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Attitudes Towards Faculty Interaction and Hybrid Learning

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Abstract

The COVID-19 pandemic accelerated the adoption of hybrid learning in Philippine higher education, amplifying long-standing constraints in access, infrastructure, and pedagogical readiness. Yet beyond technology constraints, less is known about what shapes students' attitudes toward hybrid learning as institutions transition from crisis-driven remote delivery to more stable blended modalities. This study examines factors influencing students' hybrid-learning preferences using data from the 2022 College Experience Survey (CES), a probability sample of 3,318 students across 15 Philippine institutions. Using survey-weighted ordinal logistic regression, the study relates preferences for on-campus learning to predictors in technology, pedagogy, and mental health.

Results indicate that most students (40.1%) prefer a mid-range hybrid setup (three days face-to-face). The importance of faculty interaction is the strongest predictor: students who value it are nearly 19 times more likely to prefer more in-person days. The effect of technological factors is mixed, while mental health concerns (e.g., COVID-19 anxiety) significantly reduce preference for on-campus learning. Notably, student autonomy and self-regulation measures were not robust predictors, controlling for other factors. These findings challenge infrastructure-centric assumptions, suggesting that policy efforts should prioritize strengthening faculty-student engagement and pedagogical quality to improve attitudes toward hybrid learning in the Philippines.

Keywords: hybrid learning, factors influencing student preferences across learning modes, faculty interaction, online access, ordinal logistic regression, College Experience Survey, education policy

1. Introduction

The COVID-19 pandemic transformed the delivery of higher education around the world, accelerating the adoption of hybrid learning modalities that combine face-to-face and online instruction. In the Philippines, this transformation in higher education was particularly significant given the country's archipelagic geography and the country's longstanding challenges in educational access, technological infrastructure, and pedagogical readiness. As academic institutions transitioned to hybrid learning modalities, even before COVID-19, the Philippine Commission on Higher Education (CHED) played a central role in shaping policy frameworks, building on its earlier Memorandum Orders and making revisions to formalize distance and open learning modalities. The pandemic, however, introduced unprecedented urgency to scale up these learning reforms, prompting rushed institutional shifts that raise critical questions about student engagement and learning outcomes in hybrid learning environments.

The existing literature has focused on the technological access of students and the usability of online learning systems as determinants of online learning success (e.g., Belmonte et al. 2024; Sanpanich 2021). A notable gap remains, however, in understanding the broader mix of factors that shape student attitudes toward hybrid learning environments. Attitudes toward learning are not merely reflections of access or skill but are shaped by pedagogical experiences, mental health, environmental conditions, and individual autonomy (Bond and Bedenlier 2019). In the post-pandemic period, as academic institutions recalibrate their instructional models, understanding these student attitudes becomes essential for designing inclusive and effective hybrid learning environments.

This study addresses this literature gap by examining the factors influencing Filipino college students' attitudes toward hybrid learning. We use data from the College Experience Survey (CES) 2022 conducted between May and July 2023 across 15 colleges and universities in the Philippines. The CES 2022 provides a comprehensive and representative snapshot of students across a diverse set of colleges in the Philippines, allowing for a large-scale investigation of student preferences for face-to-face learning and online learning in a hybrid setup.

2. Setting

Higher education in the Philippines has undergone significant changes in recent years, with hybrid learning emerging as a crucial component. Hybrid learning is defined as the combination of two learning environments: face-to-face classroom instruction and an online environment (Sanpanich 2021).

Well before the COVID-19 pandemic, the Philippines' Commission on Higher Education (CHED) had already been moving to gradually mainstream alternative modes of education delivery through a

series of CHED memorandum orders (CMOs). These policy developments included the introduction of "distance learning" in 1995, the incorporation of "open learning" in 2000, later clarifications on the criteria for degrees earned through "distance education" (e.g., CHED CMO No. 27, s. 2005), and the recognition of transnational education.

As information and communication technologies expanded alongside the globalization and internationalization of higher education, CHED increasingly recognized the need to accommodate alternative delivery modes and the new teaching and learning possibilities they enabled, although this shift was widely understood by authorities and education leaders as a gradual transformation rather than an immediate system-wide change. In practice, therefore, prior to COVID-19, distance and hybrid learning existed but were not the dominant modes of formal instruction: open and distance learning (ODL) was largely concentrated in authorized programs and a limited number of open/distance institutions rather than across most higher education institutions (HEIs), even as the Open Distance Learning Act (Republic Act No. 10650, approved 9 December 2014) further institutionalized ODL in tertiary education.

Meanwhile, comparatively large-scale "nontraditional" provision was more visible in second chance and skills pathways, such as DepEd's Alternative Learning System (ALS), which enrolled hundreds of thousands of learners annually, and Technical Education and Skills Development Authority's (TESDA) Online Program, which had over 1.2 million registered users by August 2018 (TESDA 2018).

The period of the pandemic represented a huge disruption, as the entire education system struggled to adjust to the consequences of COVID-19 restrictions while striving to sustain education provision. In Metro Manila, class suspensions began as early as 10–14 March 2020 (Galvez 2020). Soon after, much of the country entered varying levels of community quarantine. For example, Luzon was placed under Enhanced Community Quarantine (ECQ) beginning 17 March 2020, with national announcements subsequently extending and modifying restrictions into the following months (Baclig 2021).

Crucially, COVID-19 school closures affected learning outcomes. Through their analysis of PISA results across 70 countries Jakubowski, Gajderowicz, and Patrinos (2025), showed that students lost about 7 months of mathematics learning due to COVID-19 school closures — following the United Nations Educational, Scientific and Cultural Organization's (UNESCO) definitions where schools were fully closed "in case of government-mandated closures of educational institutions affecting most or all of the student population" and partially closed when schools were open in certain regions, or some grades, or age groups, or with reduced in-person class time including distance learning.

