participation format. This involves not only a mastery of content and pedagogical skills, but also fluency in the technological tools that underpin HyFlex learning, underscoring the pivotal role of instructor competence in the model's success.

Clear communication about the HyFlex model's logistics and expectations emerged as a crucial theme as well. Consistent with the broader academic view (Raza et al., 2021), transparency and consistent information dissemination are essential to ensure all students, irrespective of their participation mode, are well-informed. Participants reported that their ability to reap the benefits of the HyFlex model was significantly influenced by the clarity of information provided. Several participants stated that detailed schedules and explicit instructions on how to engage with different learning modules enhanced their educational experience. Conversely, areas where communication was lacking, such as inconsistent updates on class changes or unclear expectations for asynchronous participation, were frequently cited as sources of frustration and confusion. The clarity with which institutions articulate the operational aspects of this model, from how and when classes will be available online to the expectations for in-person attendance, directly impacts students' ability to make informed decisions about their learning path.

The flexibility offered by the HyFlex model stands out as a critical feature that resonates deeply with contemporary educational needs. Participants in this study highlighted the model's capacity to accommodate their diverse and evolving circumstances—from varying work

schedules and personal health concerns to differing learning preferences—as a pivotal advantage. Such adaptability is crucial in today's educational landscape, where traditional, one-size-fits-all approaches are increasingly recognized as insufficient. According to González-Ramírez et al. (2021), this emphasis on flexibility is vital for fostering an inclusive and accessible learning environment. Our study's findings mirror this perspective, with many participants appreciating the HyFlex model's ability to meet their individual needs. However, they also noted challenges, particularly in maintaining high levels of student engagement and ensuring the quality of education, issues that are echoed in the literature (González-Ramírez et al., 2021). The HyFlex model, by offering multiple modes of participation, risks diluting the immersive experience of learning, as participants reported feeling less compelled to engage actively with course content and peers. This dispersion of attention, spread across in-person, online live, and asynchronous modes, necessitates innovative pedagogical strategies to ensure educational outcomes are not compromised. The challenge, then, as supported by both our participants' experiences and academic research, lies in developing and implementing methods that not only preserve but also enhance student engagement and learning quality within this flexible framework.

Reflections on academic performance and emotional well-being under the HyFlex model provide nuanced insights into its impacts, contributing to the broader discussion on the efficacy of flexible learning models in contemporary education. This study's findings suggest that while the HyFlex model offers adaptable learning experiences tailored to individual circumstances, enhancing student well-being and academic success, these benefits are not universally experienced. Students appreciated the option to engage with course material in multiple formats—such as in-person, online synchronous, and asynchronous—which allowed them to manage their studies more effectively, aligning with their personal learning styles and external

commitments. This flexibility alleviated the stress associated with rigid scheduling and empowered students to take control of their learning process, potentially leading to improved academic outcomes. However, it also emerged that this flexibility could have a disruptive impact by decreasing connection to classmates, as the varied modalities sometimes led to fragmented interactions. Specifically, students noted that while the freedom to choose their mode of engagement was liberating, it often resulted in fewer opportunities for social connection and collaborative learning. Therefore, while the HyFlex model facilitates a balance with competing commitments through its inherent flexibility, it also necessitates additional strategies to mitigate the potential isolation that can arise from less frequent face-to-face interactions.

Conclusion

This study has illuminated the complexities and nuances of implementing the HyFlex model in genetic counseling education. While the HyFlex model has demonstrated significant potential in enhancing educational accessibility and flexibility to accommodate diverse student needs and preferences, challenges in technological integration, student engagement, and maintaining a cohesive learning community have emerged as significant barriers to its effectiveness. These findings echo the broader discourse on flexible learning models, contributing new insights by considering the specific context of genetic counseling education.

Multiple points are highlighted by this research: the critical role of instructor technological proficiency, clear communication, and the need for pedagogical strategies aimed at fostering active participation and engagement. It emphasizes the HyFlex model's capacity to support student well-being through adaptable learning experiences tailored to individual circumstances. This discussion has clearly demonstrated the need for innovative approaches

within this flexible learning framework, not only to sustain social connectivity and community cohesion but also to foster students' self-management of learning.

