A Critical Case Study:

The Implementation of Hyflex at the College of New Caledonia

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Educational Technological Change Case Study

In this case study, we will examine an event of technological displacement, specifically the implementation of HyFlex delivery at the College of New Caledonia (CNC) in 2021. This shift represented a transition from traditional face-to-face instruction to an educational model that utilizes technology to offer three simultaneous learning options: in-person, synchronous online, and asynchronous online.

The Tipping Point

The College of New Caledonia (CNC) is a public community college situated in Prince George, BC. It has six regional campuses that serve a large area of northern BC, covering approximately 117,500 square kilometers—about 12% of the province. CNC provides education and training for students in various fields, including health sciences, trades and technologies, social services, business, and university studies (CNC Institutional Report, 2023. p 6).

In late 2020, the VP Academic tasked the IT department and the Centre for Teaching and Learning (CTL) with leading a HyFlex project to enhance access to education for students on campus (D. Lampron, personal communication, October 23, 2024). This technology would displace the traditional classroom technology such as whiteboards and PowerPoint presentations and align with the academic plan driven by the Covid-19 pandemic, which underscored the need for physical distancing and online learning options (CNC Academic Plan, 2022, p. 9-10). Like many educational institutions, CNC transitioned to primarily online instruction during this time, highlighting the possibilities and feasibility of these options for both students and faculty.

IT and CTL decided to initiate the HyFlex project with two prototype rooms located next to each other, drawing heavily on resources and best practices from Columbia University. Faced with a tight deadline of September 2021 implementation, a limited budget, and constrained resources (they could not change room layout as the facilities department was not involved), they outfitted these rooms with technology to support HyFlex delivery (D. Lampron, personal communication, October 23, 2024).

Each room was equipped with a camera focused on the speaker and another on the students. To enhance functionality, they invested in a whiteboard camera that digitized everything the instructor wrote. Video conferencing equipment, including a second computer dedicated to Zoom calls, was added. The system featured a touch panel for easier camera switching, annotation screens for interactive drawing, and ceiling-embedded speakers and microphones for improved audio quality. (Appendix, Figures 1-4).

Several courses were piloted over the course of 1 semester using three volunteer faculty from the Human Services, University Transfer and Business Studies (HUB) department. CTL organized workshops to train these faculty on the new equipment and created best practices documentation. They also conducted evaluations, including surveys for students and faculty, and held workshops to gather feedback and insights from instructors (M. Ray, personal communication, October 25, 2024).

Building on the relative success of the initial prototype rooms, CNC decided to expand the HyFlex delivery model by outfitting an additional eight rooms (CNC Funding, 2022, p. 4). This expansion aimed to enhance access to education and provide more flexibility for students (CNC Institutional Report, 2022, p. 22). The Registrar's office actively supported this expansion by sending emails from the administration encouraging all faculty to incorporate multiple delivery modes into their course offerings, including Hyflex (Appendix, Figure 6).

At this stage, several challenges with HyFlex delivery began to emerge. While faculty were encouraged to undergo training for this delivery format, it was not mandatory. Most training sessions occurred during the summer, and many faculty members chose not to attend. Consequently, many struggled with the technology and did not adjust their curricula to accommodate the different learning modalities. Additionally, there were limited opportunities to practice with the necessary technology, as classrooms were often occupied throughout the day (M. Ray, personal communication, October 25, 2024).

CNC did not invest in HyFlex technology to the same extent as other universities. For instance, they did not equip each desk with a microphone, provide a second screen or

projector to display online participants during sessions, or provide dedicated on-site tech support. As a result, the system lacked the integration necessary for effective HyFlex delivery and left faculty responsible for learning the technology independently and managing their classrooms (M. Ray, personal communication, October 25, 2024). Additionally, the system was prone to minor glitches requiring rebooting, further complicating the teaching process.

