Online Vs. In-Campus, Comparative Analysis of Intrinsic Motivation Inventory, Student Engagement and Satisfaction: A way forward for Post COVID-19 Era

S. Suriagiri[1], N. Norlaila[2], Albertus Wahyurudhanto[3] and A. Akrim[4]
[1]Department of Islamic Educational Management, Universitas Islam Negeri Antasari, Banjarmasin, Indonesia
[2]Department of Arabic Education, Universitas Islam Negeri Antasari, Banjarmasin, Indonesia
[3]Department of Police Science, Sekolah Tinggi Ilmu Kepolisian, Jakarta, Indonesia
[4]Department of Islamic Education, Universitas Muhammadiyah Sumatera Utara, Medan, Indonesia.
[1]suriagiri@uin-antasari.ac.id
[2]norlaila@uin-antasari.ac.id
[3]wrudhanto@gmail.com
[4]akrim@umsu.ac.id
[1]Author Correspondence

Abstract: The education sector was severely impacted due to the pandemic; thus, educational institutions had to shift toward an online learning system. This adaptation in the educational system posits a challenging question: which mode of learning would be best to engage and satisfy the students in the post-COVID-19 era? Therefore, drawing on the self-identity theory, this study explores the differential impact of intrinsic motivational factors (interest/enjoyment, competence, autonomy, and belongingness) on digital engagement and online class satisfaction versus on-campus psychological engagement and physical class satisfaction. Surveying 496 students from six Indonesian universities shows that digital technologies make the learning process interesting and joyful for students compared to on-campus classroom learning, thus resulting in more digitally engaged and satisfied students. Simultaneously, competence is found to be positively impacting online and on-campus students' engagement and satisfaction at an equal level. Moreover, autonomy and belongingness show more students' engagement and satisfaction within the campuses than in an online learning mode. These findings suggest that the post-COVID-19 era can take advantage of both these methods to incorporate a hybrid mix of blended learning to achieve the best learning outcomes in terms of engagement and students' satisfaction. Implications for higher education institutions and directions for future research are suggested.

Keywords: Teaching Presence, Students' Cognitive Presence, Social presence, Content Quality, Students' Satisfaction with E-learning Experience, Online Learning Readiness, Community of Inquiry Model

1. Introduction

The sudden outbreak of the COVID-19 pandemic posed many challenges to on-campus learning and forced almost all education levels worldwide to shift towards virtual learning (Dalle et al., 2021). However, the online education system and distance learning were functioning previously but not for most students across the globe. Recently all those students have also experienced online learning who had never been exposed to it earlier (Widikasih et al., 2021). Simultaneously, student engagement and satisfaction have been a hot scholarly debate agenda during the pandemic time (Crawford et al., 2020). Many scholars, educational leaders, and policymakers showed a deep concern about the future education system in the post-COVID-19 era (Karakose et al., 2022a, Cahapay, 2020). Thus, measuring students' engagement and satisfaction who experienced both learning methods becomes the need of time to determine the future education roadmap for the post-Covid -19 era. Thus, intended to provide empirical evidence from the Indonesian higher education context, this study advanced by paving a way forward for future agenda.

Digital engagement is a form of active learning that gives students autonomy to think and present information based on their cognitive and comprehensive abilities (Van Ryzin, Gravely, and Roseth, 2009). Moreover, it impacts students' online learning refers to students' interest, curiosity, optimism, and passion for learning using digital media tools and online software programs designed for student focus and learning (Crawford et al., 2020). Furthermore, on

campus, students' psychological engagement is based on students' perception of community, involvement, and desire to learn (Gray and DiLoreto, 2016). It is related to their dedication, absorption, and vigor. Hence it is highly important for quality learning outcomes as it covers students' cognitive, emotional, and behavioral reactions to in-class and out-of-class educational activities (Kim et al., 2020). In addition, online student satisfaction varies based on the asynchronous or synchronous learning form, depending on course complexity and interactivity (Dalle et al., 2021, Dalle et al., 2020). Many factors have been identified to affect online class satisfaction among students, including interactivity, self-efficacy, course content, self-regulation, and perceived usefulness (Hamdan et al., 2021). In contrast, on-campus class satisfaction can be related to students being on campus, sharing a positive learning experience, or going for face-to-face interaction (deJonge-Kannan, 2021). It is also related to the students' motivation to interact, learn, and perform.

