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Factors Which Influence Student Performance in Hyflex Courses

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ABSTRACT

Hyflex is a little-studied emerging course delivery method in higher education. A comprehensive qualitative study about this topic can contribute significantly to multiple fields of scholarship to ensure that the full potential is achieved. The pilot study discovered two significant factors influencing student performance in Hyflex courses: engagement and infrastructure. Findings hint that focus could be placed on increasing connections between students and the college community. Students could be taught how to improve their communication skills to advocate for themselves in the course, and incentives to attend the course could be provided. This pilot study aims to establish research methods and methodology as a template for more comprehensive qualitative and quantitative studies to determine which factors affect student performance in a Hyflex course.

Keywords

Hyflex courses, student performances, influencing factors

INTRODUCTION

Hyflex is an educational mode combining live in-person and virtual delivery, allowing students to learn in the format of their choosing. In the late 2000s, reduced computer and videoconferencing costs and technological advances allowed educators to experiment with students learning live via web cameras without entering a physical classroom (Power, 2008). Hyflex is also known as Hybrid Flexible (Beatty, 2007), Here or There (Zydney et al., 2019), Multi Options (Donovan, 2018), Virtual, Interactive, Real-time, Instructor-led (Francescucci & Foster, 2013), and Blended Synchronous Learning (LaFortune, 2019). It was increasingly utilized during Covid 19 and subsequent returns to campus but has been unexplored from a student performance perspective (Miller et al., 2021). This presents many opportunities for study to understand its impacts on the educational environment better. This project is a pilot study using qualitative methods to explore factors affecting student performance in Hyflex courses from the perspectives of the students themselves. This study's methodology, especially coding, is designed to be easy to replicate with an increased sample and demonstrate a clear path for adding quantitative elements.

The literature has explored the perspective of Hyflex instructors; findings indicate that the modality is more difficult to teach due to increased workload demands and technical skill requirements (Beatty, 2007, 2019). The literature emphasizes the importance of classroom infrastructures such as internet bandwidth, screens, cameras, room design, and layout (Stewart et al., 2011). Studies suggest Hyflex could increase enrollment because students access the course anywhere, and there are new opportunities for experiential learning (Smalley, 2021). Best teaching practices for Hyflex have also been explored. Instructors have utilized virtual reality to create more immersive classroom environments (Bower et al., 2014). However, Hyflex may reduce student engagement in discussions and activities due to the anonymity of the online environment. Marquart et al. (2018) found that Hyflex may reduce student and instructor interactions. Overton (2021) mentioned that faculty indicated a lack of student connection with each other which diminished student engagement and mental health.

A shared conclusion of Hyflex research literature is that most study and evaluation of this new modality is from the perspective of the course instructor or class observations (Marquart et al., 2018; Overton, 2021). Very little research has been conducted from the student's perspective. Also, little research exists about the efficacy of Hyflex. While this modality may have the capacity to be a disruptive force in education because of its nature as an emerging technology, its effect on students, specifically student performance, is relatively unknown (Raes et al., 2020).

RESEARCH PURPOSE

Research literature has documented the accelerated emergence of Hyflex as an educational delivery method (Raes et al., 2020). However, very little research exists which provides information about its effects upon student performance. Without this understanding, it will be difficult for educators, administrators, and policy leaders to determine how or whether to implement this new delivery method. As a result, an understanding of which factors affect student performance in Hyflex courses has significant implications for higher education professionals and students for future course planning and implementation decisions. The purpose of this research study is to determine which factors affect student performance in Hyflex courses.

METHODOLOGY

This study utilized the design of a qualitative method (Creswell, 2018). The methodology is appropriate to determine the factors which affect student performance in Hyflex courses. The qualitative component allows unique perspectives about the relationship between Hyflex courses and student performance. Data was collected by interviewing students who have completed or are in the process of completing a Hyflex course. A bracketing process was utilized to mitigate bias (Beech, 1999). The process was adapted from Tufford and Newman (2012); researchers conducted project conceptualization conversations to share their primary biases about Hyflex. This bracketing process led to the redesign of some of the interview questions to eliminate leading questions. All of the questions were in the semi-structured interview were open-ended. This study was approved by a Midwest Public University Human Subject Review Board (HSRB). All participants signed an informed consent form. All participant data was kept confidential and was only accessible by the authors of this research.

