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University Students' Acceptance of Hybrid Learning at a South African University

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ABSTRACT

In the period of the post-COVID-19 pandemic, innovative lecturers have continued using hybrid learning strategies. This study investigated university students' satisfaction with hybrid learning in a country plagued by intermittent power outages and connectivity. Giray's (2021) e-learning satisfaction framework guided the study. One hundred and ninety-four (194) students responded to an online survey. Structural equation modelling analyses revealed that student autonomy and lecturer support positively correlated with hybrid learning satisfaction, while student interaction and collaboration did not. Second-order structural modelling indicated that lecturer support was the most important predictor of the overall hybrid learning experience in diminishing order, followed by hybrid learning satisfaction, student autonomy and student interaction and collaboration. Gender moderated student collaboration and interaction, student autonomy, and hybrid learning satisfaction returned means for males greater than those of females. The results could inform e-learning practitioners on designing effective hybrid learning environments in infrastructure constrained environments where there are unreliable connectivity issues and power outages, to enhance student satisfaction and success.

Keywords: *hybrid learning satisfaction; hybrid learning; lecturer support; student autonomy; face-to-face learning; online learning; power outages; connectivity*

INTRODUCTION

Hybrid learning was popularised during the COVID-19 pandemic (Gagnon et al., 2020; Handle-Pfeiffer et al., 2022; Haningsih & Rohmi, 2022). Post-pandemic, many institutions of higher learning continued with this newfound teaching approach (Mistretta, 2024), including universities in developing countries where students' poor socioeconomic backgrounds, erratic power supplies, expensive data, inadequate lecturer support and Internet access pose challenges (Dube, 2020; Bubou & Job, 2021; Mphuthi & Tshelane, 2022) to hybrid learning. The accomplishment of hybrid learning will rest on resolving the lack of faculty support to the students, technological, connectivity, technical, motivational, instructional, and pedagogical challenges (Abedi & Ackah-Jnr, 2023; Detyna et al., 2023; Greyling & Wolhuter, 2023; Mistretta, 2024).

Hybrid learning simultaneously combines distance(remote) and on-campus learning(onsite) for two groups of students in the same class (Bell et al., 2014; Ladd, 2020; Raes, 2022). The lecturer will be in class with the onsite students and use technology to communicate with the remote online students. Raes (2022) found no difference in content understanding between remote and onsite students, provided the lecturers are technologically and pedagogically competent (Cevikbas & Kaiser, 2023; Detyna et al., 2023; Torrisi-Steele, 2023). Nevertheless, in developing countries, lecturers may lack technological and pedagogical skills (Gyawali & Mehndroo, 2024), and those without professional teaching qualifications may be less effective in their content delivery (Burroughs et al., 2019; Ndebele, 2022). However, the shortcomings of the lecturers in this regard can be addressed when instructional designers provide lecturers with support and training to assist them in attaining effective pedagogical strategies and technological skills in hybrid learning environments (Ikebuchi, 2023; Nebrida & Bangud, 2022; Mucundanyi & Woodley, 2021; Torrisi-Steele, 2023). It is worth noting that lecturers hardly consult instructional designers (Beirne &

Romanoski, 2018), leading to ill-informed pedagogical decisions that affect student academic achievement and contentment with hybrid learning.

This study investigated how lecturer support, student autonomy, student interaction and collaboration correlated with students' satisfaction and overall hybrid learning experiences at a South African university in a country beset by infrastructural challenges such as unreliable connectivity and power outages. The university in Johannesburg serves a diverse student body, including many from disadvantaged backgrounds, with a significant number being black.

The study is significant because student satisfaction fosters enhanced student engagement with content, boosting motivation levels, leading to student success (Bowden et al., 2021; Martin & Bolliger, 2022; Perfetto, 2019; Wut et al., 2022), which is key in public South African universities where graduation levels are appalling (Ramrathan, 2013; Saidi, 2020). In addition, there is a dearth of literature on student satisfaction with hybrid learning, specifically in developed countries (Radwan, 2023). Further similar studies have concentrated on hybrid learning satisfaction, but this study went further by ranking the contributions of predictors, including hybrid learning satisfaction, to hybrid learning. With the increasing internet penetration rate in Africa (Mphuthi &Tshelane, 2022), hybrid learning has become an enabler for equity and equality in education (Ikebuchi, 2023). Against the aforementioned background, the following research questions were formulated:

1. How does university students' satisfaction with hybrid learning relate to lecturer support, student autonomy, and student interaction and collaboration?
2. What proportion of the explained variance in the overall hybrid learning experience is contributed by lecturer support, student autonomy, hybrid learning satisfaction, and student interaction and collaboration?

LITERATURE REVIEW

Hybrid learning fosters student engagement (Linder,2017), which is associated with student-centred pedagogies that the students prefer rather than traditional approaches (Martin & Bolliger, 2022). Student satisfaction is the student's contentment with the instructor, peer, course, and organisational-related attributes (Martin & Bolliger, 2022). Student satisfaction results in positive educational experiences leading to student motivation and engagement (Chan, 2023; Dastidar, 2021; Hasanah, 2022; Linder, 2017) and hence improved student success (Bowden et al., 2021; Chen & Chiou, 2014; Hews et al., 2022; Reeve & Jang, 2022; Raes, 2022; Wang, 2021). According to several authors (Bubou & Job, 2021; Ikebuchi, 2023; Meeprom & Fakfare, 2023; Raes, 2022; Torrisi-Steele, 2023), hybrid learning benefits such as flexibility and different learning style accommodations correlate positively with student satisfaction, but lecturers have to be creative in their lecture designs to cater for both the students in the physical and virtual settings and the students' differing learning styles (Torrisi-Steele, 2023). Further, hybrid learning provides students with digital literacy skills, self-regulatory learning skills, and the 4Cs of 21st-century skills, as highlighted by Mistretta (2024).

Lecturer Support (LS)

The elements of lecturer support include infrastructure, organisational, instructional and technical support, and providing these leads to student satisfaction (Martin & Bolliger,2022). Several authors (Martin & Bolliger, 2022; Meeprom & Fakfare, 2023; Gray, 2021; Taghizadeh & Hajhosseini, 2021; Linder, 2017) posited that student support (online or onsite) is an antecedent of satisfaction in hybrid learning environments. According to Ikebuchi (2023) and Mucundanyi & Woodley (2021), pedagogy and course design are important elements of hybrid learning that will address equity, diversity, and inclusion challenges in hybrid learning. Online students may feel alienated from their peers and lecturers, particularly if lecturers lack the pedagogical skills to design engaging lectures,

leading to dissatisfaction with hybrid learning (Athens, 2023; Beatty, 2019; Raes, 2022; Wut et al., 2022). For instance, distance (remote) students may feel excluded when they encounter technical difficulties without lecturer support (Detyna et al., 2023; Huang et al., 2017) and simultaneously, in-person students may also feel excluded when the lecturer spends time, solving online technical problems (Raes et al., 2020). Subsequently, technical problems, lecturer unreadiness and a lack of social presence will lead to dissatisfaction and frustrations, especially for remote students (Cevikbas & Kaiser, 2023; Detyna et al., 2023; Nebrida & Bangud, 2022). However, in some developing countries, maintaining the social presence of the lecturer can be constrained by the availability of technology (Detyna et al., 2023). Further, for effective lecturer support, lecturers need to be proficient in using pedagogies and technologies that foster communication (use of announcements and emails), collaboration (use of forums, discussion boards and wikis, and interactive learning experiences (web conferencing) for students in both physical and virtual settings to effectively enhance engagement and support their students (Torrisi-Steele, 2023). For instance, providing prompt feedback leads to enhanced learning experience and satisfaction (Zamri et al., 2021) Nonetheless, because of the pressure to publish, lecturers will prioritise research output ahead of time to support their students (Li & Yang, 2024). Further, decent lecturer-student interaction leads to motivation (Taghizadeh & Hajhosseini, 2021). Richardson et al. (2017) posited that the lecturer's active engagement in an online learning environment was strongly linked with student satisfaction and perceived learning. However, findings by Dastidar (2021) indicated that "instructor support" was an insignificant predictor of student satisfaction.