Part of the response to adapt and minimize disruption was a resort to modes of distance education, which is reflected in a marked policy shift toward flexible and technology-mediated delivery. In higher education, CHED Memorandum Order (CMO) No. 4, s. 2020 ("Guidelines on the Implementation of Flexible Learning", issued 2 September 2020) formally directed higher education institutions (HEIs) to adopt flexible learning beginning in Academic Year 2020–2021, legitimizing a spectrum of remote and blended approaches rather than fully face-to-face instruction. In addition, CHED CMO No. 6, s. 2022 ("Sustaining Flexible Learning in Higher Education: An Addendum to CMO No. 4, s. 2020") reinforced and extended this orientation toward continued flexible (including hybrid/online) arrangements beyond the acute phase of the crisis.

This sudden shift in modality requirements itself, however, presented numerous challenges as students experienced problems of technological access, learning-space constraints, pedagogical fit, and well-being. A large national survey of Filipino medical students by Baticulon et al. (2021) found that only about 41% of students considered themselves physically and mentally capable of engaging in online learning under prevailing conditions, and it identified barriers spanning technological, domestic, institutional, and individual factors. Meanwhile, concerns about mental health also rose alongside remote learning demands, particularly given the increased burden of technology use and the unequal capacity to access devices and connectivity (Alibudbud 2021).

Furthermore, concerns were also rising over faculty members' ability to keep up with the sudden demand for hybrid and online delivery. As Fearney and Ulayao (2021) noted, online teaching is not a mere online migration of teaching materials, since it requires additional skills on the end of the educators. Teacher training programs, such as the CHED HiED Bayanihan initiative, are crucial in the effectiveness of online teaching, though it also faces it owns challenges like internet connectivity, online resource access, and faculty preparedness (Tuga et al. 2021).

On the other hand, if as Barber, Donnelly, Rizvi, and Summers (2013) predict, alternative modes of deliver education are ultimately bound to predominate, then the country's experience during the COVID crisis — though admittedly a baptism by fire — may hold valuable early lessons for a future when such modes can be adopted in a more planned and measured manner. Future policy will be better designed if the most significant factors that hinder or promote the effectiveness of such alternative modes can be identified, problems anticipated and addressed beforehand.

With that in mind, this study focuses on the factors that affect students' attitudes towards hybrid learning. It seeks to determine the extent to which student attitudes are affected by such factors as technological access, teaching quality, and the learning environment.

In terms of uncovering attitudes towards hybrid learning, however, the current literature is still relatively sparse. A study by Belmonte et al. (2024) seeks to uncover factors affecting the behavior of

Filipino university students towards hybrid learning. Their variable of interest is the *actual use* of technology (utilizing a five-point Likert scale ranging from 1 to 5), which they find is directly influenced by intention and user interface. At the back end of actual use is the system quality and information quality referring to design and the available communication tools such as email and forums in general. The core of their hypothesis is that the actual use of technology is influenced by the perceived ease of use and perceived usefulness of technology, which also directly influences intentions. The paper argues that actual use of technology can be improved through usability and quality of systems such as design interfaces.

A limitation of the Belmonte et al. (2024) study is that the observed use of technology does not directly measure student attitudes or *school/student engagement*, which is a crucial element in learning outcomes, as earlier empirical studies have consistently shown that student engagement is strongly associated with academic achievement, persistence, and satisfaction. For instance, Erdoğdu (2019) finds that school engagement mediates the relationship between students' attitudes toward learning and academic achievement, suggesting that positive attitudes matter partly because they translate into stronger behavioural and emotional engagement with schooling. In higher education, student-faculty interaction has also been identified as an important dimension of engagement. Hu, Hung, and Ching (2015) find that student-faculty interaction mediates the relationship between engagement-related factors and perceived educational outcome gains, highlighting the importance of faculty presence and communication in shaping students' learning experiences.

Bond and Bedenlier (2019) synthesize this literature by proposing a framework (Figure 1), which we adopt, that clarifies relationships among various hypotheses. Their paper posits that the learning environment and technology play a key role in the student engagement in a hybrid learning context. Key determinants of engagement include access to technology, provision of technical and emotional support, autonomy (or self-directed learning), and allowing choices in technologies to be used. Access to technology determines level of confidence (or autonomy) (Zweekhorst and Maas 2015). Meanwhile, the provision of technical and emotional support can alleviate anxiety regarding issues on technology and test-taking (Mejia 2016). Also, allowing choices in technologies used can meliorate issues of low technology confidence (Northey et al. 2018). Combining these factors while ensuring instructor presence could potentially improve student engagement with learning in technology-enabled environments.

It is therefore important to define a variable that closely measures engagement itself and then investigate what influence, if any, the aforementioned factors exert on student engagement in a hybrid learning context.