Population and Sampling

The population is first-year and second-year community college students. The sample is freshman and sophomore students at community college in Minnesota, previously or currently enrolled in at least one Hyflex course. A convenience sampling method was utilized. Hyflex instructors at the college informed students of the opportunity. The first four students who indicated their interest and had time available to complete an interview were selected.

The Informed Consent Process ensured participants understood the parameters of the study. A formal consent handout was provided and also read to participants before each interview. Participants were made aware that participation was voluntary and that all information shared would remain confidential. Pseudonyms replaced names during transcription, and all data would be stored in a password-protected computer.

Data Collection

Four semi-structured interviews were conducted. Each interview consisted of 20 questions including, two demographic questions. Follow-up questions were added as needed to ensure interviewee understanding. Topics were divided into five areas: demographic information, factors that may cause good student performance in a Hyflex course, factors that may cause poor student performance in a Hyflex course, the relationship between student performance and instructional factors in a Hyflex course, and the relationship between student performance and environmental factors in a Hyflex course. Interviews were between 45 and 60 minutes over Zoom. Transcripts were created through voice transcription software, corrected by researchers, and utilized for coding.

Analysis

The coding model by Krathwol (2009) & Richards (2020) was utilized for document analysis. Researchers reviewed transcripts and established codes and categories for key aspects utilizing DeDoose software. Coding was reviewed and revised using the constant comparative analysis technique (Creswell & Creswell, 2018) until an agreement was reached. To create categories and themes, codes were analyzed for hierarchical relationships. Codes related to each other were grouped into categories, and categories that related to each other were grouped into themes.

Credibility & Reliability

To ensure inter-rater reliability (IRR) and intra-rater reliability (ITR), after coding and categorizing, both researchers evaluated the transcript codes and excerpts together to create categories and themes from the research (Krathwol, 2009). In DeDoose, four training exercises of 61 questions each were created to ensure ITR. Each exercise included two codes created by the researchers and all excerpts related to them. In addition, exercises provided a Pooled Cohen's kappa score, a widely used measure to evaluate rater agreement compared with chance (Cohen, 1960). Researchers were considered as one coder for ITR. If exercise scores did not meet a good or excellent level of agreement, it was repeated up to three times. See Table 1 for DeDoose Training Exercises Codes & Training Scores.

DeDoose Training Exercise Codes Evaluated	First Attempt Training Score	Second Attempt Training Score	Third Attempt Training Score
Skills & Infrastructure	1	1	NA
Attendance & Distraction	.5	.5	.82
Attention & Distraction	.39	.60	NA
Advocacy & Visual	.61	.82	NA

Table 1. DeDoose Training Exercises Codes & Training Scores

Validation of qualitative data collected was completed through triangulation techniques. Best practices in qualitative research were followed: worthy topic, rich rigor, sincerity, credibility, resonance, significant contribution, ethics, and meaningful coherence (Tracy, 2010).

RESULTS AND DISCUSSION

Initially, there were 37 distinct codes, eight categories, and three nonoverlapping themes discovered regarding which factors affect student performance in Hyflex courses. The three themes were Engagement, Infrastructure, and Skills. After an intensive analysis process, the researchers excluded Skills from the pilot analysis as it was tied to individual students. The themes of Engagement and Infrastructure were derived from 24 distinct codes in six categories regarding student performance in Hyflex courses.

Engagement

Student engagement was defined as active participation, attendance, and interaction with all learning elements in a class (Gray & DiLoreto, 2016). Level of engagement was related to communication levels in the course, the quality and quantity of relationships with teacher and classmates, and behaviors exhibited that related to engagement. See Figure 1 depicts a visual representation of categories and codes related to engagement.