Student Autonomy (SA)

Hybrid learning gives students autonomy (Perfetto, 2019; Pinto & Anderson, 2013; Mistretta, 2024). Autonomy is when one acts out of their own volition (Reeve & Jang, 2006). Autonomy has also been conceptualised as empowering students to take ownership of their learning (Abduramanova et al., 2021). Specifically, remote learning promotes self-regulation and independence when students learn independently (Linder, 2017; Singh et al., 2022). For instance, the anytime and anywhere freedom to learn creates autonomy and self-regulation (Ikebuchi, 2023). Auer (2023) reported that providing feedback by lecturers also resulted in autonomy and self-regulation. Martin & Bolliger (2022) and Giray (2021) posited that autonomy predicted student satisfaction in hybrid learning, among other factors such as course design and student and lecturer characteristics. However, Dastidar (2021) reported that student autonomy was an insignificant predictor of student satisfaction.

Student Interaction and Collaboration (SC)

Interactions are "reciprocal events" between students during the learning process (Wagner,1994, p.8). Hussin et al. (2019) posited that student interaction drives knowledge construction and sharing, leading to active learning and cultivating 21st-century skills like critical thinking. Mayer (2023) reported a lack of personal connection between remote and onsite students; however, onsite students had more affective engagement through personal interaction than remote students (Raes, 2022). For instance, the face-to-face interaction in onsite settings (student-to-student, lecturer-to-student) created an impression of community and engagement (Gyawal & Mehndroo, 2024; Mistretta, 2024) at the expense of remote students (Raes, 2022). Several authors (Alqurashi, 2017; Conrad et, 2021; Dastidar, 2021; Giray, 2021; Hussin et al., 2019; She et al., 2021; Taghizadeh & Hajhosseini, 2021) posited that student interaction and collaboration are antecedents of satisfaction. However, in other studies, student-to-student interaction was perceived as less important than lecturer-to-student and student-content interaction (Meeprom & Fakfare, 2023; Kyei-Blankson et al., 2016).

Overall Hybrid Learning Experience

Drawing from the above discussion, we conceptualise the overall hybrid learning experience as the holistic experience (second-order factor) that embraces the environmental dimensions (lecturer support, interaction, collaboration autonomy), the affective dimension (satisfaction) and other dimensions, including course design and facilitation. The overall hybrid learning experience provides an overarching understanding of hybrid learning by uniting the first-order factor, which self-reported surveys will measure, and the overall hybrid learning will be measured indirectly by employing the second-order confirmatory factor analysis. Figure 1 shows the relationship between first-order factors (e.g., LS, SC, SA) and the overall hybrid learning experience.

PROPOSED RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

The student satisfaction with the e-learning model by Giray (2021) was used to frame this study. In this model, the antecedents of hybrid learning satisfaction are student collaboration and interaction, lecturer support, and student autonomy. Figure 1 shows the proposed predictor variables for student hybrid learning satisfaction.

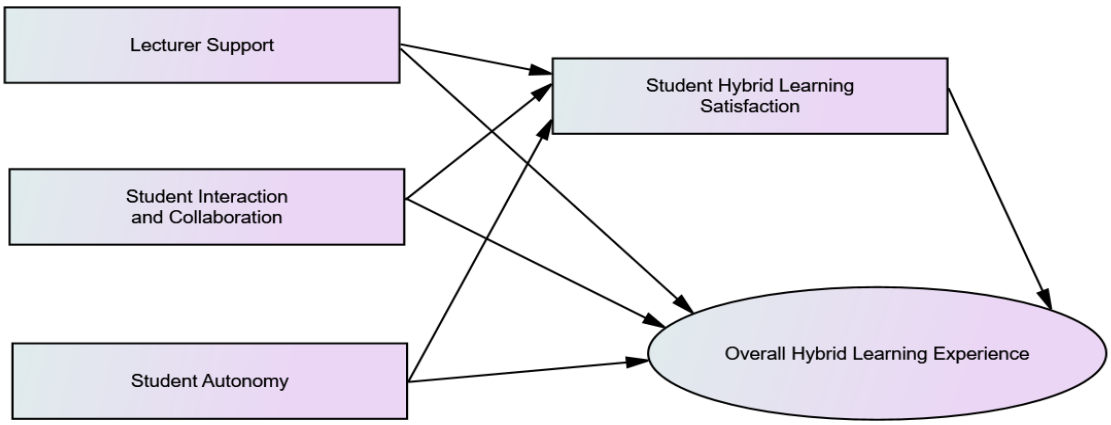

Figure 1: The proposed research model for hybrid learning satisfaction

Student Collaboration and Interaction

In this context, student interaction and collaboration refer to the degree to which students engage in peer-to-peer exchanges during hybrid learning.

In developing economies such as Nigeria and South Africa, connectivity, erratic power cuts, and technical glitches will render the virtual part of hybrid learning impossible, since remote students would be periodically disconnected from the sessions (Bubou & Job, 2021; Greyling & Wolhuter, 2023; Motaung & Dube, 2020; Tobi et al., 2021), hence creating poor student learning experiences, which may lead to dissatisfaction. For example, during web conferencing, the learning management system would deactivate collaborative functionalities such as chat functionalities because of the large number of students. In addition, because of a lack of pedagogical skills, lecturers would not use breakout rooms, discussion boards, or wikis for student-to-student interactions, denying students the opportunity to interact (de Lima et al., 2019).

Despite the recorded live sessions, students from disadvantaged backgrounds do not have the connectivity or data to watch the recorded videos (Moonasamy & Naidoo, 2022). Nevertheless, the students could still play or download the recordings at night during off-peak times when network data is cheaper.

This leads to the hypotheses:

- *$H_0$1a: There is no significant relationship between student interaction and collaboration and student satisfaction during hybrid learning*
- *$H_0$1b: There is no significant relationship between student interaction and collaboration and overall hybrid learning experience.*

Lecturer Support

In this study, lecturer support is the instructional and technical assistance the lecturers provide to their students during hybrid learning.

Li & Yang (2024) reported that lecturers prioritise research output, which leads to their promotion rather than curriculum-based teaching, resulting in less time being invested in student support, such as providing timely feedback. In South African universities, this is aggravated by the large classes that the lecturers must teach (Matoti & Lenong, 2018). In addition, pedagogical and technological shortcomings prevent lecturers from supporting the students more effectively (Krishnan & Nagaratnam, 2023; Torrisi-Steele,2023). In addition, Chen et al. (2021) reported that due to a lack of pedagogical skills and time, lecturers are underutilising learning analytics embedded in the learning management systems to identify students who need help and enhance learning outcomes. Lecturers hardly use student forums on the learning management systems for student engagement; however, real-time online discussions and interactions such as chats and emojis during web conferencing provide rich learning experiences for onsite and remote students (Doumanis et al., 2019). Using emojis and real-time chat during web conferencing supports social and emotional well-being, leading to satisfaction with hybrid learning (Qi et al., 2023). Further, one of the gains of online interaction is that shy students are free to express themselves online compared to traditional spaces (Kim, 2014). However, some lecturers complement hybrid learning by using WhatsApp groups, and together with tutors, they assist both groups (onsite and remote), allowing the students to interact even in the event of power cutoffs.
This leads to the hypotheses:

- *$H_0$2a: There is no significant relationship between lecturer support and student satisfaction during hybrid learning.*
- *H_0 2b: There is no significant relationship between lecturer support and overall hybrid learning experience.*

Student Autonomy

In this study, student autonomy refers to the degree of self-regulation and independent learning students exhibited during hybrid learning.

Wut et al. (2022) and Linder (2017) posited that providing learning materials in different online formats, such as video recordings, podcasts and relevant website links, stimulates the students to explore and learn independently and sometimes at their own pace. In addition, the students have the luxury of reviewing recorded videos multiple times as they deem fit to strengthen their understanding (Almendingen et al., 2021; Hollister et al., 2022). Carmichael, Reid & Karpicke (2018) reported that video access is strongly associated with student satisfaction. On the other hand, technical issues present in hybrid classes curtail autonomous learning (Greyling & Wolhuter, 2023). In addition, a lack of connectivity and expensive data may compel remote students not to join the hybrid classes (De Wet, 2014; Moonasamy & Naidoo, 2022). Further, students from disadvantaged backgrounds may not have conducive study places at home (Mphuthi & Tshelane, 2022; Zimba et al., 2021). The provision of regular feedback supports student autonomy, and the converse holds (García-Jiménez et al., 2015). In short, student autonomy is curtailed by factors such as, lecturers' poor pedagogical skills, unstable connectivity, poor student self-regulation skills, and socioeconomic factors discussed earlier as obstacles to hybrid learning, leading to dissatisfaction.