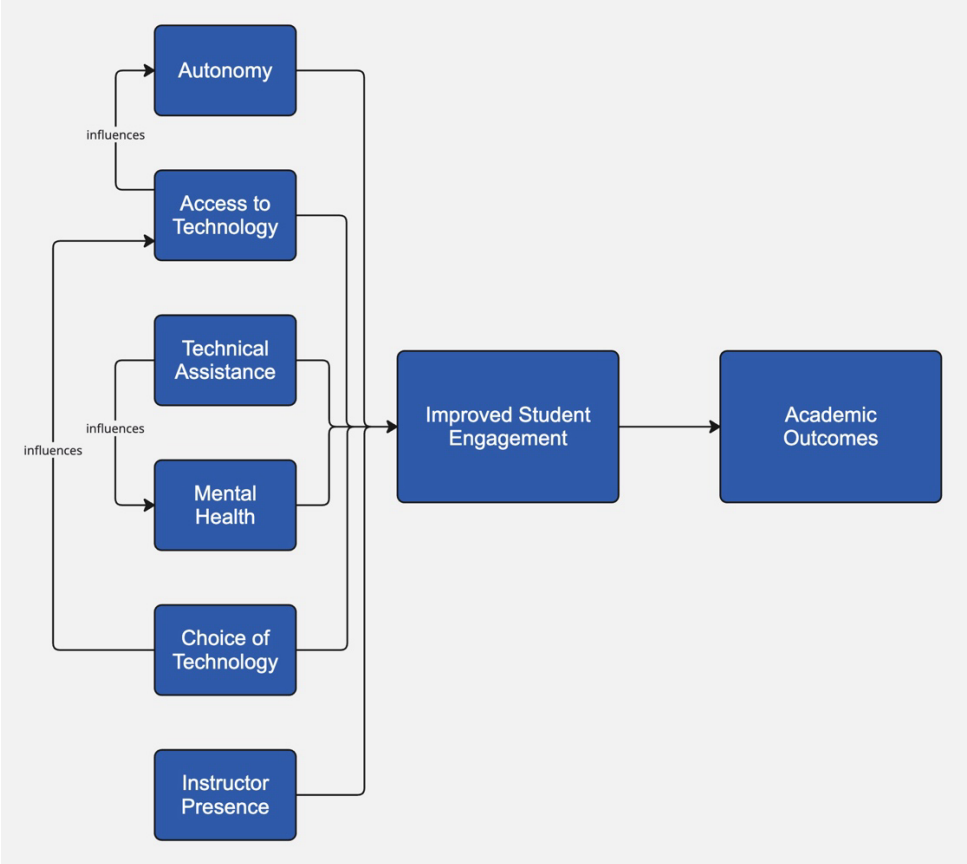

Figure 1. Student Engagement Framework (Adopted from Bond and Bendelier 2019)

3 Methodology

As a measure of attitudes or engagement towards hybrid learning among college students in the Philippines, this study uses the *number of days college students would want to attend classes face-to-face versus classes online* in the next academic year. Data on this variable was collected through the College Experience Survey (CES) 2022.

The College Experience Survey (CES) is an annual survey of college students in the Philippines, started in 2014, which aims to explore the perspectives of students on their college experience (FEU Public Policy Center 2025). CES 2022 in particular was a probability sample of college students in the Philippines from May to July 2023 across 15 colleges and universities, with a total of 3,318 respondents The margin of error for the survey was $\pm$ 2% at a 95% confidence level for the aggregated year levels. Further, sampling weights were adjusted to account for non-response and was raked to align with participating CES population margins on sex assigned at birth and degrees.

We hypothesise that a student with a negative attitude towards hybrid learning would want fewer days of online classes, while conversely a student with a positive attitude would prefer more. Key to this assumption is the *ex-ante* or prospective nature of the question in the survey:

> *If your college/university implements a blended learning environment (i.e., some classes are done on campus while others are held online) and there are five (5) school days in a week, and*

if you were given the choice, how many days would you be willing to go to your school campus for your classes?

3.1 Data and Variables

The outcome of interest is students' preference for the number of face-to-face class days per week. This was operationalized as an ordered categorical variable with six levels, ranging from "0 days (Fully online)" to "5 days (All face-to-face)". The independent variables were grouped into several thematic blocks based on theoretical considerations. The thematic blocks and the variables in the blocks are:

- **Technology Access & Skills**: Variables related to computer/internet access (*elearn17*), self-rated computer skills (*trait21*), and online content creation ability (*trait32*, *act14*).
- **Teaching & Interaction**: Importance placed on faculty interaction (*imprtnc16*).
- **Learning Environment**: Perceived supportiveness of the student's residence (*enviready*) and having a conducive learning space (*elearn15*).
- **Student Autonomy & Self-Regulation**: Variables related to project completion (*elearn1*), staying on track (*elearn3*), learning preferences (*elearn9*), managing distractions (*elearn12*), and time management skills (*trait30*).
- **Mental Health & Well-being**: Self-reported COVID-related worry (*covid_worry1*) and frequency of feeling depressed (*feels6*).
- **Demographics**: Student gender (*gender*), parental income (*parentinc*), overall satisfaction with college (*satisfyOverallCollege*), and whether at least one parent is a college graduate (*parent_college_grad*).

3.2 Survey Design and Model

The survey data incorporates a complex design involving stratification by school and sampling weights to ensure representativeness and account for potential non-response bias. To obtain generalizable results and accurate standard errors, all analyses were conducted using the *survey* package in *RStudio* 2024.12.1 (Lumley 2011). Specifically, a survey design object was created using *svydesign*, specifying strata and weights. All subsequent modeling (*svyolr*) and descriptive statistics utilized this survey design object.

3.3 Model Specification and Model-Building

For the analysis with the ordered categorical dependent variable *Y* (preferred face-to-face days) with six levels ($j = 0, 1, 2, 3, 4, 5$), the proportional odds model (also called the cumulative logit model) can be represented as follows:

Model Specification

The proportional odds model simultaneously estimates the cumulative probability of being at or below category *j* versus being above category *j*:

$$logit\ P(Y \leq j\ |\boldsymbol{X}) = ln\frac{P(Y \leq j|\boldsymbol{X})}{P(Y > j|\boldsymbol{X})} = \alpha_j - \boldsymbol{\beta}'\boldsymbol{X}$$

where:

$j = 0, 1, 2, 3, 4$ (yielding five cumulative logits for six response categories)

α_j represents the threshold (cut-point) parameters, with $\alpha_o < \alpha_1 < \alpha_2 < \alpha_3 < \alpha_4$

$\boldsymbol{\beta} = (\beta_1, \beta_2, \dots, \beta_k)'$ is the vector of regression coefficients

$\boldsymbol{X} = (X_1, X_2, \dots, X_k)'$ is the vector of predictor variables

Key Assumption

The proportional odds assumption (parallel regression assumption) posits that the slope coefficients β are constant across all j cumulative logits and that only the intercepts (thresholds) α_j differ. This implies that the effect of each predictor on the odds of being in a higher versus lower category is the same regardless of where the categories are dichotomized. To assess the relative contribution of different sets of factors while controlling for student background, a nested-modeling approach was implemented:

- **Model 1:** Include demographic controls plus variables in the "Technology Access & Skills" block.
- **Model 2:** Add "Teaching & Interaction" variables to Model 1.
- **Model 3:** Add "Mental Health & Well-being" variables to Model 2.
- **Model 4:** Add "Learning Environment" variables to Model 3.
- **Model 5** (Full Model)**:** Add "Student Autonomy & Self-Regulation" variables to Model 4.

Sequential addition allows one to examine how the inclusion of variables from later blocks affects the coefficients of variables included earlier and assesses the overall improvement in model fit.