Institutionally, HyFlex delivery was not clearly defined, which allowed it to be used as a catch-all term for various types of non-in-person teaching. This lack of clarity resulted in unintended applications. For example, in some classes, instructors taught remotely via Zoom while all students were physically present in the classroom, without anyone available to manage the technology (D. Lampron, personal communication, October 23, 2024). Additionally, the college did not adjust class schedules, leaving only five minutes between classes. This brief interval was insufficient for faculty to set up the necessary technology and materials, adding to the stress of delivering their courses in this format.

Designing a curriculum for the three modalities of HyFlex is time-consuming. Faculty who participated in training often found that they couldn’t simply replicate their in-person instruction. Unfortunately, they were not given additional preparation time to adapt to this new format. As a result, those who succeeded typically had to invest a considerable amount of their own time to make the necessary adjustments.

These factors contributed to a growing negative reputation for HyFlex among faculty, leading many to avoid or abandon the format, even when it was listed in the course calendar. Students voiced numerous complaints about unmet needs (D. Lampron, personal communication, October 23, 2024). Ultimately, the expected accessibility and convenience of HyFlex delivery were not realized. Currently, only one faculty member in the entire college continues to use this teaching modality regularly (M. Ray, personal communication, October 25, 2024).

Examining through the lens of usability

Usability refers to methods for improvement during the design process and is an attribute used to assess the ease at which interfaces are utilized (Nielsen, 2003, as

cited in Issa & Isaias, 2015). Analyzing usability allows designers to create tools that work well for the user (McCready, 2024). In education, if usability is not applied to the user's context and purpose, the pedagogy will become less effective, as it can lead to a misalignment between the teacher's intention and the student's purpose (McCready, 2024). The implementation of Hyflex technology at CNC involved two user groups – the educator utilizing Hyflex as a classroom tool and the student using Hyflex to access course material. This section will focus on the human computing interaction (HCI) between the CNC educators and Hyflex technology.

"HCI is a discipline focusing on design, evaluation and implementation of interactive computer systems" (Issa & Isaias, 2015, p. 22). To achieve a safe and user-friendly system, organizational, environmental, health, and safety, as well as user and comfort factors, must be considered (Issa & Isaias, 2015). Focusing on the user/usability is essential to HCI's success because a frustrated user will fail to use the technology (Issa & Isaias, 2015, p. 22), making the technology futile. Independent variables, including system functions, user characteristics and task characteristics, influence the user's reaction to the system, thus determining whether there is a positive or negative outcome (Issa & Isaias, 2015). CNC's primary focus was on that of the system, failing to identify and involve a specific user group in the design process. Instead, they sought volunteers to participate rather than determining which curriculum and pedagogy might best suit the technology and involving those users in the design process. Involving the user during the building and implementation of a new system is critical to the development process and success of a successful HCI (Issa & Isaias, 2015).

The second critical dimension of HCI development involves evaluation (Issa & Isaias, 2015). Designers and users must work together to ensure effective and efficient systems (Issa & Isaias, 2015). Although CNC did seek feedback from the volunteers involved in the initial Hyflex implementation, there was no standardized method for gathering feedback. This hindered understanding of the challenges instructors faced and the development of a supportive model to address their needs. Additionally, the faculty involved were volunteers and had a vested interest in the project, which may not have represented the broader concerns of the general faculty. Their limited feedback

meant that necessary changes were not identified, resulting in an implementation that failed to meet the diverse needs of all faculty and students. Although evaluation was done initially, it was discontinued after the initial two prototype rooms were rolled out and were not conducted during the project's expansion.

Issa Isaias (2015) identifies several principles that need to be followed to support usability. These principles make systems easier to learn and use, and perhaps if they had been applied to the implementation of Hyflex at CNC, the rollout of this system would have been more successful.