This leads to the hypotheses:

- *$H_0$3a: There is no significant relationship between student autonomy and student satisfaction during hybrid learning.*
- *H_0 3b: There is no significant relationship between student autonomy and overall hybrid learning experience.*

Hybrid Learning Satisfaction

In this context, hybrid satisfaction is the degree to which the students were satisfied with the hybrid learning experience.

Hybrid learning is associated with satisfaction and student success (Chan, 2023; Chen & Chiou, 2014). Hybrid learning provides flexibility and autonomy and caters for different learning styles (Ikebuchi, 2023; Martin & Bolliger,2022; Torrisi-Steele, 2023). However, a lack of hybrid teaching pedagogy (de Lima et al., 2019), a lack of feedback (Auer, 2023; Bubou & Job, 2021), a lack of collaboration and interaction, erratic connectivity, and power outages (Bubou & Job, 2021; De Wet, 2014; Moonasamy & Naidoo, 2022) would result in poor learning environments, leading to bad hybrid learning experiences. This leads to the hypothesis:

- *$H_0$4: There is no significant relationship between hybrid learning satisfaction and overall hybrid learning experience.*

RESEARCH DESIGN

A cross-sectional correlational quantitative study design was employed. A cross-sectional correlational study enables the researcher to find the relationships between predictor and dependable variables.

Instrument

The questionnaire was adopted from Giray's (2021) satisfaction with the online learning framework. The Cronbach's alpha measures of internal consistency ranged from 0.82 to 0.94, indicating strong reliability (Tavakol & Dennick, 2011). In addition, measures of construct validity (Average Variance Extracted (AVE) and Composite Reliability (CR)) values were above 0.5 and 0.7, respectively, indicating good convergent validity (Hair et al., 2006). Lecturer support had eight items, hybrid learning satisfaction and student Interaction and collaboration had six items, and student autonomy had five items. The participants answered on a 5-point Likert scale ranging from "never" to "always". To ensure content validity, the questionnaire items were checked for wording. Statistical analyses were used to determine the construct validity, and the analyses are depicted in the following sections.

Data Collection

Purposive sampling was used to collect data from the students where their lecturers used hybrid learning as a mode of delivery. Notably, not all lecturers used the hybrid mode of delivery. This approach is not new since Natarezwa and Heng (2023) have successfully used purposeful sampling in a correlational study. Data was collected using an online Google form. Tutors in different faculties were provided with the Google form link to forward to the students in their faculties.

Participants

Most of the students come from disadvantaged families. Data is also expensive to purchase, and some students get financial assistance from the government, which may not be enough. The participants were drawn from undergraduate and postgraduate students from the faculties of the College of Business and Economics, Art, Design and Architecture, Education, Engineering, Health Sciences, Humanities, Law, Sciences and Management, making a total population of 194. From this population, 179(92,3%) students were undergraduates and 15(7,7%) were postgraduates. Most of the students were Blacks (77,8%), and 64,4% were in the age group 18-21.

DATA ANALYSIS

Sample Size and Power Analysis

An a priori power analysis was conducted using G*Power 3.1.9. to determine the required sample size for the multiple regression analysis. The following parameters were set: an alpha level of .05, a desired power((1–β) of .80, a medium effect size (f^2 = .15), and three predictors. The results indicated that a minimum sample of **N = 77** participants was required to detect a significant R^2 deviation from zero. To ensure sufficient power, 194 participants participated in the study.

Exploratory Factor Analysis

We used SPSS version 29 to analyse the survey items and explore their unidimensional extent using principal axis factoring with varimax method rotation with Kaiser normalisation. Four factors were extracted for eigenvalues greater than 1. The resultant factor loadings exceeded the threshold of 0.5, suggesting that items reliably measured the variable they intended to measure (Field, 2018). Table 1 depicts the standardised regression weights of the items in each construct.

***Table 1**: Standardised regression weights for all the constructs.*

ITEMS	LS	SC	SA	HLS
1	0.683	0.780	0.556	0.848
2	0.651	0.685	0.678	0.912
3	0.716	0.686	0.721	0.943
4	0.744	0.830	0.716	0.916
5	0.685	0.755	0.733	0.932
6	0.682	0.652		0.855
7	0.655			
8	0.731			

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

Sampling Adequacy

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for LS, SC, SA and HLS were equal to 0.850,0.905, 0.795 and 0.905, respectively, and these values exceed the threshold of 0.7, signifying meritorious sampling adequacy and plausibility of factor analysis (Kaiser, 1974). The Bartlett's test of sphericity was significant ($p < 0.05$), indicating that intercorrelations existed among the variables, enabling the plausibility for factor analysis (Bartlett, 1954).

Reliability

Reliability measures the internal consistency of the items. The overall Cronbach's Alpha was equal to 0.921, which indicates good reliability (Tavakol & Dennick, 2011).

Multicollinearity

Multicollinearity exists if the constructs are highly related, and its absence leads to a parsimonious model, which is desirable (Cohen & Swerdlik, 2005). The inter-construct correlations in Table 2 are less than 0.8, indicating the absence of multicollinearity in the data.

***Table 2**: Inter-construct correlation for all the constructs*

	LS	SC	SA	HLS
LS	1			
SC	0.365	1		
SA	0.296	0.218	1	
HLS	0.549	0.231	0.387	1

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

Construct Validity

Construct validity measures what the questionnaire items intend to measure. Construct validity comprises convergent and discriminant validity, where convergent validity measures the relatedness of items in a construct and discriminant validity measures how distinct items across constructs are (Field, 2018). In this study, the composite reliability for all the constructs (CR) surpassed 0.7, and the average variance extracted (AVE) was approximately equal to 0.5(1dp) or greater, indicating convergent validity (Hair et al., 2006). Discriminant validity was achieved since correlations between the constructs are lower than the square roots of the AVEs (bolded values)

as per Fornell and Larcker (1981) requirements. Table 3 displays the convergent and discriminant validity measures.

Table 3*: Composite reliability and AVE measures for all the constructs*

	CR	**AVE**	**LS**	**SC**	**SA**	**HLS**
LS	0.881	0.482	**0.694**			
SC	0.874	0.539	0.365	**0.734**		
SA	0.813	0.468	0.296	0.218	**0.684**	
HLS	0.963	0.813	0.549	0.231	0.387	**0.902**

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction.

Descriptive Statistics

The descriptive statistics shown below indicated that the students valued Student autonomy (SA) the most because of its largest mean (4,16) followed by Lecturer support (3,72). Student collaboration (SC) had the lowest mean (2,96), indicating a poor perception of the construct by the students.

Construct	**Mean**	**Std. Deviation**
LS	3.72	.84
SC	2.96	.93
SA	4.160	.74
HLS	3.64	1.13

CONFIRMATORY FACTOR ANALYSIS (CFA)

CFA was undertaken to verify the measurement model using the AMOS version 29 software. Figure 2 below shows the confirmatory factor analysis model.

The indices that were used to determine model fit were the ratio of Chi-Square to degrees of freedom (CMIN/df = 2.058), Incremental Fit Index (IFI =0.907), Comparative Fit Index (CFI = 0.906I), which were all greater than 0.90 except Tucker-Lewis Index (TLI = 0.896I), and the Root Mean Square Error of Approximation (RMSEA = 0.074) was less than 0.08, indicating a reasonable model (Hair et al., 2010; Hu & Bentler,1999). The model was then modified to improve the model fitness by correlating measurement errors. However, some authors, such as Hermida (2015) and Kang and Ahn (2021), discourage correlation of measurement errors because this may cause model misspecification. Nevertheless, in this case, the items for LS, SC, SA and HLS are conceptually similar since they all contribute to hybrid learning satisfaction; hence, it is reasonable to expect their measurement errors to be correlated.