Limitations

The scope of this study, focusing on the experiences within a single academic program, presents limitations in terms of generalizability. The insights gained are deeply informed by the specific institutional culture, technological infrastructure, and student population of the program under investigation. Future research could expand the inquiry to include a broader range of academic disciplines and institutional contexts, exploring how different configurations of the HyFlex model affect educational outcomes and community dynamics. Additionally, longitudinal studies could provide valuable data on the long-term impacts of HyFlex learning on student success, professional preparedness, and emotional well-being.

Investigating the efficacy of specific technological tools and pedagogical strategies within the HyFlex framework could also offer practical guidance for educators seeking to optimize this model. As higher education continues to evolve in response to technological advancements and societal challenges, this study's findings contribute to the ongoing conversation about creating more inclusive, flexible, and effective learning environments.

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Appendix A: Interview Protocol

Introduction (5 minutes)

- **Welcome and Introduction**: Briefly introduce yourself and the purpose of the study.
- **Informed Consent**: Prior to the interview, send the consent form to participants. At the beginning of the interview, confirm if they have read the consent form. Invite any questions they might have regarding the form or the interview process. Then, obtain verbal consent to proceed with the interview.
- Define Hyflex, and other methodologies (in person vs online only)

Interview Questions (30-40 minutes):

1. **Background Information:**
    - Did you know about Hyflex at Sarah Lawrence prior to applying?
    - What was your initial impression of the HyFlex model when you first encountered it?
    - Please describe your experience with the HyFlex model in your educational setting
        - ⇨ How long have you been participating in or teaching HyFlex courses?
2. **General Experience:**
    - Can you describe a typical day or session in a HyFlex class from your perspective?
3. **Technology and Resources:**
    - What role does technology play in your experience with the HyFlex model?
        - ⇨ Factors – LMS platform, AV issues, internet requirements, teacher tech skills
    - Have you encountered any technological challenges or limitations? If so, how did you address them?
4. **Instructor and Peer Interaction:**
    - How would you describe your interaction with instructors in the HyFlex environment?
    - How would you describe your interaction peers in the HyFlex environment?
    - What, if any, are the notable differences in these interactions compared to other learning formats?
5. **Support and Resources:**
    - What resources or support do you wish were available to support your learning in a Hyflex environment?
    - How do you see your instructors using Hyflex to help you learn?
    - What approaches do instructors use that hinder how you learn in a Hyflex environment?
6. **Flexibility and Choice:**
    - **In what ways has the HyFlex model accommodated your personal or academic needs?**
    - How important is the flexibility aspect of the HyFlex model to you?
    - What, if any, are the factors that influence how you choose to engage in learning in a Hyflex environment?
7. **Engagement and Participation:**
    - Can you share how you engage with in class activities in the HyFlex setup?

    - What challenges, if any, have you faced in maintaining engagement in this learning environment?
8. **Learning Outcomes:**
    - How has the HyFlex model impacted your learning outcomes compared to traditional or online-only formats?
    - Can you share any specific instances where the HyFlex model particularly helped or hindered your learning?
9. **Suggestions for Improvement:**
    - Based on your experience, what improvements would you suggest for the HyFlex model?
    - Are there any specific aspects of the model you think should be reevaluated or enhanced?
    - What suggestions would you give to students or instructor to enhance their engagement of Hyflex learning?
10. **Future Prospects:**
    - How do you see the role of the HyFlex model evolving in the future of education?
11. **Personal Reflection:**
    - What has been the most significant benefit and the biggest challenge of the HyFlex model for you?
    - Is there anything else about your experience with the HyFlex model that you would like to share?

Conclusion (5-10 minutes)

- **Final Thoughts**: Is there anything else you think I should have asked?
- **Thank You and Next Steps**: Thank them for their participation, explain the next steps, and how their input will be used.
- **Debriefing**: Offer to answer any questions they have about the study.