In their study, Khalil et al. (2020) reflected that during COVID-19, students could feel a sense of loss of touch with their friends due to distance learning for a long and might want to reconnect with old friends through on-campus learning. Therefore, it is important and timely to investigate the students' preference for online or on-campus learning modes via their online or on-campus class satisfaction responses (Sumarliah et al., 2021, Parmigiani et al., 2021). Hence, this study aims to advance by examining the impact of rarely constructs such as interest, belongingness, autonomy, and competence on students' class satisfaction.

Students' interest or involvement is a critical factor because it depicts their willingness to learn and engage (Gray and DiLoreto, 2016). Showing Interest in any subject or learning method, whether online or in-campus, impacts students' satisfaction levels. Instructors and teachers implement various techniques to involve students actively in class and increase their cognitive abilities (Havice et al., 2010; Karakose, Polat, and Papadakis, 2021). Online teachers use various tools to actively involve students, such as videos, audio, images, etc. Similarly, on-campus teachers can use presentations, field trips, models, and lab experiments to involve students positively to achieve desired learning outcomes. Especially as COVID-19 has raised students' anxiety, uncertainty, and fear, their learning has been greatly affected (Khalil et al., 2020). Thus, based on the fact that increasing students' interest can lead to increased engagement and overall satisfaction (Gray and DiLoreto, 2016), the current study establishes the differential impact of interest or enjoyment on students' engagement and satisfaction in online vs. on-campus learning mode.

Another important factor rarely considered is competence, affecting students' engagement and overall satisfaction in online and offline learning modes. Competence involves students' knowledge, skills, and abilities to carry out learning tasks and compete with peers and fellows (De Las Heras, Luque-Sendra, and Zamora-Polo, 2020). It includes collaboration, communication, critical thinking, innovation and sets performance standards for active engagement in the learning process (Havice et al., 2010). Moreover, in online learning, a student needs to have the necessary skills and technological know-how to compete with fellow students successfully. Therefore, it is imperative to check the intensity to which it impacts students' engagement and satisfaction in online as well as on-campus learning modes (Yakhshieva and Sidiqova, 2020). Furthermore, autonomy is related to the feeling of being in control and possession of outcomes and is best exerted through the provision of choice and removal of external controls such as rewards and punishments (Van Ryzin, Gravely, and Roseth, 2009). In higher education, especially among college and university students sense of belongingness is an important factor for academic success (De Las Heras, Luque-Sendra, and Zamora-Polo, 2020). However, literature is scarce on the role of belongingness in the students' engagement and satisfaction. Thus, to bridge these gaps in the literature, the current study aims to investigate the predictive differences of the impact of autonomy and belongingness on students' online versus on-campus engagement and satisfaction.

Adding to that, the current study is established on self-determination theory to explore students' engagement and satisfaction with online vs. on-campus learning. It depicts human motivation based on their inner growth and psychological needs (Shearer et al., 2020). It advocates that people make choices without external benefits or interference based on the provision of choice and autonomy, which leads to psychological wellbeing (Van Ryzin, Gravely, and Roseth, 2009). It further suggests that students work towards achieving their goals based on their competence and the perception that their actions lead to a positive outcome. Thus, grounded in self-determination, the current study aims to examine the impact of students' interest/ enjoyment, competence, autonomy, and sense

of belongingness on students' digital engagement and online class satisfaction versus students' on-campus psychological engagement and class satisfaction.