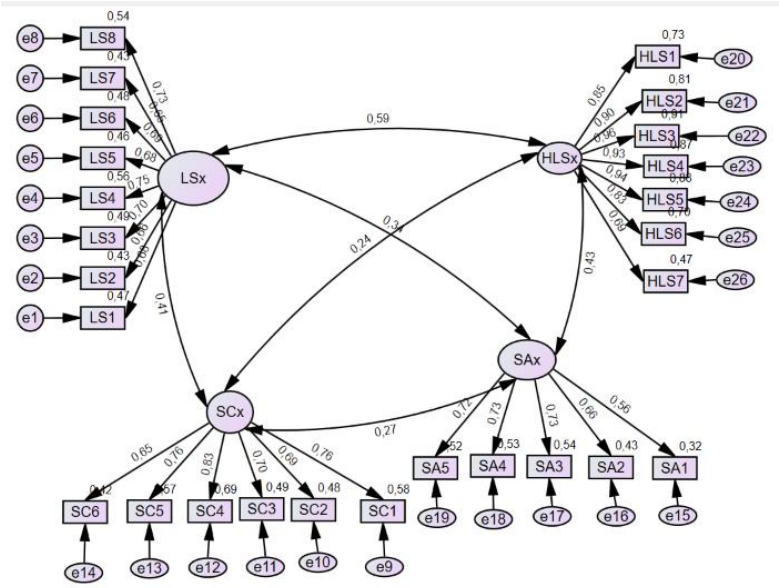

Figure 2: The confirmatory factor analysis model 1

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

Figure 3 shows the model after the correlation of measurement errors for modification indices greater than 10.

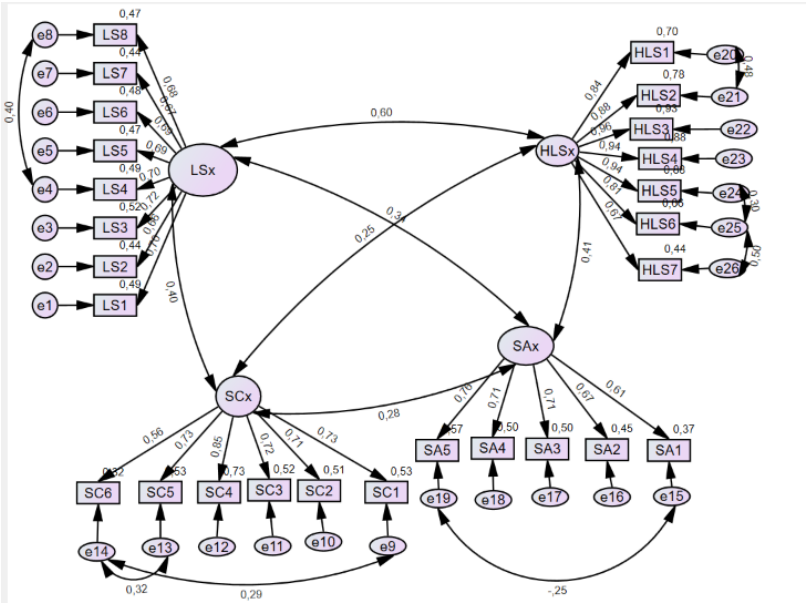

Figure 3: The confirmatory factor analysis model after modification

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

The results of CFA confirmed that the measurement model had excellent fit indices [CMIN/df = 1,480 (which is between 1 and 3), RMSEA = 0,050, CFI =0,959, TLI =0,953, IFI =0,959 (Hair et al., 2010; Hu & Bentler, 1999).

Structural Analysis

Structural equation modelling was then used to find the relationships among the variables, LS, SC and SA and HLS. Figure 4 shows the structural analysis of the variables.

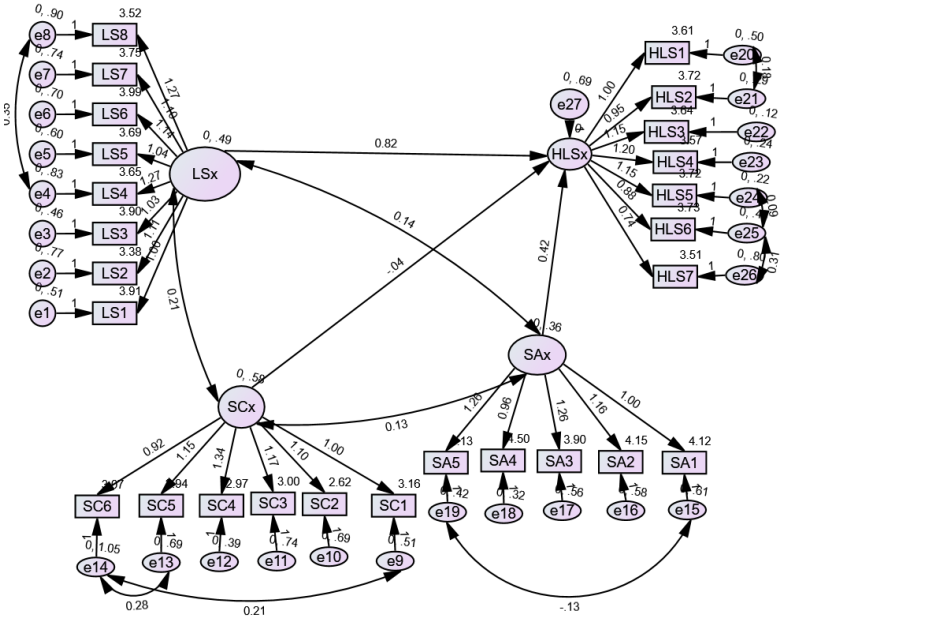

Figure 4: The structural analysis among the variables.

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

The structural analysis results indicated that Lecturer support (LS) and Student autonomy (SA) were significant predictors of hybrid learning satisfaction. Student collaboration (SC) did not influence Hybrid learning satisfaction. Table 4 shows the results of structural analysis.

Table 4*: The structural analysis of the constructs*

Hypothesis	**Path**			**Estimate**	**P**	**RESULT**
$H_0$2a	HLSx	<---	LSx	0.529	***	Rejected
$H_0$1a	HLSx	<---	SCx	-0.027	0.708	Supported
$H_0$3a	HLSx	<---	SAx	0.234	0.002	Rejected

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

Hypotheses H02a and H03a were rejected, indicating that Student autonomy and Lecturer support were important elements of student satisfaction during hybrid learning. Student interaction and collaboration did not positively correlate with hybrid learning satisfaction since the null hypothesis (H01a) was supported. The explained variance of hybrid learning satisfaction was a paltry 40.5%, indicating the absence of other factors that contribute to hybrid learning satisfaction, such as course design and lecture characteristics.

Second Order Confirmatory Factor Analysis (CFA)

In Table 3, the CR and AVE values are shown as ≥ 0.7 and ≈0.5, respectively, suggesting another latent factor that can account for these variables. Second-order structural equation modelling was employed to determine the Overall hybrid learning experience latent factor. Figure 5 depicts the pictorial analysis.

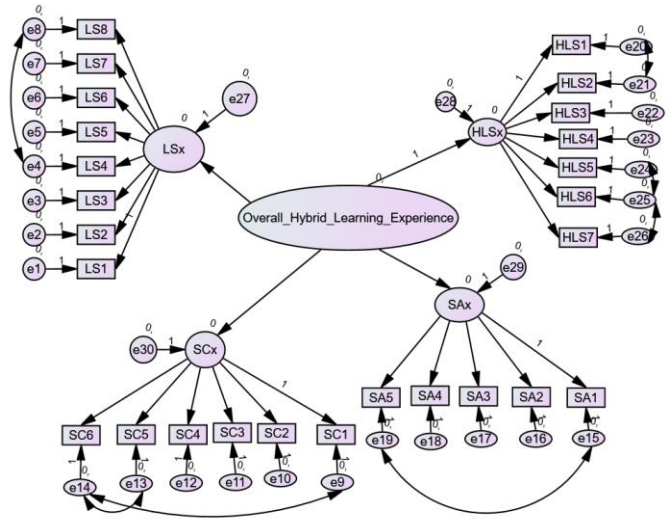

Figure 5: The second-order CFA model

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

Table 5 shows the path analysis of the variables.

The explained variance of hybrid learning is 40.65 %. The null hypotheses H02b, H04b, H03b and H01b were rejected, indicating that LSx, HLSx, SAx and SCx were significantly correlated with the Overall hybrid learning experience.