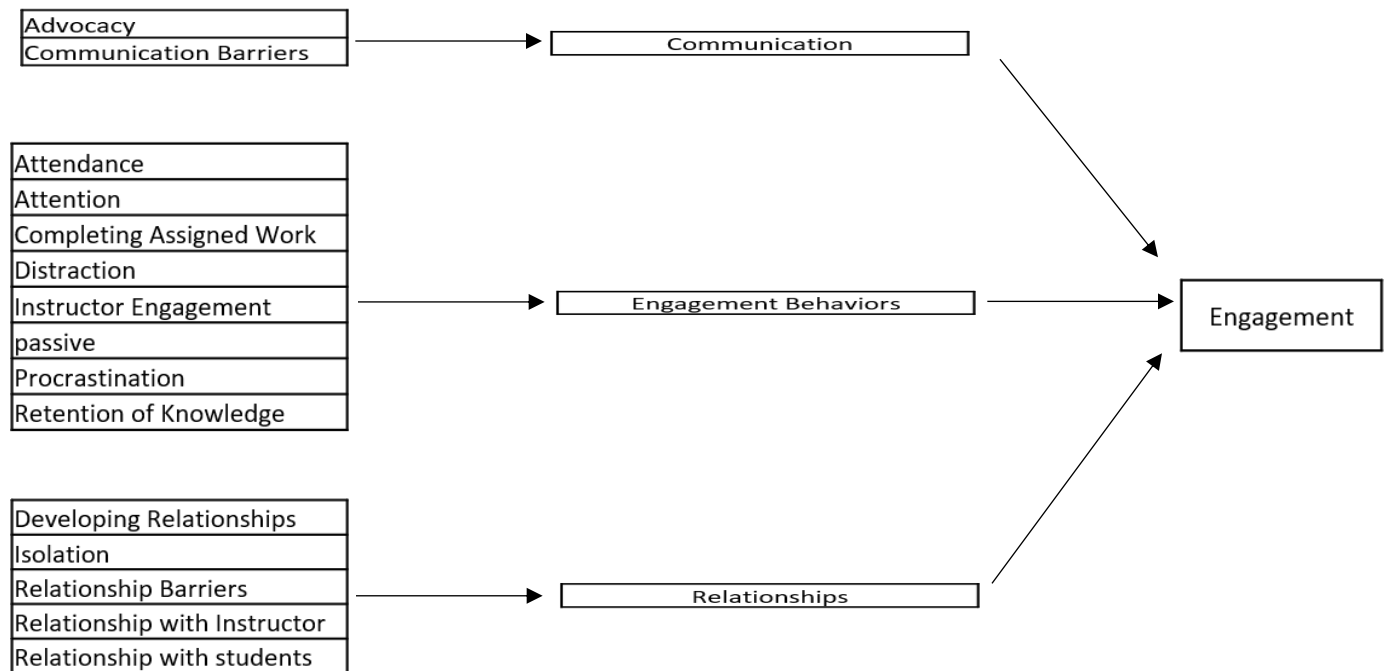


Figure 1. Engagement Categories and Codes

Participants often indicated behaviors of engagement, such as “asking questions” or acting “involved” in the classroom. Participants also provided examples of low engagement such as “not taking the initiative to ask for help when it’s needed”, or “not having their cameras on” online. Findings indicated the degree of connectedness and participation a student may act upon and or feel within a classroom related to others is aligned with the research literature on Hyflex. Studies of student engagement have indicated that students who show less engagement are more likely to perform at lower rates than students who are more engaged (Duncan et al., 2012). Engagement declined more rapidly over time compared with students in face-to-face courses

and Hyflex students demonstrated fewer relationship connections with their classmates, college, and increased feelings of loneliness (Gobeil-Proulx, 2019).

Infrastructure

Infrastructure in an academic setting is the non-pedagogical systems and constructs allowing effective teaching and learning (Overton, 2021). Findings described many examples of infrastructure affecting performance through accessibility for various learning needs. All Infrastructure categories and codes are provided in Figure 2 below.