2. Literature review and theoretical foundation

2.1 Student's Intrinsic Motivation Inventory and Digital Engagement in Online Class Context.

Interest/Enjoyment is referred to as motivation and emotion in research (Imlig-Iten and Petko, 2018). Individual student interest is categorized as a pre-existing investment or attachment to a particular subject. The more they feel inclined toward a subject, the more interest they take in, and the better would be the engagement (Rands and Gansemer-Topf, 2017). Moreover, self-determination theory in students learning perspective suggests that the student's interest as an emotional and psychological developmental factor impacts the overall student's engagement and learning (Cerasoli and Ford, 2014). Therefore, it is critical to realize the role of interest in increasing students' motivation to learn. In an online setting, digital engagement enables students to interact, create and transform information in a meaningful way (Mädamürk et al., 2020). Furthermore, interest/enjoyment in today's era has been linked with game-based learning for motivating students to engage digitally through simulations, music, audio, graphics, animation, etc. (Luczak and Kalbag, 2018). Simultaneously, students' competencies are built upon what they know, think, and have the ability to do and impact their academic performance (Tsai, 2020). Besides, competencies play an important role in improving digital engagement since technological know-how and possession of digital learners' skills give them an edge over others to perform better (Lee and Lee, 2020).

Moreover, students' autonomy is related to the possession of decision-making power, freedom of choice, and free will to act in their academic learning (Chik, 2018). The self-determination theory strongly advocates the role of autonomy in increasing intrinsic motivations toward achieving goals (Deci and Ryan, 2012). Autonomy has also been liked in students' active learning, in which students actively participate and create information based on their knowledge. It allows students to set their own goals, make choices around learning activities, and make decisions based on their preferences (Ting, 2015). In contrast, autonomy helps students with various opportunities to exercise power to design activities based on their preferences (Chik, 2018). Hence, by providing students' autonomy to design, conceive and interpret information and learning activities online, their digital engagement is expected to be enhanced. At the same time, students' social and psychological needs are an important factor in determining their need for engagement (Boyle et al., 2012). Parmigiani et al. (2021) reported that teachers try to provide an inclusive and diverse environment in online settings where students can participate and interact. At the same time, they face different challenges to perform, which they fulfill based on a sense of belongingness as belongingness can provide a sense of comfort and feeling of community in a virtual environment (Van Ryzin, Gravely, and Roseth, 2009), which can further be instrumental in engaging students in the online learning context.

Furthermore, self-determination theory advocates that student interest in learning and competence is critical in developing self-determined motivation that further affects their digital engagement. The self-determination theory also suggests that a sense of belongingness can give the students a feeling of intrinsic motivation to engage them actively in the learning process in an online or digital setting. Thus, based on the literature and theory support, this study proposed the following hypothesis for empirical investigation;

H1a: There is a positive association between students' intrinsic motivation inventory (interest/enjoyment, competence, autonomy, belongingness) and their digital engagement in an online class context.

2.2 Student's Intrinsic Motivation Inventory and Satisfaction in Online Class Context

Research shows that students' interest plays a vital role in increasing intrinsic motivation, working harder, performing better, and achieving academic outcomes (McFarland and Hamilton, 2005). Moreover, course design has also been linked with improving learning outcomes based on the fit between students' interests and the instruction material (Fischer et al., 2020). Although, various studies on students' online class satisfaction have investigated factors, including instructor's presence, course design, interaction, and learner's perception (Alqurashi, 2019, Park and Kim, 2020). However, very few studies have focused on the role of interest in improving students' online class satisfaction. Besides, self-determination theory postulates that students' interest generates positive feelings towards learning, improving overall satisfaction in an online setting. Hence, a positive association between students'

interest and online class satisfaction is expected. Moreover, online learning modes, especially online classes, have been a popular educational practice during the COVID-19 era (Agung, Surtikanti, and Quinones, 2020; Karakose, Yirci, and Papadakis, 2022b). Simultaneously, making an advance in the current literature, the authors aim to explore the association of students' competencies with their satisfaction in online classes. Besides, Azzajjad,Tendrita, and Ahmar (2021) demonstrated that core competencies play an important role in understanding, learning, and processing information online by forming students' performance backgrounds and abilities. Hence, based on adapting successful online learning during and after the pandemic, it is expected that students' competence can play an essential positive role in satisfying them with digital learning mode.