***Table 5**: Path analysis of the variables*

Hypothesis	Path			Estimate	P	Variance Explained %	Rank	Result
$H_0$2b	LSx	<---	Overall hybrid learning experience	.807	***	65.1	1	Rejected
$H_0$4b	HLSx	<---	Overall hybrid learning experience	.734		53.9	2	Rejected
$H_0$3b	SAx	<---	Overall hybrid learning experience	.497	***	24.7	3	Rejected
$H_0$1b	SCx	<---	Overall hybrid learning experience	.435	***	18.9	4	Rejected

Note: LS = lecturer support; SC = student interaction and collaboration; SA = student autonomy; HLS = hybrid learning satisfaction

MODERATORS

The ANOVA test was used to determine the moderating effect of gender, age and programme level on LS, SC, SA and HLS. Gender had a significant influence on SC ($p = 0.027$), SA ($p = 0.012$), and HLS ($p = 0.009$), with the means of males greater than those of the females. Age and programme level did not influence all the constructs, LS, SC, SA and HLS.

DISCUSSION

The study investigated the relationship between lecturer support, student autonomy and student interaction and collaboration with hybrid learning satisfaction and the individual contribution of lecturer support, student autonomy, hybrid learning satisfaction, and student interaction and collaboration on the overall hybrid learning experience.

Lecturer Support and Hybrid Satisfaction

Lecturer support positively correlated with hybrid learning satisfaction in line with findings of several authors (Martin & Bolliger, 2022 Meeprom & Fakfare, 2023; Gray, 2021; Taghizadeh & Hajhosseini, 2021; Linder, 2017; Zamri et al.,2021) and resonating with the views of Zamri et al. (2021), who reported that lecture support in the form of feedback leads to satisfaction with the hybrid learning experience. However, this result is inconsistent with the findings of Dastidar (2021), who indicated that "instructor support" was an insignificant predictor of student satisfaction. With the ubiquitous growth of social media and its affordability, lecturers can support their students despite infrastructural constraints through low bandwidth social media channels such as WhatsApp, designed to optimise student resource availability.

Student Autonomy and Hybrid Satisfaction

Student autonomy positively correlated with hybrid learning satisfaction, agreeing with findings from Martin and Bolliger (2022) and Giray (2021). In addition, this aligns with the views of several authors (Abduramanova et al., 2021; Mistretta, 2024; Perfetto, 2019; Pinto & Anderson, 2013; Singh & Allers, 2022), who reported that a hybrid learning environment provides student autonomy. However, the significant effect of student autonomy in hybrid learning must be considered, along with the intermittent power outages and unreliable internet access in South Africa. Therefore, students facing these infrastructural disruptions are bound to be self-regulated and innovative to keep up with their learning amid their challenges. This result is inconsistent with findings from Dastidar (2021), who reported that student autonomy was an insignificant predictor of student satisfaction. Nonetheless, Dastidar's (2021) study took place at a university in India where power outages and connectivity were not issues.

Student Collaboration and Interaction and Hybrid Satisfaction

Student collaboration and interaction had no significant relationship with hybrid learning satisfaction, supporting earlier findings from Meeprom and Fakfare (2023) and Kyei-Blankson et al. (2016), who reported that student-to-student interaction was inferior to lecturer-to-student and student-to-content interaction. However, this result is inconsistent with the findings from several authors (Alqurashi, 2017; Conrad et, 2021; Dastidar, 2021; Giray, 2021; Hussin et al., 2019; She et al., 2021; Taghizadeh & Hajhosseini, 2021), who reported that student interaction and collaboration are significant predictors of satisfaction. The insignificance of student collaboration and interaction can be attributed to infrastructural challenges such as poor connectivity and power outages that make synchronous interactions impossible to occur, as well as a lack of hybrid learning lecturing strategies on the part of lecturers, hindering student collaboration.

Lecturer Support, Hybrid Satisfaction, Student Autonomy, Student Interaction and Collaboration and Overall Hybrid Learning Experience

Lecturer support and hybrid learning satisfaction positively correlated with the overall hybrid learning experience, with lecturer support and hybrid learning satisfaction contributing 65.1% and 53.9% of explained variance, respectively, highlighting their importance in the Overall hybrid learning experience. The factor loadings of lecturer support and hybrid learning satisfaction are .807 and .734, respectively, indicating that lecturer support strongly correlates with student satisfaction, hence resonating with the views of Richardson et al. (2017), who posited that lecturer support was strongly linked with student satisfaction and perceived learning.

Student autonomy positively correlated with the overall hybrid learning experience despite the connectivity constraints (De Wet, 2014; Greyling & Wolhuter, 2023; Moonasamy & Naidoo,2022) and social problems (Mphuthi & Tshelane, 2022; Zimba et al., 2021) that the students faced. This result resonates with the findings of Ikebuchi (2023), Linder (2017) and Singh et al. (2022), who posited that the virtual learning component of hybrid learning fosters self-regulation and independent learning.

Student interaction and collaboration positively correlated with the Overall hybrid learning experience, resonating with the views of Hussin et al. (2019) and Raes (2022), who posited that student collaboration and interactions drive knowledge construction in Hybrid learning. Notwithstanding, this result surprisingly contrasts with the views of several authors (Greyling & Wolhuter, 2023; Motaung & Dube, 2020; Tobi et al., 2021) who posited that poor connectivity, erratic power cuts, and technical glitches would render the virtual part of hybrid learning impossible. Similarly, student interaction and collaboration contributed the least explained variance to the overall hybrid learning experience, probably indicating a lack of interaction tools uses, probably due

to poor hybrid learning pedagogies, resonating with findings from Gyawali & Mehndroo (2024) and Torrisi-Steele (2023). Notably, using social media, which uses low bandwidth, can support collaboration and interaction in constrained environments. In addition, assigning students to group projects and fostering peer feedback in social media channels will improve collaboration and student interaction.

Hybrid learning satisfaction positively correlated with the overall hybrid learning experience. This result aligns with the views of Meeprom & Fakfare (2023), Raes (2022) and Torrisi-Steele (2023), who regarded hybrid learning benefits, such as flexibility, as strongly associated with student satisfaction, which is a component of the overall hybrid learning experience. In addition, this result aligns with findings from several authors (Chan, 2023; Dastidar, 2021; Hasanah, 2022; Linder, 2017) who reported that student satisfaction results in positive educational experiences leading to student motivation and engagement and improved student success. In addition, this result resonates with the findings from several authors (Bowden et al., 2021; Chen & Chiou, 2014; Hews et al., 2022; Reeve & Jang, 2022; Raes, 2022; Wang, 2021), who posited that hybrid satisfaction leads to improved student success.

RECOMMENDATIONS

Based on the connectivity constraints that the students face, it is recommended that lecturers use low-bandwidth educational platforms such as WhatsApp, enabling the students to learn when connectivity is poor, unlike learning management systems that use high bandwidth and will not be able to function when connectivity is poor or non-existent. In addition, lecturers must provide resources with offline access, such as textbooks, software or apps that function without an internet connection and downloadable content that can be accessed offline. For instance, when students attend in-person classes at a university with stable connectivity, they can download the work and the resources they will be using in the next week in advance. The lecturers can upload less data-intensive teaching materials such as audio and compressed videos and provide video and audio transcripts, which are low on data usage. In addition, the university must train its lecturers on hybrid learning pedagogies to become comfortable with content design and lecture delivery. Further, Universities must recognise teaching and learning as being on par with research outputs so that lecturers can spend more time preparing hybrid lectures. Lecturers must post compressed web conferencing class videos on the learning management system so that students who cannot join the online web conferencing can access the resources. Finally, universities must also provide data packs to students, although this can be unsustainable in developing countries.

IMPLICATIONS

Practical Implications

Lecturer support had a significant influence on hybrid learning satisfaction and hybrid learning. These results are important because lecturers must be trained pedagogically and technologically to increase their repertoire of lecturer support strategies. In addition, alternative low-bandwidth learning channels such as WhatsApp, manned by tutors, should complement the learning management system and improve the hybrid learning experience.

Student autonomy had a significant influence on hybrid learning satisfaction and hybrid learning. This result implies that universities must provide lecturers with training on how to support students using feedback and provide data packs so that remote students can access content and learn independently at any time.

Student collaboration and interaction did not correlate with hybrid learning satisfaction but correlated with the overall hybrid learning experience. The university must train its lecturers on hybrid learning pedagogies to empower them to use collaborative activities such as discussion boards and web conferencing tools more effectively. In addition, the provision of data packs to students would enable remote poor students to join the online sessions, hence facilitating equity and bridging the digital divide.