1. Learnability is defined by the ease at which new users can begin effective interaction and achieve maximal performance (Issa & Isaias, 2015). As highlighted in this case study, Hyflex was not easy to learn and required training. Unfortunately, training was limited to the summer, when many faculty were unavailable. Practicing was also difficult, as the HyFlex-equipped classrooms were frequently in use, forcing instructors to learn the technology while teaching.
2. Flexibility involves the number of ways the user and system exchange information (Issa & Isaias, 2015). From a student user perspective, Hyflex technology provided flexibility as it allowed access to class material in three ways; however, this was at a cost to the educator, as it increased their workload.
3. Robustness or the level of support provided to the user helps ensure the achievement and assessment of goals (Issa & Isaias, 2015). HyFlex requires ongoing IT and instructional support. Although CNC did provide some support initially by offering training to those interested, if an instructor needed support during class, a ticket had to be created, and the problem would be addressed after the class was completed. This lack of support resulted in less user success and increased frustration with the technology.
4. Efficiency indicates the ease of performing tasks once the system has been learned (Issa & Isaias, 2015). After using Hyflex for multiple classes, there was some ease with using the technology; however, the faculty was still required to

teach those in class and online. Although Hyflex enhanced accessibility, it did not improve efficiency for the educator.

5. Memorability, or how easily the user will remember the system functions after a period of time without using it (Issa & Isaias, 2015), is not a strength of Hyflex. This technology required multiple steps that were difficult to memorize, and the flow was not intuitive. In the classrooms, there were step-by-step, detailed instructions that were challenging to follow in real-time while also attempting to teach. (Appendix, Figure 6)
6. Errors: How many errors do users make, how severe they are, and how easily can they recover from them (Issa & Isaias, 2015)? As noted above, if an error occurred, no IT support was available to assist the instructor in real-time, forcing the instructor to troubleshoot on the spot with a new technology unfamiliar to them. In some cases, errors could not be corrected, forcing students and faculty to continue with the issue, such as a frozen screen, until the class was over.
7. Satisfaction, or how enjoyable and pleasant it is to work with the system (Issa & Isaias, 2015), is the final usability principle. Staff reported an increased workload and multiple technical issues, making the experience stressful and unpleasant. As a result, faculty stopped offering Hyflex in their classes, leading to limited use across the college.

This case also illustrates Woolgar's perspective on how technology "configures" its users. According to Woolgar (1990), technology is more than a tool responding to user input; it is an active agent that shapes user behaviours, habits, and actions. By choosing to implement the HyFlex model, CNC not only introduced a technology that faculty and students would interact with but also imposed specific expectations on them regarding their roles, behaviours, and adaptability. In Woolgar’s terms, CNC configured users by assuming that faculty and students would adapt effortlessly to the HyFlex system, overlooking how the technology would shape and potentially limit their actions (Woolgar, 1990).

For example, CNC imagined faculty as technologically adept, highly flexible users capable of switching between in-person and remote formats. This prescriptive view led to a setup that did not align with the real needs and experiences of faculty (and students), who often struggled with the demands of the technology. Faculty members, who were expected to manage multiple modalities with limited training, faced significant usability challenges that impacted their ability to teach effectively.

Examining through the lens of global health

Global health focuses on improving health outcomes for all people worldwide and achieving health equity (Koplan et al., 2009). March 2020 marked the beginning of the COVID-19 pandemic, making the academic year of 2020–2021 one of the most challenging times for faculty, students, and academic administrators (Singh et al., 2021). When faced with the pandemic, which encouraged physical distancing, technology allowed us to connect, create access, and enhance collaboration despite the physical distance that separated us. There were numerous unknowns about the duration and trajectory of this global health crisis, making it difficult for educators to plan.

Prior to the pandemic, most classes at CNC were offered in person. Face-to-face instruction provides in-person, real-time interaction between faculty-students and student-students, which in turn can spark innovative questions and conversations (Singh et al., 2021). This is often viewed as the preferred method for learning amongst educators; however, the benefits of online learning have become increasingly evident. Flexibility, the ability to work at your pace, engaging learning experiences, self-directed learning, cost-effectiveness, and the ability to produce in-depth discussions are some of the most widely cited benefits of online learning (Singh et al., 2021). With solid evidence to support both learning styles, it makes sense why hybrid or blended instruction has become increasingly popular. Hybrid or blended learning offers one such opportunity to provide engaging learning opportunities to students by combining face-to-face instruction with online learning opportunities (Singh et al., 2021).