Autonomy gives students a sense of empowerment, which increases their confidence and ability to perform (Evans and Boucher, 2015). Freedom of choice and flexibility in the overall learning system provides increased trust and interaction between the instructor and the student (Agung, Surtikanti, and Quinones, 2020). It also helps remove barriers to communication, as it gives opportunities to the students to provide feedback (Khalil et al., 2020). Moreover, project-based learning is an example of students' autonomy, leading to a more competitive and satisfactory experience than passive learning (Chik, 2018). Therefore, we can say that students' autonomy is expected to impact online class satisfaction directly. Furthermore, belongingness makes students feel a part of the learning environment; therefore, it motivates them to perform and interact in class (Shernoff, 2010). It is also related to humans' emotional and basic need to interact, feel valued, and become an important part of any group, class, or community (Tice et al., 2021). Hence, we can say that the students' online class satisfaction can be enhanced by creating a sense of belongingness among students via increased collaboration, participation, and social activities like celebrating birthdays, cultural events, and other such things. Thus, based on the above arguments and self-determination theory, this study proposed the following hypothesis for empirical investigation:

H1b: There is a positive association between students' intrinsic motivation inventory (interest/enjoyment, competence, autonomy, belongingness) and students' satisfaction in an online class context.

2.3 Student's Intrinsic Motivation Inventory and Psychological Engagement in an On-Campus Context

Students' interest measures their emotions and feelings toward learning in a particular environment (Imlig-Iten and Petko, 2018). Research suggests that interest is related to attention and focus or curiosity towards a subject matter by either positive or negative feelings towards it (Mohd Shahali et al., 2019). At the same time, psychological engagement has been referred to as a state of presenting oneself emotionally, cognitively, and physically (Appleton et al., 2006). To engage psychologically, a student needs to experience enjoyment or be interested in achieving learning goals (Alamri et al., 2020). Therefore, it can be stated that students' interest/enjoyment can increase their psychological engagement during on-campus classes. In addition, students' competence can be enhanced by providing coherently linked, stimulating, and action-driven educational opportunities to tailor their skill levels and interests (Shernoff, 2010). Self-determination theory also suggests that students show high achievement when their psychological needs are fulfilled, and competence plays a very important role in it (Crawford et al., 2020). Hence, it is expected that competency will be directly related to on-campus students' engagement.

When students feel autonomous, they are more likely to see each learning task's value and thus engage more in the activity (Yu, Li, and Zhang, 2015). In terms of autonomy, by providing multiple options for accessing information, expressing knowledge, and becoming engaged in the learning process, teachers can ensure that the learning environment meets the widest possible range of learners' needs (Yoh, Mohr, and Gordon, 2008). As discussed in the literature, psychological engagement is related to emotional and mental contributions toward achieving learning objectives; it can be enhanced through increased interaction and the teacher's support (Nania et al., 2020). Simultaneously, research suggests that the teacher can regulate how students are supposed to complete a task and achieve learning goals by giving them autonomous power (Yu, Li, and Zhang, 2015). Hence a strong sense of autonomy is expected to increase the psychological engagement of the student. Furthermore, Spencer et al. (2020) suggested that students' belongingness is enhanced through interactivity, communication, and perception of value. Research has also observed gender differences in how various students perceive belongingness towards their fellow mattes and differentially engage in various tasks while keeping men in the groups and females in dyadic relationships (Chik, 2018). Whereas, based on the literature support and self-determination theory, this study proposed the following hypothesis:

H2a: There is a positive association between students' intrinsic motivation inventory (interest/enjoyment, competence, autonomy, belongingness) and their on-campus psychological engagement.