Hybrid learning satisfaction positively correlated with a hybrid learning experience. Since hybrid learning satisfaction was positively correlated with student autonomy and lecturer support, all interventions that apply to student autonomy and lecturer support mentioned above will apply to student satisfaction.

Theoretical Implications

The study extends Giray's (2021) e-satisfaction satisfaction framework to hybrid learning in an environment constrained by infrastructural challenges such as intermittent power outages and unreliable connectivity. In addition, the study used second-order confirmatory factor analysis to rank the individual contributions of lecturer support, hybrid learning satisfaction, student autonomy, and student interaction and collaboration to hybrid learning. In this study, the explained variances of hybrid satisfaction and overall hybrid learning experience were 40.5% and 40.7 %, respectively, implying there are a lot of factors that were not included, such as course design, student and lecturer characteristics and institutional support, that contribute to hybrid satisfaction and the overall hybrid learning experience.

LIMITATIONS and FUTURE RESEARCH

Although the sampling adequacy statistic (KMO) was adequate, a large sample of upwards of 300 participants is always desirable for structural equation modelling. Employing a mixed-methods approach would have complemented the quantitative approach solely used in this study. There are always problems with self-reporting, which may introduce social bias, leading to unreliable results. The scope of the study was limited since it only included autonomy, lecturer support, and student collaboration. Including other variables, such as course design and student and instructor characteristics, would increase the models' explanatory power for hybrid learning and satisfaction.

CONCLUSION

Student autonomy and lecturer support were important elements of student satisfaction during hybrid learning. Student autonomy, lecturer support, hybrid learning satisfaction, and student interaction and collaboration are important elements of the overall hybrid learning experience. In environments prone to infrastructural constraints, lecturers and universities must innovate to improve hybrid learning and satisfaction.

REFERENCES

Abedi, E.A. & Ackah-Jnr, F.R., (2023). First-Order Barriers Still Matter in Teachers' Use of Technology: An Exploratory Study of Multi-Stakeholder Perspectives of Technology Integration Barriers. *International Journal of Education and Development Using Information and Communication Technology*, vol.19, no. 2, pp.148-165. http://ijedict.dec.uwi.edu/viewarticle.php?id=3164.

Abduramanova, D., Aliyev, D., & Rasulmetova, S. (2021). Student autonomy as a principle of organization of learning foreign languages. *Academic Research In Educational Sciences*, vol.2, no. 5, pp.1588-1593.

Almendingen, K., Morseth, M. S., Gjølstad, E., Brevik, A., & Tørris, C. (2021). Student's experiences with online teaching following COVID-19 lockdown: A mixed methods explorative study. *PloS one*, vol.*16, no. 8*, pp. e0250378. https://doi.org/10.1371/journal.pone.0250378

Athens, W. (2023). Self-regulation, motivation, and outcomes in HyFlex classrooms. *Educational Technology Research and Development*, vol.*71, no. 4*, pp.1765-1783. https://doi.org/10.1007/s11423-023-10243-y

Auer, N. (2023). Formative assessment in hybrid learning environments. In *Digital Teaching, Learning and Assessment*, pp. 147-159. Chandos Publishing. https://doi.org/10.1016/B978-0-323-95500-3.00013-4

Bartlett, M. S. (1954). A note on the multiplying factors for various χ 2 approximations. *Journal of the Royal Statistical Society. Series B (Methodological)*, 296-298.

Beatty, B. J. (2019). *Hybrid-Flexible Course Design: Implementing student-directed hybrid classes*. *EdTech Books*. https://doi.org/10.59668/33

Bell, J., Sawaya, S., & Cain, W. (2014). Synchromodal classes: Designing for shared learning experiences between face-to- face and online students. *International Journal of Designs for Learning,* vol.5, no. 1. pp. 68-82. https://doi.org/10.14434/ijdl.v5i1.12657

Bowden, J. L. H., Tickle, L., & Naumann, K. (2021). The four pillars of tertiary student engagement and success: a holistic measurement approach. *Studies in Higher Education*, vol.*46, no. 6*, pp. 1207-1224. https://doi.org/10.1080/03075079.2019.1672647

Beirne, E. & Romanoski, M.P. (2018). Instructional design in higher education: Defining an evolving field. *OLC Outlook: An Environmental Scan of The Digital Learning Landscape*.

Bubou, G. & Job, G. (2021). Benefits, Challenges and Prospects of Integrating E-Learning into Nigerian Tertiary Institutions: A Mini Review. *International Journal of Education and Development using Information and Communication Technology*, vol.17, no. 3, pp.6-18.

Burroughs, N., Gardner, J., Lee, Y., Guo, S., Touitou, I., Jansen, K., ... & Schmidt, W. (2019). A review of the literature on teacher effectiveness and student outcomes. *Teaching for Excellence and Equity: IEA Research for Education*, *Springe*r, vol 6. pp.7-17. https://doi.org/10.1007/978-3-030-16151-4_2

Carmichael, M., Reid, A., & Karpicke, J. D. (2018). Assessing the impact of educational video on student engagement, critical thinking and learning. *A SAGE white paper*.

Cevikbas, M., & Kaiser, G. (2023). Can flipped classroom pedagogy offer promising perspectives for mathematics education on pandemic-related issues? A systematic literature review. *ZDM–Mathematics Education*, *vol.55, no.1, pp.* 177-191. https://doi.org/10.1007/s11858-022-01388-w

Chan, S.C. (2023). Are You Enjoying It--" Online Learning"? Enjoyment of Study, Study Engagement, Learning Performance, and Informal Learning. *International Journal of Education and Development using Information and Communication Technology*, vol.*19, no. 2,* pp.7-18.

Chen, B. H., & Chiou, H. H. (2014). Learning style, sense of community and learning effectiveness in hybrid learning environment. *Interactive Learning Environments*, vol.*22, no. 4*, pp. 485–496. https://doi.org/10.1080/10494820.2012.680971

Chen, W., Sanderson, N. C., Nichshyk, A., Bong, W. K., & Kessel, S. (2021). Usability of learning management systems for instructors–the case of canvas. In International Conference on Human-Computer Interaction (pp. 210-223). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-77889-7_14

Cohen, R. J., & Swerdlik, M. E. (2005). *Psychological testing and assessment: An introduction to tests and measurement* (6th ed.). New York: McGraw-Hill

Conrad, C., Deng, Q., Caron, I., Shkurska, O., Skerrett, P., & Sundararajan, B. (2022). How student perceptions about online learning difficulty influenced their satisfaction during Canada's Covid-19 response. *British Journal of Educational Technology*, vol. 53, no.3, pp. 534-557. https://doi.org/10.1111/bjet.13206

Dastidar, S. G. (2021). The impact of students' perceptions of online learning environments on students' satisfaction in the context of Covid-19 pandemic. *Studies in Learning and Teaching*, vol.2, no.3, pp. 61-72. https://doi.org/10.46627/silet.v2i3.84

de Lima, D.P., Gerosa, M.A., Conte, T.U. and de M. Netto, J.F., (2019). What to expect, and how to improve online discussion forums: the instructors' perspective. *Journal of Internet Services and Applications*, vol.10, pp.1-15. https://doi.org/10.1186/s13174-019-0120-0

De Wet, C. (2014). Trends in digital pedagogies: Implications for South African universities expanding through hybrid online education. *Mediterranean Journal of Social Sciences*, vol.*5, no.23*, pp.859-867.https://doi.org/10.5901/mjss.2014.v5n23p859

Detyna, M., Sanchez-Pizani, R., Giampietro, V., Dommett, E. J., & Dyer, K. (2023). Hybrid flexible (HyFlex) teaching and learning: climbing the mountain of implementation challenges for synchronous online and face-to-face seminars during a pandemic. *Learning Environments Research*, vol.*26, no.1,* pp. 145-159. https://doi.org/10.1007/s10984-022-09408-y

Doumanis, I., Economou, D., Sim, G. R., & Porter, S. (2019). The impact of multimodal collaborative virtual environments on learning: A gamified online debate. *Computers & Education*, vol.*130*, pp.121-138. https://doi.org/10.1016/j.compedu.2018.09.017

Dube, B., (2020). Rural online learning in the context of COVID 19 in South Africa: Evoking an inclusive education approach. *REMIE: Multidisciplinary Journal of Educational Research*, vol.*10, no. 2*, pp.135–157. https://doi.org/10.17583/remie.2020.5607

Gyawali, Y.P., & Mehndroo, M., (2024). Navigating the Digital Frontier: Exploring Opportunities and Challenges in the Integration of Technology in Higher Education. *International Journal of Education and Development using Information and Communication Technology*, vol.*20, no. 1*, pp.119-133.