4. Interpretation and Presentation

Model results are presented as Odds Ratios (ORs) with corresponding 95% confidence intervals (CIs) and p-values. An OR greater than 1 indicates a positive association between the predictor variable and preferring a higher number of face-to-face days (compared to preferring that number or fewer). Conversely, an OR less than 1 indicates association with increased odds of preferring fewer days of face-to-face instruction. Statistical significance was assessed at the $\alpha = 0.05$ level.

All statistical analyses were performed using *RStudio* 2024.12.1 and the following key packages: *survey* (for handling complex survey data and fitting svyolr), *dplyr* and *tidyr* (for data manipulation), *MASS* (for unweighted polr models used in diagnostics), *brant* (for the approximate proportional odds test), and *car* (for VIF calculation).

4.1 Results

We seek to identify factors predicting preference for the number of face-to-face (F2F) classes in a five-day school week. The most frequent preference for F2F learning days was for 3 days per week (40.1%), followed by 5 days (fully face-to-face, 20.1%) and 2 days (20.6%). Relatively few students preferred fully online (0 days, 7.6%) or only 1 day (2.8%) on campus.

The weighted sample comprised slightly more males (56.5%) than females (43.5%). The majority of students (70.1%) had at least one parent who was a college graduate, and most reported lower or middle parental income levels (88.5%). Overall, college satisfaction was generally high, with 62.5% reporting being satisfied. First-year students constituted the largest group (36.8%), followed by second-year (25.9%), fourth-year (19.0%), and third-year students (18.3%). These are summarized in Table 1 (see *Annex A.1 Descriptive Statistics of Relevant Variables).*

Ordinal logistic regression models, adjusted for survey design, were used to examine predictors of students' preference for more F2F learning days. Independent variables were entered in thematic blocks (Technology, Teaching Importance, Mental Health, Environment, Autonomy), controlling for demographic factors (gender, parental income category, overall college satisfaction category, parental college graduate status, and year level) in all models. Odds Ratios (OR) greater than 1 indicate higher odds of preferring more F2F days (more negative attitudes) compared to the reference group, while ORs less than 1 indicate lower odds (more positive attitudes).

The main result is as follows: preference for face-to-face instruction during the pandemic was most strongly influenced by the perceived importance of faculty interaction, level of worry about COVID-19, and certain technology skills. The fact that below-average content-creation skills proved significant across all models suggests that students with moderate though not poor digital creation abilities may have faced unique challenges in online environments.

Technology-Related Factors (Model 1)

The initial model that examined the importance of demographics and technology access and skills showed several statistically significant associations between technology variables and preference for F2F instruction. Students who agreed that they had good computer and internet connections at home showed higher odds of preferring face-to-face classes (OR = 2.02, $p < 0.10$) compared to those who strongly disagreed. Students who said they had average computer skills were 38% less likely to prefer F2F classes (OR = 0.62) than those with poor computer skills. On the other hand, students who reported “sometimes” using online resources to learn on their own curiously showed higher odds of preferring face-to-face classes, as compared to those who “never” used online resources. These and other seemingly paradoxical or counter-intuitive results are discussed once the full model is developed below.

Gender was a significant predictor in Model 1, with male students showing higher odds of preferring face-to-face instruction (OR = 1.26, $p < 0.05$). With regard to overall college satisfaction, more dissatisfied students were 29% (OR = 0.71) less likely to prefer F2F classes relative to satisfied students. Third year students also showed a lower preference for F2F classes compared to first year students (OR = 0.70).

Teaching Importance (Model 2)

Upon incorporating perceptions of faculty importance, we found strong associations with preference for F2F instruction. Students who rated faculty interaction as "important" had substantially higher odds of preferring in-person instruction compared to those who rated faculty as "not important" (OR = 21.33, $p < 0.01$). Similar significant effects were observed for those who rated faculty interaction as "somewhat important" (OR = 15.27, $p < 0.05$), "neutral" (OR = 14.72, $p < 0.05$), and even "somewhat unimportant" (OR = 15.88, $p < 0.05$). This suggests that any level of recognition of faculty value is strongly associated with preference for face-to-face instruction.

The significant and apparently counterintuitive association between computer skills and F2F preferences was sustained. However, using online resources to learn something on their own was no longer significant in the presence of instruction preferences. A significant association between having a good computer and internet connection at home was observed in this model: students who “agree” that they have good connections were more likely to prefer F2F classes (OR = 2.26) than those who thought they had poor connectivity (i.e., “strongly disagree”). The impact of sex, overall college satisfaction, and year level was also consistent after accounting for the importance of faculty interaction.

Mental Health Factors (Model 3)

COVID-19 concerns and mental health variables revealed that students who were "deeply worried" about COVID-19 were significantly less likely to prefer F2F instruction (OR = 0.40, $p < 0.001$) compared to those who were not worried. This is a 60% reduction in the odds of preferring in-person classes, highlighting the substantial impact of pandemic concerns on instructional modality preferences. The observations found in models 1 and 2 were also consistently observed with this model.

Environmental Factors (Model 4)

Interestingly, none of the newly added environmental factors—conducive learning space and residence=support—showed significant associations with preferences for hybrid learning. When residential support and learning environment variables were included, we found that the paradoxical impact of quality of computer/internet connection remained significant, with students who were neutral or who agreed showing higher odds of preferring F2F instruction, (OR = 2.12, $p < 0.05$) and OR = 2.42, $p < 0.05$, respectively). Students who were "worried" about COVID-19 (as distinct from "deeply worried") also showed lower odds of preferring face-to-face instruction in this model (OR = 0.65, $p < 0.05$).

Full Model with Autonomy Factors (Model 5)

The final and most complete model includes self-regulation and learning autonomy variables alongside all previously examined factors. However, among the added autonomy and self-regulation variables — finishing projects, keeping on track, learning alone, ignoring distractions, learning best by themselves, and time management skills — only keeping themselves on track and learning best by themselves had p-values less than 0.10, showing the expected opposite association with preference for F2F classes.