2.4 Student's Intrinsic Motivation Inventory and Class Satisfaction in an On-Campus Context

Literature reveals that students' interest is subjective to various experiences, interactions, perceptions, and expectations (Frenzel et al., 2018). Interest/enjoyment plays a vital role in learning and retention because it generates positive feelings about the subject (Alsancak Sirakaya and Ozdemir, 2018). Moreover, Frenzel et al. (2018) suggest that joyful lectures are not only fun but tend to increase overall retention, leading to satisfaction. In the case of on-campus learning, students interact with various objects (auditorium, labs, cafeteria, gym, sports ground, etc.) and persons, including peers, teachers, juniors, administrative staff, etc. (Chang, 2001). All these interactions create interest in the students' overall education experience, and they can generate a positive feeling of satisfaction. Additionally, students' competence involves applying knowledge to develop understanding and cognitive skills to effectively and efficiently complete tasks (Pena and Yeung, 2010). It relates to active participation and interaction between instructor and peers (Kwun, Ellyn, and Choi, 2013). At the same time, universities and Institutes try to provide a supportive environment for students by providing campus-based opportunities and activities to create a unique physical learning experience (Kim et al., 2020). Moreover, Foltz et al. (2021) demonstrated that the educational institutions that best incorporate cognitive and physical on-campus activities like literacy competitions, business plans, sports competitions, etc., can help build and develop their students' competencies, leading to increased satisfaction. Thus, a positive association is expected between competence and the on-campus class satisfaction of students.

Autonomy concerning university or college campuses refers to providing students with decision-making opportunities to choose various programs and courses and credit hours based on their convenience and skills (Evans and Boucher, 2015). Multiple studies explained universities are autonomous in academic, organizational, financial, and staff autonomy (Gutiérrez and Tomás, 2019). But very few have focused on students' autonomy and exercise of authority in academic matters. Higher education, especially graduate-level students, are now being provided with programs that can be customized to suit their needs and skills (Ting, 2015). Students can participate in setting the curriculum, collaborative learning, and self and peer assessment (Gutiérrez and Tomás, 2019); this can further give them a sense of achievement and more satisfaction. Moreover, the self-determination theory states that students' empowerment can lead to higher satisfaction. In addition, most university campuses provide facilities like gyms, swimming pools, dine-in cafeterias, libraries, computer labs, photocopy, and printing facilities to create a sense of belongingness among students (Nania et al., 2020). All these facilities enhance students' satisfaction with the campus (Muslim, Karim, and Abdullah, 2012). Based on the literature support and self-determination theory, this study proposed the following hypotheses:

H2b: There is a positive association between students' intrinsic motivation inventory (interest/enjoyment, competence, autonomy, belongingness) and students' on-campus class satisfaction.