Field, A., (2018). *Discovering statistics using IBM SPSS statistics 5th ed. Sage, Newbury Park.*

Gagnon, K., Young, B., Bachman, T., Longbottom, T., Severin, R., & Walker, M. J. (2020). Doctor of physical therapy education in a hybrid learning environment: reimagining the possibilities and navigating a "new normal". *Physical Therapy*, vol.*100, no. 8*, pp. 1268-1277. https://doi.org/10.1093/ptj/pzaa096

García-Jiménez, E., Gallego-Noche, B., & Gómez-Ruíz, M. Á. (2015). Feedback and self-regulated learning: How feedback can contribute to increase students' autonomy as learners. *Sustainable Learning in Higher Education: Developing Competencies for the Global Marketplace*, pp.113-130. https://doi.org/10.1007/978-3-319-10804-9_9

Giray, G. (2021). An assessment of student satisfaction with e-learning: An empirical study with computer and software engineering undergraduate students in Turkey under pandemic conditions. *Education and Information Technologies*, vol.*26,* no.6, pp. 6651-6673. https://doi.org/10.1007/s10639-021-10454-x

Greyling, S., & Wolhuter, C. (2023). Changes to hybrid higher education induced by the COVID-19 pandemic: A South African case study. In *Rethinking Hybrid and Remote Work in Higher Education: Global Perspectives, Policies, and Practices after COVID-19* (pp. 209-233). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-36632-1_11

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). Multivariate data analysis (7th ed.), Prentice-Hall, Inc.

Hair, Jr., JF, Black, WC, Babin, BJ, Anderson, RE, Tatham, RL. (2006.) *Multivariate data analysis (6th Ed.),* Pearson Prentice Hall

Handle-Pfeiffer, D., Winter, C., Löw, C. and Hackl, C. (2022), May. Rethinking Hybrid Teaching: The Hybrid Rhombus Model as an Approach to Understanding Hybrid Settings. In *8th International Conference on Higher Education Advances (HEAd'22)*, pp. 1367-1375. Editorial Universitat Politècnica de València. https://doi.org/10.4995/HEAd22.2022.14602

Haningsih, S., & Rohmi, P. (2022). The pattern of hybrid learning to maintain learning effectiveness at the higher education level post-COVID-19 pandemic. *European Journal of Educational Research*, vol.11, no.1, pp. 243-257. https://doi.org/10.12973/eu-jer.11.1.243

Hasanah, M. (2022). Hybrid Learning Management as a Strategy to Improve Learning Motivation in Higher Education. *AL-TANZIM J. Manaj. Educator. Islam*, vol.6, no. 1, pp.490-500. https://doi.org/10.33650/al-tanzim.v6i2.3415

Hermida, R. (2015). The problem of allowing correlated errors in structural equation modeling: concerns and considerations. *CMSS, vol.* III, no. 1, pp. 5-17. https://econpapers.repec.org/scripts/redir.pf?u=http%3A%2F%2Fcmss.univnt.ro%2Fwp-content%2Fuploads%2Fvol%2Fsplit%2Fvol_III_issue_1%2FCMSS_vol_III_issue_1_art.001.pdf;h=repec:ntu:ntcmss:vol3-iss1-15-005

Hews, R., McNamara, J., & Nay, Z. (2022). Prioritising Lifeload over Learning Load: Understanding Post-Pandemic Student Engagement. *Journal of University Teaching and Learning Practice*, vol.19. no. 2, pp. 128-145. https://doi.org/10.53761/1.19.2.9

Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in online learning: student attitudes and behavior during COVID-19. In *Frontiers in Education* vol. 7, pp. 851019. Frontiers Media SA. https://doi.org/10.3389/feduc.2022.851019

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, vol.6. no. 1, pp. 1−55. https://doi.org/10.1080/10705519909540118

Huang, Y., Zhao, C., Shu, F., & Huang, J. (2017). Investigating and analyzing teaching effect of blended synchronous classroom. In *2017 International Conference of Educational Innovation through Technology (EITT)*, pp. 134-135). IEEE. https://doi.org/10.1109/EITT.2017.40

Hussin, W. N. T. W., Harun, J., & Shukor, N. A. (2019). Online Interaction in Social Learning Environment towards Critical Thinking Skill: A Framework. *Journal of Technology and Science Education*, vol.9, no. 1, pp. 4-12. https://doi.org/10.3926/jotse.544

Ikebuchi, S. (2023). Accessing Education: Equity, Diversity, and Inclusion in Online Learning. *Canadian Journal of Learning and Technology*, vol.49, no. 1, pp.1-20. https://doi.org/10.21432/cjlt28349

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, vol*39, no 1*, pp. 31-36. https://doi.org/10.1007/BF02291575

Kang, H., & Ahn, J. W. (2021). Model setting and interpretation of results in research using structural equation modeling: A checklist with guiding questions for reporting. *Asian Nursing Research*, vol.15, no. 3, pp.157-162. https://doi.org/10.1016/j.anr.2021.06.001

Karnad, A. (2013). Student use of recorded lectures: A report reviewing recent research into the use of lecture capture technology in higher education, and its impact on teaching methods and attendance. http://eprints.lse.ac.uk/50929/1/Karnad_Student_use_recorded_2013_author.pdf.

Kim, I. H. (2014). Development of reasoning skills through participation in collaborative synchronous online discussions. *Interactive Learning Environments*, vol.*22, no. 4*, pp. 467-484. https://doi.org/10.1080/10494820.2012.680970

Krishnan, J., & Nagaratnam, S. (2023). Hybrid Learning: A Boon or Bane. In *2023 11th International Conference on Information and Education Technology (ICIET)*, pp. 256-261. IEEE. https://doi.org/10.1109/ICIET56899.2023.10111373

Kyei-Blankson, L., Ntuli, E., & Donnelly, H. (2016). Establishing the importance of interaction and presence to student learning in online environments. *World Journal of Educational Research*, *3*.

Kyei-Blankson, L., Ntuli, E. & Donnelly, H. (2019). Establishing the importance of interaction and presence to student learning in online environments. *Journal of Interactive Learning Research*, vol. 30, no. 4, pp. 539–560. https://doi.org/10.22158/wjer.v3n1p48

Ladd, T. (2020). Optimizing concurrent classrooms: Teaching students in the room and online simultaneously. Forbes. Retrieved from: https://www.forbes.com/sites/tedladd/2020/06/19/optimizing-concurrent-classrooms-teaching-students-in-the-room-and-online-simultaneously/

Li, K. C., Wong, B. T., Kwan, R., Chan, H. T., Wu, M. M., & Cheung, S. K. (2023). Evaluation of Hybrid Learning and Teaching Practices: *The Perspective* of Academics. *Sustainability*, vol.15, no. 8, pp. 6780. https://doi.org/10.3390/su15086780

Li, T., & Yang, X. (2024). Conflict or facilitation? Faculty members' teaching time and their research performance. *Higher Education*, vol. 87, no. 5, pp.1433-1451. https://doi.org/10.1007/s10734-023-01071-3

Linder, K. E. (2017). Fundamentals of hybrid teaching and learning. *New Directions for Teaching and Learning*, *2017*(149), pp.11-18. https://doi.org/10.1002/tl.20222

Martin, F., & Bolliger, D. U. (2022). Developing an online learner satisfaction framework in higher education through a systematic review of research. *International Journal of Educational Technology in Higher Education*, vol. 19, no. 1, pp.1-21. https://doi.org/10.1186/s41239-022-00355-5

Matoti, S. N., & Lenong, B. (2018). Teaching large classes at an institution of higher learning in South Africa. In *Proceedings of International Academic Conferences* (No. 6509064). *International Institute of Social and Economic Sciences*. https://doi.org/10.20472/IAC.2018.040.044

Mayer, S. (2023). Understanding the challenges and opportunities of hybrid education with location asynchrony. Conference: Proceedings of the 56th Hawaii International Conference on System Science https://doi.org/10.24251/HICSS.2023.013

Meeprom, S., & Fakfare, P. (2023). Blended Learning: Examining Must-Have, Hybrid, and Value-Added Quality Attributes of Hospitality and Tourism Education. *Journal of Hospitality & Tourism Education*, pp.1-15. https://doi.org/10.1080/10963758.2023.2172419

Mistretta, S. (Ed.). (2024). *Reimagining Education: The Role of E-Learning, Creativity, and Technology in the Post-Pandemic Era*. BoD–Books on Demand. 10.5772/intechopen.110350

Moonasamy, A. R., & Naidoo, G. M. (2022). Digital Learning: Challenges experienced by South African university students' during the COVID-19 pandemic. *The Independent Journal of Teaching and Learning*, vol.17, no. 2, pp.76-90.