Appendix B: Recruitment Message

Subject: Invitation to Participate in a Study on the HyFlex Model in Genetic Counseling Education

I am conducting research on the HyFlex model, which combines in-person and online learning for flexibility, in the Human Genetics Program at Sarah Lawrence. This model is used in all classes in the human genetics program. The purpose of this study is to explore students' experiences and perceptions of the HyFlex model, and its impact on their learning journey.

Any current student or recent graduate from the Joan H Marks program of Human Genetics from 2022 to 2025 can participate. Your participation would involve a confidential interview via Zoom, lasting approximately 45 to 60 minutes, where you will have the opportunity to share your experiences and insights as a student at Sarah Lawrence College engaging with the Hyflex model of instruction.

Your input will be invaluable in understanding the efficacy of HyFlex, its impact on learning, and potential improvements for its implementation. This study adheres to strict confidentiality protocols, and your responses will be used solely for research purposes.

If you are interested in participating or have any questions, please feel free to reach out to me. Schedule an interview here and I will send you an informed consent form to review.

Upon completion participants will receive a $25 gift card.

Thank you for considering this opportunity to contribute to the advancement of educational methods in genetic counseling. Your experiences and opinions are extremely valuable.

Looking forward to hearing from you.
Best regards,

Andy Peralta

Appendix C: Consent Form

SARAH · LAWRENCE · COLLEGE

Examining the Perceptions of HyFlex Learning in Genetic Counseling Training
Investigator: Andy Peralta
Email: aperalta@gm.slc.edu
Phone: 347-858-1409
Sarah Lawrence College, 1 Mead Way, Bronxville, NY 10708

I am asking you to take part in a research study at Sarah Lawrence College. Please read through the following questions and responses and ***ask any other questions*** that will help you to decide whether or not to participate.

What is the purpose of this study?

- The purpose of this study is to explore students' perceptions of the HyFlex model of learning – a flexible approach that combines in-person, online, and hybrid teaching methods – and its effects on their education.

Why am I being asked to participate?

- You are being asked to participate because you are a student who has attended a genetic counseling program that uses a Hyflex method of instruction.

What will I be asked to do?

- You will be asked to complete one interview lasting between 45 minutes to 1 hour. This interview will involve a series of questions about your experience as a student in a Hyflex environment.
- The interview will take place through Zoom and will be recorded and transcribed. The recordings will be used solely for research purposes and will be confidentially stored.

Is my participation voluntary?

- Your participation in this study is entirely voluntary, meaning you have the freedom to opt out at any stage without any consequences. Choosing not to participate or withdrawing from the study will not affect your relationship with Sarah Lawrence College in any way. Additionally, you have the right to skip any specific questions you do not wish to answer without providing a reason for doing so.

Are there any benefits or risks associated with my participation in this study?

- There are no direct benefits and minimal risks related to participating.

Will I be compensated for my participation?

- You will not be compensated for participating.

Will the information I provide be kept confidential?

- We will take several steps to protect your confidentiality, including saving transcripts without identifying information and deleting recordings after they have been transcribed. We will also ensure confidentiality in all reports. Only the research team will access your data, stored securely on the researcher's personal computer.

If I have any questions or concerns after the study, how can I contact you?

- The student leading the research can be contacted at 347-858-1409 or aperalta@gm.slc.edu.

- The faculty member advising the research is Claire Davis, and can be contacted at 914-395-2605 or cdavis@sarahlawrence.edu

Who can I contact if I have questions about my rights as a research participant?

- The IRB co-chairs Professors Elizabeth Johnston (203-722-3287) and Claire Davis (914-395-2605) at irb@sarahlawrence.edu.

Please indicate with your signature on the space below that you understand your rights and voluntarily agree to participate in the study.

_____ _____

Signature of Participant Date

_____

Print Participant Name

_____ _____

[NAME], Investigator Date

[Include if applicable.] Please indicate with your signature on the space below that you understand your rights and voluntarily agree to have your participation in this study audio- and/or video-recorded.

_____ _____

Signature of Participant Date