2.5 Theoretical framework of the Study

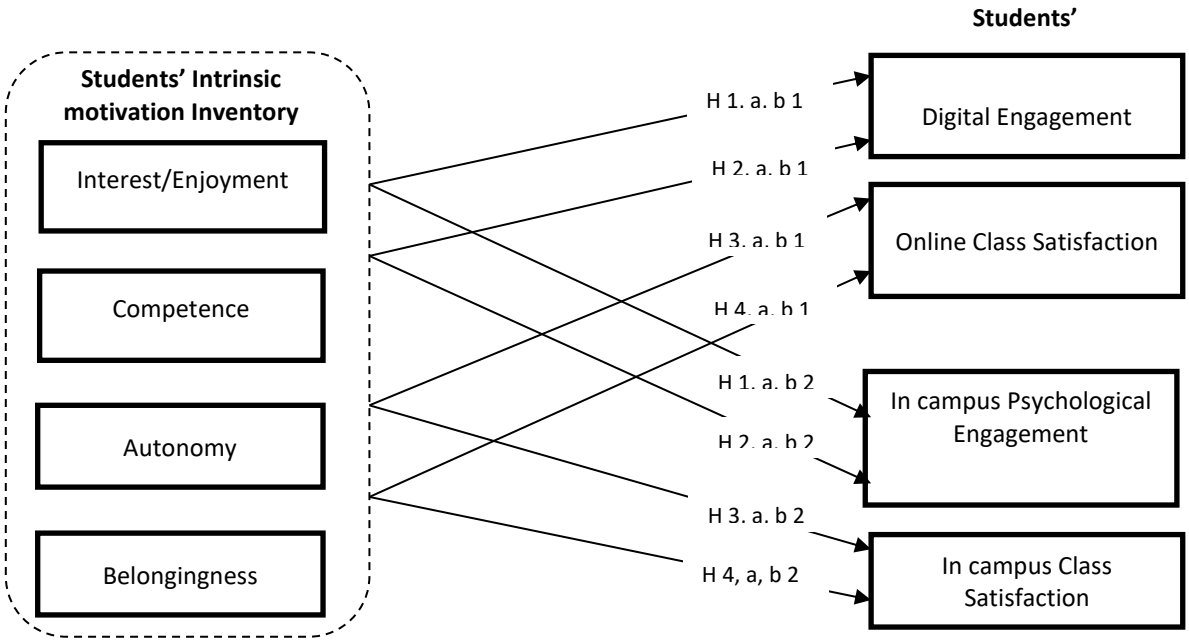

Figure1: Theoretical Framework of the study

3. Research Methodology

Using an electronic survey method, a 58 items questionnaire was distributed among university students belonging to 03 public and 03 private sector Indonesian universities in South Kalimantan province. Prior approval for approaching students was taken from the universities' administrative departments by ensuring that data obtained in this connection will be solely used for research purposes and will not be shared with any third party at any stage of this research project. The administrative departments were also requested to provide contact information of the faculty members teaching different online courses. For this purpose, administrative departments were requested to communicate with teachers who previously taught the same classes in the traditional on-campus approach. Now they are teaching the same class via an online digital approach due to COVID-19. We ensured that the same students were experiencing the traditional mode earlier and now experiencing the online mode of education. This was important to ensure that students have both experiences to give a comparative response in this research to meet study objectives. The admin departments of 6 universities provided data of 43 teachers. The authors forwarded the survey to the teachers and requested them to explain and forward it to their students via different study groups using different social media channels. Before beginning the survey, participants were briefed about their voluntary participation, ensuring their responses' anonymity. As this survey was conducted in the university setting, so most of the teachers and students were familiar with the survey language English. Thus, translation and back translation were not required as this study used original measures adopted in the English language with very good, reported reliability. In total, 700 questionnaires were circulated in accordance with the figures attained from the teachers, and 527 students completed and returned the survey for three months data collection phase. After careful evaluation and scrutinizing, 31 questionnaires were found inappropriate for the analysis based on missing values and unengaged responses. Therefore, 496 responses were used in further analysis, resulting in an active response rate of 71%.

3.1 Measures of the study

The survey consisted of 58 items and five items about demographics (gender, age, studying in semesters, weekly time for one course, and degree level). Students' Digital engagement was measured with twelve item scale adapted

from Mädamürk et al. (2020). Students' online class satisfaction was measured with a six-item scale adapted from Strachota (2006). Students' on-campus psychological engagement was assessed with an eleven items scale adopted from Gunawardena and Zittle (1997). A ten-item scale adopted from Gunuc and Kuzu (2015) was used to measure the students' on-campus class satisfaction. A 19-items scale adapted from Ostrow and Heffernan (2018) was used to measure the students' intrinsic motivation inventory, with 5-items measuring interest/enjoyment and 5-items measuring competence, 6-items measuring autonomy, and 3-items measuring belongingness. A "5-point Likert scale" ranging from "1=strongly disagree" to "5=strongly agree" was used to assess the response of the students.

3.2 Respondents' Demographic Characteristics

Table 1 depicts a detailed description of the respondents' demographic characteristics based on gender, age, studying in semesters, weekly time for one course and degree level, etc.

Table 1: Respondents' Demographic Characteristics

Variables		Number	%Age
Gender	Female	257	50.81%
	Male	239	48.18%
Age	15-20 years	103	21.76%
	21-25 years	236	47.58%
	25-30 years	91	18.34%
	31 and above	66	13.30%
Studying in Semester	1-2	121	24.39%
	3-4	128	25.80%
	5-6	130	26.20%
	7- more	117	23.58%
Weekly time for 1 course per week	Less than 1 hour	50	10.08%
	1-3 hour	92	18.54%
	4-6 hours or more	257	51.81%
	7 hours or more	97	19.55%
Degree level	Undergraduate	90	18.14%
	Graduate	293	59.07%
	Post-graduate	113	22.78%