Motaung, L. B., & Dube, B. (2020). WhatsApp messenger as a mediating tool in times of COVID-19 for enhancing student engagement in e-tutorials at a rural South African university. *Journal of Educational and Social Research*, vol.10, no. 6, pp.214-224. https://doi.org/10.36941/jesr-2020-0121

Mphuthi, M., & Tshelane, M. (2022). A pathway to adapt hybrid learning for pre-service teachers as the new normal in curriculum practice: Using WhatsApp as a learning tool. Conference: International Conference on Educational Research.At: Thailand. http://hdl.handle.net/11462/2392

Mucundanyi, G., & Woodley, X. (2021). Exploring free digital tools in education. *International Journal of Education and Development using Information and Communication Technology*, vol.17, no.2, pp. 96–103.

Natarezwa, M. K. R., & Heng, P. H. (2023). The Relationship Between Learning Motivation and Academic Procrastination in Final Year Students in the Covid-19 Endemic Era. *Riwayat: Educational Journal of History and Humanities*, *6*(4), 2336-2344.

Ndebele, C. (2022). Examining the efficacy of professionalising university teaching through formal teaching qualifications at a historically disadvantaged university in South Africa. *The Independent Journal of Teaching and Learning*, vol. 17, no. 1, pp. 23–38.

Nebrida, J., & Bangud, A. (2022). Challenges in hybrid teaching amidst pandemic: The proposed model. *Journal of Engineering Research and Reports*, vol. 22, no. 9, pp. 51-64. https://doi.org/10.9734/jerr/2022/v22i917564

Perfetto, L. M. (2019). Preparing the nurse of the future: Emergent themes in online RN-BSN education. *Nursing Education Perspectives*, vol.40, no. 1, pp.18-24. https://doi.org/10.1097/01.NEP.0000000000000378

Pinto, M. B., & Anderson, W. (2013). A Little Knowledge Goes a Long Way: Student Expectation and Satisfaction with Hybrid Learning. *Journal of Instructional Pedagogies*, vol. *10*.

Qi, J., Tang, H., & Zhu, Z. (2023, March). Exploring an Affective and Responsive Virtual Environment to Improve Remote Learning. In *Virtual Worlds*, vol. 2, no. 1, pp. 53–74. MDPI.
https://doi.org/10.3390/virtualworlds2010004

Radwan, T. G. (2023). *Students' satisfaction with the hybrid learning system: Lebanese context* (Doctoral dissertation, Notre Dame University-Louaize).

Raes, A. (2022). Exploring student and teacher experiences in hybrid learning environments: Does presence matter?. *Postdigital Science and Education*, vol 4, no. 1, pp. 138–159. https://doi.org/10.1007/s42438-021-00274-0

Raes, A., Detienne, L., Windey, I., & Depaepe, F. (2020). A systematic literature review on synchronous hybrid learning: gaps identified. *Learning Environments Research*, vol. *23*, pp. 269-290. https://doi.org/10.1007/s10984-019-09303-z

Raes, A., Vanneste, P., Pieters, M., Windey, I., Van Den Noortgate, W., & Depaepe, F. (2020). Learning and instruction in the hybrid virtual classroom: An investigation of students' engagement and the effect of quizzes. *Computers & Education*, vol. *143*, pp. 103682. https://doi.org/10.1016/j.compedu.2019.103682

Ramrathan, L. (2013). Towards a conceptual framework for understanding student dropout from HEIs. *South African Journal of Higher Education*, vol. 27, no. 1, pp. 209-220.

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology*, vol. 98, no. 1, pp. 209. https://doi.org/10.1037/0022-0663.98.1.209

Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, vol. 71, pp. 402-417. https://doi.org/10.1016/j.chb.2017.02.001

Saidi, A., 2020. Enhancing academic success through the involvement of students in quality assurance and promotion in higher education: a synopsis. *South African Journal of Higher Education*, vol. 34, no. 5, pp.1-19. https://doi.org/10.20853/34-5-4347

She, L., Ma, L., Jan, A., Sharif Nia, H., & Rahmatpour, P. (2021). Online learning satisfaction during COVID-19 pandemic among Chinese university students: The serial mediation model. *Frontiers in Psychology*, vol. 12, pp. 743936. https://doi.org/10.3389/fpsyg.2021.743936

Singh, J., Evans, E., Reed, A., Karch, L., Qualey, K., Singh, L., & Wiersma, H. (2022). Online, hybrid, and face-to-face learning through the eyes of faculty, students, administrators, and instructional designers: Lessons learned and directions for the post-vaccine and post-pandemic/COVID-19 world. *Journal of Educational Technology Systems*, vol. 50, no 3, pp. 301-326. https://doi.org/10.1177/00472395211063754

Singh, P., & Allers, A. (2022). Reforming Education through Self-Regulated Learning. *The International Journal of Pedagogy and Curriculum*, vol. 29, no. 2, pp. 77. https://doi.org/10.18848/2327-7963/CGP/v29i02/77-96

Taghizadeh, M., & Hajhosseini, F. (2021). Investigating a blended learning environment: Contribution of attitude, interaction, and quality of teaching to satisfaction of graduate students of TEFL. *The Asia-Pacific Education Researcher*, vol.30, pp.459-469.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal Of Medical Education, vo.2, pp. 53 - 55. https://doi.org/10.5116/ijme.4dfb.8dfd

Tobi, B., Osman, W. H., Bakar, A. L. A., & Othman, I. W. (2021). A case study on students 'reasons for not switching on their cameras during online class sessions. *Learning*, vol. 6, no. 41, pp. 216-224 https://doi.org/10.35631/IJEPC.641016

Torrisi-Steele, G. (2023). *Facilitating Conditions for Hybrid Teaching Among Academics. In Handbook of Research on Andragogical Leadership and Technology in a Modern World* (pp. 341-357). *IGI Global*. https://doi.org/10.4018/978-1-6684-7832-5.ch018

Wagner, E. D. (1994). In support of a functional definition of interaction. *American Journal of Distance Education*, vol. 8, no. 2, pp. 6-29. https://doi.org/10.1080/08923649409526852

Walker, S. L., & Fraser, B. J. (2005). Development and validation of an instrument for assessing distance education learning environments in higher education: The distance education learning environments survey (DELES). *Learning Environments Research*, vol. 8, no. 3, pp. 289–308. https://doi.org/10.1007/s10984-005-1568-3

Wang, A. (2021). Models of Student Engagement in Music Education Classroom in Higher Education. *Frontiers in Psychology*, vol. *12*, pp. 738207. https://doi.org/10.3389/fpsyg.2021.738207

Wut, T. M., Xu, J., Lee, S. W., & Lee, D. (2022). University student readiness and its effect on intention to participate in the flipped classroom setting of hybrid learning. *Education Sciences*, vol. 12, no. 7, pp. 442. https://doi.org/10.3390/educsci12070442

Zamri, N., Omar, N. B., Anwar, I. S. K., & Fatzel, F. H. M. (2021). Factors Affecting Students' Satisfaction and Academic Performance in Open & Distance Learning (ODL). *International Journal of Academic Research in Business and Social Sciences*, vol. 11, no. 11, pp. 1–16. https://doi.org/10.6007/IJARBSS/v11-i11/11194

Zimba, Z. F., Khosa, P., & Pillay, R. (2021). Using blended learning in South African social work education to facilitate student engagement. *Social Work Education*, vol. 40, no. 2, pp. 263-278. https://doi.org/10.1080/02615479.2020.1746261