A particular nuance is that those who “disagreed” with the statement that they keep themselves on track and on time, i.e., felt somewhat less autonomous, were more likely to prefer F2F classes (OR = 2.74) even more than those who “strongly disagreed” with the statement. Further, students who "disagreed" that they learn best by themselves were significantly less likely to prefer more F2F days than those who "strongly disagreed" with the same statement (OR = 0.33, $p < 0.10$). Since the odds ratio is below 1, this indicates a negative association with preference for more face-to-face instruction. Specifically, an OR of 0.33 means that, relative to students who strongly disagreed that they learn best by themselves, those who merely disagreed had approximately 67% lower odds of preferring a higher number of F2F days, holding other variables constant. Although only the

"disagree" category reached statistical significance for both variables, the odds ratios for the other response categories (neutral, agree, strongly agree) point in the same direction. This means that while these additional comparisons did not meet conventional thresholds for statistical significance, the overall pattern of results remains consistent across response levels, indicating a general trend rather than a single point of difference.

Good computer and internet connections remained significant in the same counterintuitive direction. Compared to students who felt they had very poor computer and internet connections, students who simply felt neutral about their connection were just as likely to prefer F2F instruction (OR = 2.00, $p < 0.05$), as those who agreed they had good connections (OR = 2.23, $p < 0.05$). Those with average self-rated computer skills still showed even lower odds of preferring F2F classes compared to those with poor computer skills. Further, those who said that they “sometimes” used online resources to learn something on their own still had higher odds of preferring F2F classes compared to those who “never” did. We note, however, that only the "average" category for computer skills and the "sometimes" category for online resource use reached statistical significance. Nonetheless, the odds ratios for the other response categories point in the same direction: below 1.0 for computer skills (indicating lower odds of preferring face-to-face instruction) and above 1.0 for online resource use (indicating higher odds of preferring face-to-face instruction).

Faculty importance variables retained their strong association with F2F preferences, though with slightly reduced magnitude, with the highest odds ratio for "important" (OR = 18.90, $p < 0.05$). The effect shows that as students find faculty interaction increasingly important in their learning experience, the odds of preferring F2F learning increases relative to those who find faculty interaction unimportant. This persistent effect across all faculty importance levels underscores the centrality of faculty interaction in driving modality preferences. In fact considering effect sizes, faculty importance is by far the strongest driver of attitudes towards hybrid learning, with students who strongly feel that faculty interaction is important showing negative attitudes towards hybrid learning.

COVID-19 concerns remained significant predictors, with deeply worried students (OR = 0.37, $p < 0.001$) and worried students (OR = 0.63, $p < 0.05$) having lower odds of preferring face-to-face instruction over those who were not worried with COVID-19. As with model 4, the conduciveness of students’ residence for online learning was not significant in their preferences for hybrid learning.

Across all models, third-year students consistently showed lower odds of preferring F2F instruction compared to first-year students (OR ≈ 0.70-0.72, $p < 0.05$). Neither parental education nor parental income showed significant associations with instructional preferences in any of the models. On the other hand, students who reported being satisfied with their overall educational experience had consistently higher odds of preferring F2F instruction compared to dissatisfied or neutral students

across all models (OR ≈ 0.70-0.76, p < 0.05, when expressed as dissatisfied/neutral vs. satisfied as the reference level).

Model Fit Statistics

To assess the overall fit of our models, we calculated several metrics. McFadden's Pseudo R^2 for our final model was 0.0251, and the Akaike Information Criterion (AIC) was 7977.5 and the Bayesian Information Criterion (BIC) was 8353.9. While the pseudo-R^2 value is modest, this is consistent with studies examining individual preferences and attitudes using survey data, where unexplained variation tends to be high due to the influence of unmeasured individual factors. Unlike ordinary least squares R^2, log-likelihood-based pseudo-R^2 measures do not represent the proportion of explained variance but rather the improvement in model likelihood over a null model, and values tend to be considerably lower than traditional R^2 (Hemmert et al. 2018).

Ozili (2023) argues that in social science research, a low R^2 is acceptable when the goal is to assess whether specific predictors have significant effects on the dependent variable rather than to predict behavior, provided that key explanatory variables are statistically significant — which we observe in this study. In this context, the statistical significance and direction of association individual predictors provide more substantive insight for policy considerations than overall variance explained.

While the model captures key determinants of student preferences, some relevant contextual factors (e.g., duration of online classes and the quality of instruction) were not directly measured and may account for part of the remaining variation. This is consistent with the modest pseudo-R^2 values typically observed in models of individual attitudes and preferences using survey data. In this context, the model diagnostics should be interpreted as reflecting both the explanatory power of the included predictors and the inherent complexity of the outcome being studied, rather than as a limitation of the model's substantive insights.

Table 2. Model Results with Odds Ratios

Predictor Variable	Model 1: Tech +Demo	Model 2: +Teaching + Demo	Model 3: +MH + Demo	Model 4: +Env + Demo	Model 5: +Autonomy (Full) + Demo
Sex Male (Reference: Female)	1.26*	1.32**	1.24	1.26**	1.26*
Self-Reported Household Income: Low/Middle (vs High)	1.14	1.16	1.23	1.24	1.25
Overall Satisfaction: Dissatisfied/Neutral (vs Satisfied)	0.71**	0.76**	0.72**	0.70***	0.72**