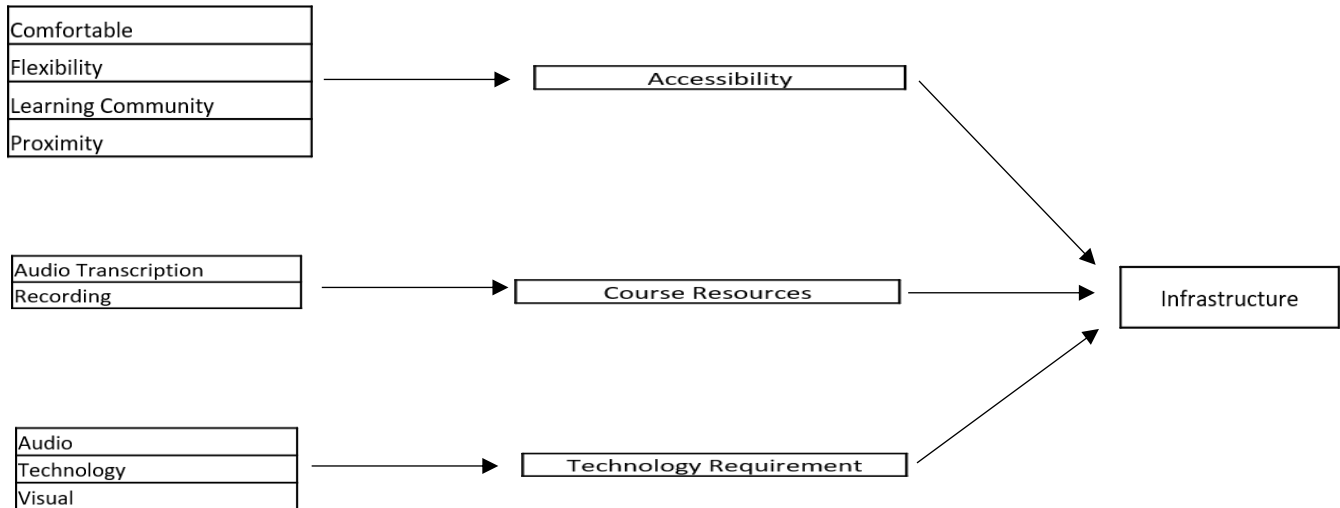


Figure 2. Infrastructure Categories and Codes

The more accessible the course, the greater comfort, and flexibility experienced. One participant shared their appreciation for infrastructure allowing live attendance virtually. The ability to join a class in a preferred setting has clear implications for student performance. High-quality audio transcription and class recordings were also important to students. One participant indicated, "having very interesting and stimulating videos can help because a lot of students are visual learners," sharing resources in a learning management system made it "a little bit easier to further go over something." Many participants appreciated class recordings. Using live video streaming created a lesser learning experience compared to face-to-face. One participant remarked, "It's like you're watching from an outside perspective" All students indicated not leaving cameras on during the class also created distractions. How academic infrastructure was utilized had significant effects on student performance. Recorded and transcribed lectures were reported as very helpful, while live virtual audio/video needs to improve. These findings correspond to Sharp et al. (2021), which concluded the capability for students to see and hear each other regardless of their attendance choice was most important to their success.

LIMITATIONS

While this research provides many insights, there are some limitations as a pilot study. Data were derived from four students at one institution due to time and human resources constraints. Expanding the population to all kinds of higher education would help validate the findings. An increase in sample size reaching the saturation stage would help define all factors. Sampling procedures were limited to students who elected to participate; limiting diversity may have created bias. Qualitative research does not describe the degree to which Hyflex factors affect performance. Regardless, study results do provide insights into factors that affect students in Hyflex courses.

CONCLUSION

The pilot study’s methodology of qualitative interviews effectively created and validated themes that were consistently related to categories and codes that may have a significant effect on student performance. A qualitative strategy was utilized because of the relatively unexplored aspects of the Hyflex delivery method and its relationship with student performance. It appears that multiple aspects of engagement and infrastructure can significantly affect student performance in Hyflex courses. Findings hint that focus could be placed on increasing connections between students and the college community. Students could be taught how to improve their communication skills to advocate for themselves in the course, and incentives to attend the course could be provided. Infrastructure improvements may also be an area in which solutions are most easily implemented. Future

studies using this methodology could add quantitative elements to measure the degree to which these factors may affect student performance in a Hyflex course.

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