After the initial lockdown, the administration implemented Hyflex at the college. For many, it was viewed as a "golden ticket" to address multiple challenges, not only

regarding issues related to COVID-19 but also concerns surrounding accessibility, enrollment, and the technology renewal cycle.

HyFlex provides accessibility, convenience, and choice, so in a period when learning could be interrupted by something as minor as a runny nose or as severe as an outbreak, it seemed like an obvious choice. Unfortunately, CNC did not effectively promote the asynchronous aspect, so it was not commonly utilized. This furthers the point that the college did not articulate a clear goal or purpose for HyFlex and communicate this to its faculty. Singh et al. (2021) highlight the importance of focusing on capacity building of faculty, so they become more familiar with online learning approaches, e-learning tools, and innovative technology to facilitate teaching and learning. CNC failed to conduct focus groups or stakeholder surveys to gather insights. Instead, they relied on research from other HyFlex schools to justify its implementation, which limited a comprehensive understanding of local needs and context. Though more accessible, the quality of instruction was questionable given the lack of time to modify the curriculum and support the implementation of the technology.

Critique: Potential + Pitfalls

Affordability is perhaps an even more useful construct than usability in education as it focuses on what a tool ‘affords’ learners and purposes and contexts (McCready, 2024). HyFlex is a delivery model with significant potential, especially for learners. It affords flexibility and control, allowing students to choose between attending classes in person, joining live online sessions, or viewing recorded lectures at their convenience. This adaptability is especially valuable for students balancing academic work with other commitments like jobs, family, or health needs.

HyFlex also enhances engagement by supporting multiple ways to participate, whether through real-time discussions or contributing to forums afterward, catering to various communication styles and comfort levels. In addition, HyFlex improves accessibility to course content, as students can review materials in asynchronous formats, allowing them to reinforce their understanding or revisit complex topics as needed.

HyFlex also inherently enhances accessibility for diverse learners by removing barriers often present in traditional classroom settings. For example, some students need recorded lectures, which can be challenging to manage discreetly in a conventional classroom. HyFlex supports this need, allowing all students access without drawing attention to individual accommodations.

From a global health perspective, HyFlex offers resilience to unexpected disruptions, such as the COVID-19 pandemic. As a flexible model, it allows students to switch to online learning if they are unable to attend in person, ensuring continuity of learning. In the event of a shutdown or absence, students can still access essential content, making the learning process more resilient to external challenges.

At CNC, a college serving northern communities across multiple campuses, HyFlex aligns with the region's unique needs. It supports distributed learning, which is particularly valuable given the large distances between campuses and the harsh winter conditions that often make travel difficult.

Given the many benefits, it’s understandable why CNC wanted to incorporate new technology to deliver instruction in a more flexible way. However, in doing so, it inadvertently became a case study of what not to do, facing numerous challenges and pitfalls along the way.

1. **Insufficient Technological Infrastructure**

Implementing HyFlex requires reliable hardware, software, and internet connectivity to support both in-person and remote participants. However, CNCs lacked the necessary funds to implement the model at the level seen in other institutions. With the limited resources available, they did the best they could, but this resulted in a system that was prone to technical issues, such as poor video and audio quality, connectivity problems, and frequent system crashes. We believe the institution underestimated the level of technological investment required, leading to a setup that was unable to support seamless, simultaneous participation from both in-person and remote students.

2. **Lack of Faculty Training and Support**

Effective HyFlex teaching requires faculty to be comfortable with technology and adapt to a hybrid environment, yet CNC's approach lacked the necessary support for instructors to succeed. The absence of proper training left faculty struggling to manage multiple learning modalities, maintain student engagement, and adjust their curriculum. Additionally, without dedicated IT support, instructors were expected to learn the technology on their own and troubleshoot technical issues during class.