At least 1 parent is a college graduate	0.97	0.97	0.99	0.97	0.96
Year					
2nd	0.82	0.82	0.84	0.86	0.87
3rd	0.70**	0.72**	0.72**	0.71**	0.70**
4th	0.84	0.85	0.83	0.84	0.80
Good computer and internet connection at home (Reference: Strongly Disagree)					
Disagree	1.67	1.84	2.15*	2.06*	1.88*
Neutral	1.81	2.08	2.36**	2.12**	2.00**
Agree	2.02*	2.26*	2.54**	2.42**	2.23**
Strongly Agree	1.76	1.81	2.12	2.10*	1.85*
Self-rated computer skills (Reference: Poor)					
Below Average	0.80	0.78	0.83	0.86	0.87
Average	0.62*	0.57**	0.63**	0.65**	0.65*
Above Average	0.66	0.62*	0.69	0.74	0.71
Excellent	0.90	0.84	0.91	0.92	0.96
Self-reported: Used online resources to learn something on their own (Reference: Never)					
Rarely	1.17	1.23	1.22	1.33	1.24
Sometimes	1.62*	1.55	1.63*	1.70*	1.64*
Often	1.16	1.06	1.12	1.14	1.11
Very Often	1.30	1.15	1.18	1.18	1.16
Importance of Interaction with faculty members (Reference: Not Important)					
Somewhat Unimportant		15.88**	15.57**	16.22**	14.32**
Neutral		14.72**	13.57**	13.13**	11.84**
Somewhat Important		15.27**	14.12**	13.33**	12.55**
Important		21.33***	21.27***	20.40***	18.90**
Worried about COVID-19 (Reference: Not worried at all)					
Slightly worried			0.84	0.83	0.83
Moderately worried			0.89	0.84	0.83
Worried			0.69*	0.65**	0.63**
Deeply worried			0.40****	0.40****	0.37****
Feel Depressed (Reference: Never)					
Rarely			0.85	0.87	0.85
Sometimes			1.15	1.17	1.15
Often			1.00	1.04	1.03
Very Often			1.25	1.27	1.22

Current residence supports learning environment for online classes (Reference: Not at all)					
Little Extent				0.95	1.00
Some Extent				1.35	1.39
Good Extent				1.43	1.52
Great Extent				0.76	0.81
Conducive learning space at home (Reference: Strongly Disagree)					
Disagree				0.65	0.66
Neutral				0.74	0.81
Agree				0.66	0.71
Strongly Agree				0.91	0.93
Self-reported: Finish projects that they start (Reference: Strongly Disagree)					
Disagree					1.01
Neutral					1.10
Agree					1.13
Strongly Agree					0.86
Self-reported: Keep themselves on track and on time (Reference: Strongly Disagree)					
Disagree					2.74*
Neutral					1.73
Agree					1.36
Strongly Agree					2.05
Learn best by themselves (Reference: Strongly Disagree)					
Disagree					0.33*
Agree					0.47
Neutral					0.46
Strongly Agree					0.50
Self-reported: Can ignore distractions when they study (Reference: Strongly Disagree)					
Disagree					1.08
Neutral					0.98
Agree					1.21

Strongly Agree					1.28
Self-reported: Time Management Skills (Reference: Poor)					
Below Average					0.77
Average					0.88
Above Average					1.07
Excellent					0.80
Significance: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001					

4.2 Discussion

Our results show the attitudes of college students towards hybrid learning in the waning stages of COVID-19 being shaped by a number of factors, not purely by technological access, which has been the focus of much of public policy discussions. Predominant influences were their pedagogical preferences and their level of comfort with technology and COVID-19 concerns. Our most significant finding is the dominance and consistent impact of faculty interaction in the greater preference for more F2F classes. Even college students who rated faculty interaction as "somewhat unimportant" were more likely to prefer more F2F classes (i.e., compared to those who found it "not important" at all). This highlights the importance of faculty guidance and presence for students in their college experience. This aligns with the literature that notes that faculty presence is a critical aspect of student satisfaction and successful learning outcomes whether in online or offline settings, through improving student engagement and learning outcomes (Hu, Hung, and Ching 2015).

The dominance of faculty interaction over other factors suggests that experiences in remote learning, given the backdrop of COVID-19, may have magnified the perceived value of direct and in-person faculty interaction, which students might have felt had not been replicated fully in online learning. This highlights the importance of consistent consultations and communication with students in hybrid learning environments (Garcia, Vidar, and Basa 2021) perhaps even more so in improving positive attitudes towards hybrid learning than focusing on the technological access and capabilities of students.

The results on the impact of technological access and skills of students on F2F classes preferences complicate the straightforward assumption that better access and skills lead to a greater preference for online learning. Students who had better computer or internet connections at home were paradoxically more likely to prefer F2F classes. This somewhat surprising result suggests that mere access is not sufficient to form positive attitudes towards hybrid learning.

Students with good internet access may possibly have higher expectations for the quality of hybrid and online learning pedagogy. If their online course pedagogy is perceived to be lacking in quality and interaction (e.g., compared with what is already available to them through global

platforms), then these students might prefer the perceived reliability of F2F classes. This is in line with a recent study on college students in 2020 (Belmonte et al. 2024), which showed that system quality and information quality are critical for the actual use of technology. Alternatively, students who already have access to online resources may regard F2F classes as a complement to rather than a substitute for online learning, particularly if the former affords a closer interaction with faculty.

On the other hand, students with self-rated “average” computer skills were less likely to prefer F2F classes compared to those with “poor” skills. However, students with “above average” and “excellent” computer skills did not show statistically different preferences compared to those with “poor” skills. In other words, while students with average skills were less likely to prefer F2F instruction, those with higher skill levels did not continue this trend. This suggests there may be a baseline level of digital literacy that is necessary to be comfortable with hybrid learning, but advanced skills do not necessarily increase preference for online learning. Colleges and universities may need to proactively provide a working knowledge of computer skills among students (and teachers) to increase their level of comfort with hybrid learning, echoing suggestions by Guinto, Villaverde, and Manzanilla (2021) which they formulated through on-the ground consultations at the height of COVID-19 in a Philippine state university.

Though not as salient now as in 2022, health concerns particularly over COVID-19 were a powerful factor in forming positive attitudes with hybrid learning. Students in 2022 who were "deeply worried" about COVID-19 were approximately 60% less likely to prefer F2F instruction. This is a clear and expected finding, reflecting the impact of COVID-19 on student decision-making. While the COVID-19 pandemic has waned, this underscores the need for university administrators to ensure robust public health measures within campus. As long as health anxieties persist, a segment of students will prefer fewer F2F classes.

Another key finding is the limited impact of student autonomy and self-regulation on hybrid learning attitudes. This would seem to contradict a part of the student engagement framework proposed by Bond and Bedenlier (2019), which identifies autonomy as a key determinant of improved student engagement. The non-significance of the key autonomy variables, such as finishing projects, ignoring distractions, and time management, in the study could be partly driven by the self-reported nature of the data collection: students may not be able to accurately gauge their true autonomy and self-regulation habits through self-reporting alone. Alternatively, these results could also suggest that given the crisis-context in which the survey was taken, student engagement might have been more strongly influenced by external or environmental factors—notably the availability of teacher interaction, as well as health concerns—rather than innate internal traits. Indeed, it is likely the dire

and abnormal experience students underwent could have undermined their self-assessments of their own autonomy.