Training in the HyFlex modality was not mandatory for faculty, leaving many unaware and unprepared for the challenges they would face. While some training opportunities were offered, they often took place at times when faculty members were unavailable, such as during summer break. Because training was not required, there was also a relatively casual attitude towards its implementation—many faculty viewed it simply as an extension of Zoom, underestimating the complexities of the HyFlex model.

In addition, without formal feedback mechanisms in place, it became difficult to identify and address gaps in support. CNC assumed that faculty would quickly adapt based on initial testing, but this testing failed to capture the full range of experiences across all users. As a result, usability became a significant barrier, with many instructors struggling to effectively deliver instruction across multiple formats.

3. **Lack of Institutional Support**

On many levels, CNC didn't fully anticipate or plan for the support and changes required to implement HyFlex successfully. For example, the increased workload of managing multiple modes of instruction was not recognized. Faculty were not given additional workload for training, or to modify their curriculum or create materials for multiple modes of delivery. This led to many faculty members having to invest a significant amount of their own time to make the model work. Additionally, what became apparent is that many faculty started to prioritize certain modes over others, with almost all instructors avoiding the asynchronous component of HyFlex, which is arguably the most accessible for learners but also the most time-consuming to prepare.

Moreover, CNC lacked a clear definition of HyFlex, leading faculty to interpret and use the technology in ways that were unintended, causing confusion and inconsistent

learning experiences. The institution also failed to account for the extra time required to set up these courses, meaning that right from the start, instructors were not given the time they needed to set themselves up for success in teaching this way.

In essence, CNC focused too much on technology-driven solutions without addressing the fundamental institutional changes needed to successfully implement the HyFlex model. This approach was rigid and mismatched, like trying to fit a square peg into a round hole. As a result, the HyFlex system became confusing and burdensome, particularly for instructors.

4. **Lack of a clearly defined target user or use case for Hyflex**

Perhaps the biggest issue with CNC's approach to HyFlex was that they didn't clearly define who the project was for. In many ways, it became a "solution in search of a problem." - a well-intentioned idea without a clear understanding of the specific needs it was meant to address.

By not identifying the specific courses, faculty, or students who would benefit most from HyFlex, CNC essentially developed a system that was too general and not tailored to actual needs. Without clearly understanding which courses were in high demand, where students were located, or which faculty were ready for the shift, the implementation of HyFlex became disconnected from the realities of the institution as the project lacked a clear focus.

In addition, the adoption of HyFlex seemed based on the assumption that flexibility in learning would be beneficial for all students and faculty. However, CNC didn't first assess whether flexibility was actually the critical requirement for its target audience. For a small college like CNC, with a smaller student population and limited course offerings, a large-scale flexible learning model simply wasn't justified. By assuming HyFlex was the solution, CNC overlooked the essential question: What are the actual needs of the students, faculty, and institution?

Conclusion

So, was this instance of technological change successful? We believe the answer is no. While the idea was well intended, this project can be considered a failure, as evidenced by the fact that only one faculty member at CNC continues to use the technology today. Despite the potential benefits of HyFlex, its implementation demands significant resources—such as educational technology, faculty training, and institutional support—resources that CNC either did not fully anticipate or could not afford. It also might have been a doomed project from the start, as it was a solution brought in to meet an unidentified need.

Ultimately, this case highlights the importance of aligning technological solutions with actual needs and ensuring that proper support is in place before undertaking significant changes in education.

Appendix

Figure 1

Photograph of general set up of Hyflex rooms at CNC. Pictured here from left to right are the projector, screen, interactive whiteboard and instructor station.

Figure 2

Photograph of the whiteboard camera (white) and audience camera (black), both positioned above the whiteboard, with the instructor speaker on the left.

Figure 3

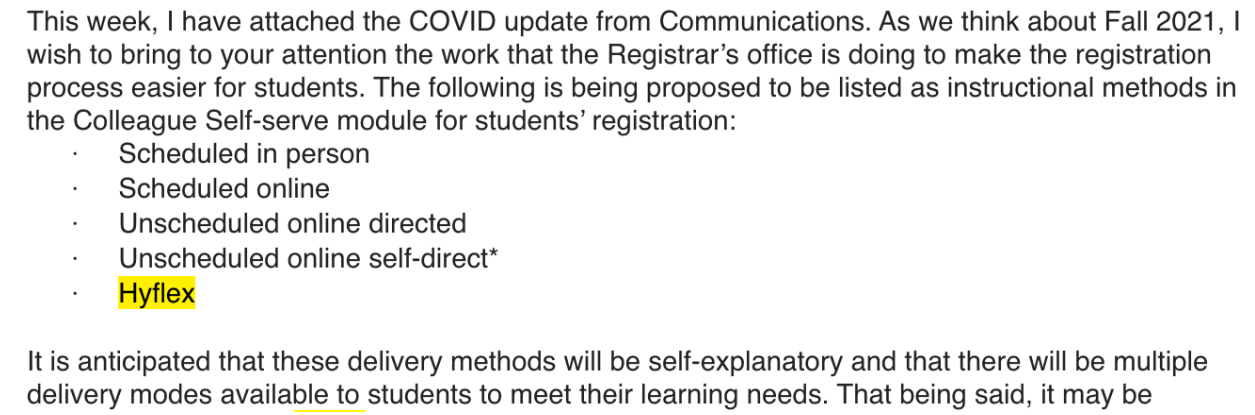
Photograph of the instructor's station, with the touch screen control panel located on the left.

Figure 4

Photograph of the video camera at the back of the room, capable of focusing on either the instructor or students.

Figure 5:

Screenshot of email sent by the administration to faculty promoting multiple delivery modes at the college including Hyflex.



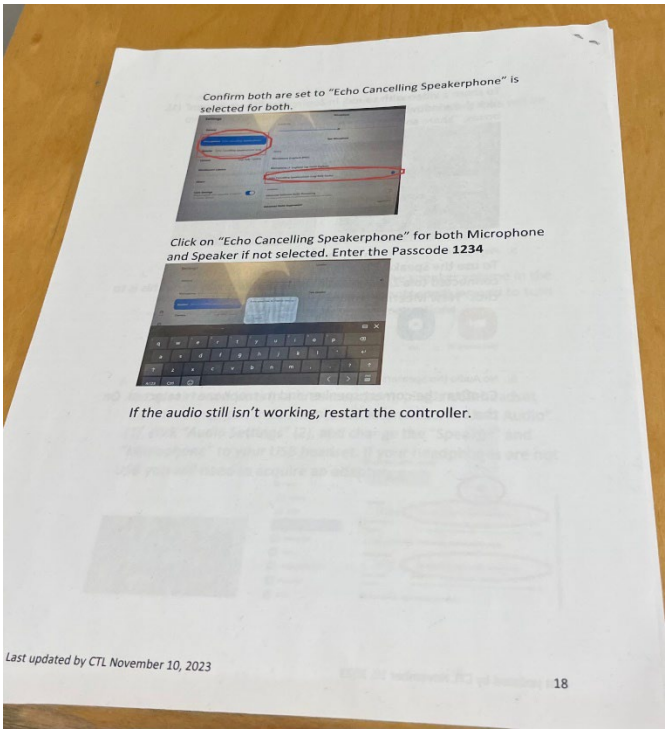
This week, I have attached the COVID update from Communications. As we think about Fall 2021, I wish to bring to your attention the work that the Registrar's office is doing to make the registration process easier for students. The following is being proposed to be listed as instructional methods in the Colleague Self-serve module for students' registration:

- Scheduled in person
- Scheduled online
- Unscheduled online directed
- Unscheduled online self-direct*
- Hyflex

It is anticipated that these delivery methods will be self-explanatory and that there will be multiple delivery modes available to students to meet their learning needs. That being said, it may be

Figure 6

Screenshot of instructions left in HyFlex rooms for faculty, providing guidance on how to use the technology



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