Finally, the fact that third-year students prefer less F2F classes compared to first-year students suggests that first-year students might place a higher value on in-person and campus-based social and academic interactions compared to online interactions. We note that these third-year students were first-year students when COVID-19 started in 2019 and thus, experienced a degree of in-person interactions before classes shifted online. This highlights the need for administrators to ensure that first-year students integrate well with their college community, perhaps by increasing more in-person classes for these younger cohorts.

5. Conclusion

Analysing the learning preferences of Filipino college students in hybrid learning environments, we found a complex interplay of factors that extend well beyond considerations of access to technology. Three major findings stand out. The first is the perceived importance of faculty interaction as the strongest and most consistent predictor of preference for face-to-face instruction, with students who rated faculty interaction as "important" having nearly 19 times higher odds of preferring in-person classes. This underscores the centrality of pedagogical relationships in shaping student attitudes and suggests that faculty presence remains irreplaceable in hybrid learning environments.

The second major finding is that COVID-19-related concerns were a major influence on student preferences. Students who were "deeply worried" about the virus had 63% lower odds of preferring F2F instruction, highlighting the enduring impact of health anxieties on educational decision-making. Even as the pandemic wanes, these findings suggest that public health measures and psychological safety remain critical components of hybrid learning design.

The third finding is that technology-related factors exhibited nuanced effects. A good internet connection was paradoxically associated positively with F2F preference, while average computer skills were negatively associated. This suggests to us that students with only moderate digital literacy may feel inadequately prepared for online learning, while those with better connectivity may have higher expectations for online pedagogy that are not always met. These findings complicate the assumption that better access to technology automatically translates to more favorable attitudes toward hybrid modalities.

For university administrators, these findings point to the need to strengthen faculty-student engagement mechanisms, particularly in online settings. Investments in faculty training, communication strategies, and pedagogical innovation are essential to replicate the relational aspects of in-person learning. For CHED and policymakers, the results highlight the importance of integrating

mental health support and digital literacy programs into hybrid learning frameworks. Regulatory efforts should go beyond infrastructure provision to include pedagogical standards and student support systems.

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Annex A.1 Descriptive Statistics of Relevant Variables

Table 1. Distribution of the Variables in the Study

Variable	Level	Percent of Students
Number of preferred school days	0 days (Online)	7.6
	1 day	2.8
	2 days	20.6
	3 days	40.1
	4 days	8.9
	5 days (All Face to Face)	20.1
Sex	Female	43.5
	Male	56.5
Parent's Income	Low/Middle Income	88.5
	High Income	11.5
Overall college satisfaction	Dissatisfied/Neutral	37.5
	Satisfied	62.5
At least 1 parent is a college graduate	No	29.9
	Yes	70.1
Year level	1	36.8
	2	25.9
	3	18.3
	4	19.0
Good computer and internet connection at home - *elearn17*	Strongly Disagree	2.8
	Disagree	9.1
	Neither disagree nor agree	27.2
	Agree	41.4
	Strongly Agree	19.4
Self-rated computer skills - *trait21*	Poor	5.8
	Below Average	17.8
	Average	43.7
	Above Average	23.3
	Excellent	9.4
Used online resources to learn something on my own – *act14*	Never	2.9
	Rarely	8.2
	Sometimes	29.9
	Often	31.0
	Very Often	28.0
Importance of Interaction with faculty members – *imprtnc16*	Not Important	0.7
	Somewhat unimportant	3.0
	Neither unimportant nor important	16.8
	Somewhat Important	34.0
	Important	45.5
Worried with COVID-19	Not worried at all	18.3
	Slightly Worried	20.1
	Moderately worried	28.5
	Worried	17.7
	Deeply worried	15.4
Feels depressed - *feels6*	Never	17.3
	Rarely	22.3

Variable	Level	Percent of Students
	Sometimes	32.6
	Often	17.6
	Very Often	10.1
Current residence supports learning environment for online classes - *enviready*	Not at all	6.4
	To a little extent	8.8
	To some extent	35.0
	To a good extent	35.7
	To a great extent	14.1
Conducive learning space at home - *elearn15*	Strongly Disagree	3.3
	Disagree	9.1
	Neither disagree nor agree	31.5
	Agree	40.7
	Strongly Agree	15.3
Online learn readiness: finish projects I start - *elearn1*	Strongly Disagree	1.2
	Disagree	2.8
	Neither disagree nor agree	21.3
	Agree	50.6
	Strongly Agree	24.1
Online learn readiness: keep myself on track - *elearn3*	Strongly Disagree	1.9
	Disagree	7.7
	Neither disagree nor agree	33.1
	Agree	41.6
	Strongly Agree	15.6
Online learn readiness: learn best by oneself - *elearn9*	Strongly Disagree	0.8
	Disagree	3.9
	Neither disagree nor agree	23.9
	Agree	46.9
	Strongly Agree	24.5
Online learn readiness: can ignore distractions - *elearn12*	Strongly Disagree	5.0
	Disagree	14.2
	Neither disagree nor agree	38.8
	Agree	30.8
	Strongly Agree	11.1
Self-rated time management - *trait30*	Poor	2.0
	Below Average	10.7
	Average	40.3
	Above Average	29.5
	Excellent	17.6

Annex A.2 Model Diagnostics

Several diagnostic checks were performed on the final nested model (Model 5) to assess model adequacy. While the *svyolr* R function does not directly provide a survey-adjusted test on the proportional odds assumption, an approximate assessment was conducted using the Brant test (*brant::brant*) on an equivalent, but unweighted, proportional odds model fitted with *MASS::polr*. This provides an indication of whether any predictors significantly violate the assumption, with the caveat that it ignores the survey design and may be affected by data sparsity.

A survey-adjusted Likelihood Ratio Test (LRT) was performed using *survey::regTermTest* (with method="LRT") to compare the final survey model (*svyolr*) against a corresponding intercept-only null survey model. This tests whether the full set of predictors significantly improves model fit over the null model, accounting for the survey design.

As a descriptive measure of fit improvement, an approximate McFadden's Pseudo R^2 was calculated. This was derived from the log-likelihoods of the unweighted full and null models fitted with *MASS::polr* (used for the Brant test). This metric ignores the survey design and serves only as an indicative measure of the proportion of variance explained compared to the null model.

Variance Inflation Factors (VIFs) were calculated to assess potential multicollinearity among predictors in the final model. Due to the lack of direct VIF calculation for *svyolr*, we employed a common proxy method: fitting a Gaussian *svyglm* model using the same predictors, the survey design, and a numeric version of the dependent variable, restricted to complete cases for the final model's variables. VIFs (or Generalized VIFs for multi-category predictors like gender) were then calculated from this proxy model using *car::vif*. Values exceeding 5 or 10 were flagged for potential concern.

Annex A.3 Surrogate Residual

An examination of surrogate residuals plotted against the model's predictor (based on an approximate, unweighted *polr* model) did not reveal major issues with non-linearity or non-constant variance (heteroscedasticity), as the points were scattered reasonably randomly around zero with only a very slight curve in the LOESS smooth line.

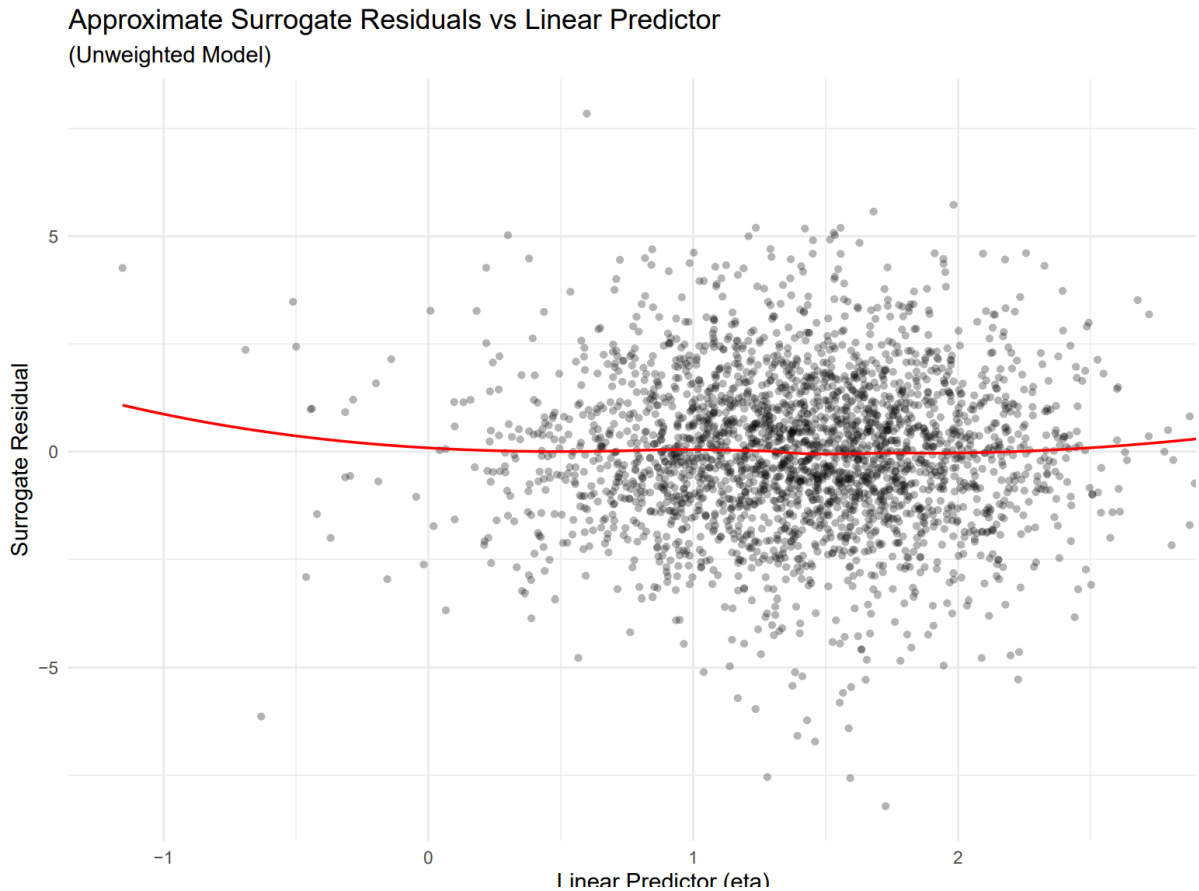

Figure 2. Visual Inspection of Residuals vs Predictor

Annex B. Multicollinearity among predictors for Model 5

Multicollinearity among predictors was assessed using the Generalized Variance Inflation Factor (GVIF), adjusted for degrees of freedom $GVIF^{\frac{1}{2DF}}$ calculated from a proxy Gaussian *svyglm* model. All $GVIF^{\frac{1}{2DF}}$ values were well below common thresholds of concern which indicates that multicollinearity is not a significant issue among the predictors in this model.

Table B. Multicollinearity among predictors for Model 5

Variable	GVIF	Df	Adjusted GVIF
elearn17	8.085432	4	1.298563
trait21	4.720737	4	1.214091
act14	5.405861	4	1.234833
imprtnc16	5.556352	4	1.239078
covid_worry1	3.048078	4	1.149485
feels6	3.63408	4	1.175031
enviready	5.038822	4	1.224027
elearn15	8.412039	4	1.305006
elearn1	25.542855	4	1.49937
elearn3	22.866844	4	1.478771
elearn9	9.274678	4	1.321029
elearn12	8.707334	4	1.310647
trait30	4.851586	4	1.218247
Sex	1.561398	1	1.249559
Parent's Income	1.369732	1	1.170356
Overall college satisfaction	1.729853	1	1.315239
At least 1 parent is a college graduate	1.585807	1	1.259288
Year	2.218127	3	1.141996

Annex C. Forest Plot of Odds Ratio