4. Data analysis and results

To access the descriptive statistics and find out the control variables, SPSS 25 was used. The results revealed no outliers in our data set. Moreover, to satisfy the multivariate normality criterion, normality tests, including kurtosis, skewness, and Mahalanobis distance statistics, were performed for all study constructs (Henseler, Ringle, and Sarstedt, 2015). The results revealed no deviations from normality. ANOVA (Analysis of Variance) revealed that none of the demographic variables positively impacted dependent variables; therefore, no demographic variable was controlled during analysis. Whereas SmartPLS3 was used to analyze the hypothesized paths along with reliabilities, validities, factor loadings, etc. Tests of validity and reliability were performed to establish the discriminant validity amongst variables. To test the proposed hypotheses, measurement and structural models were analyzed.

4.1 Assessment of the Measurement Model

4.1.1 Confirmatory Factor Analysis; Reliability and Validity

Moreover, to evaluate the quality of research, the validity and reliability of the measures are considered. They depict the authenticity of techniques and methods applied to measure the study constructs. More specifically, reliability is accessed based on the composite reliability and Cronbach's alpha (Sarstedt, Ringle, and Hair, 2017). The measures' reliability that belongs to the same construct reflects the composite reliability (Mansoor and Paul, 2022). Simultaneously, Cronbach's alpha also presents the internal consistency of the scale used to measure a construct (Sarstedt, Ringle, and Hair, 2017). Measures' validity reflects that researchers have used the questions that fully present the issue of importance and belong to the same construct (Henseler, Ringle, and Sarstedt, 2015). In other words, the validity of the survey items depicts the degree to which they measure what they claim to measure. Hence, to assess the reliability of measures as per directions provided by, "Cronbach's α" and "composite reliability (CR)"

were calculated. Table 2 depicts the reliability of all the reflective measures based on Cronbach's α (above 0.70) and CR values. Besides, measures' "convergent and discriminant validity" was also assessed. As "factor loadings" of all indicator variables were => 0.70 with significant loading of each item ($p < 0.01$) onto its underlying variable, and "average variance extracted" (AVE) of latent variables was above 0.50 for all study constructs. Therefore, "convergent validity" was established as per the criteria prescribed by (Mansoor, 2021; Sarstedt, Ringle, and Hair, 2017).

Table 2: Factor loadings, reliability, and validity

Constructs/indicators	Factor Loadings								AVE	CR	Cronbach's α
	1	2	3	4	5	6	7	8			
Students' Digital Engagement									0.572	0.915	0.811
SDE1	0.744										
SDE2	0.755										
SDE3	0.783										
SDE4	0.694										
SDE5	0.766										
SDE6	0.775										
SDE7	0.773										
SDE8	0.759										
SDE9	0.698										
SDE10	0.721										
SDE11	0.776										
SDE12	0.712										
Students' Online Class Satisfaction									0.517	0.865	0.787
SOCS1		0.738									
SOCS2		0.703									
SOCS3		0.715									
SOCS4		0.728									
SOCS5		0.744									
SOCS6		0.683									
Students' On-campus Psychological Engagement									0.548	0.906	0.825
SIPE1			0.769								
SIPE2			0.679								
SIPE3			0.774								
SIPE4			0.781								
SIPE5			0.736								
SIPE6			0.751								
SIPE7			0.716								
SIPE8			0.709								
SIPE9			0.679								
SIPE10			0.772								
SIPE11			0.722								

Constructs/indicators	Factor Loadings								AVE	CR	Cronbach's α
	1	2	3	4	5	6	7	8			
Students' On-campus Class Satisfaction									0.551	0.908	0.809
SICS1				0.783							
SICS2				0.719							
SICS3				0.719							
SICS4				0.706							
SICS5				0.726							
SICS6				0.769							
SICS7				0.789							
SICS8				0.724							
SICS9				0.745							
SICS10				0.775							
Interest/Enjoyment									0.538	0.854	0.797
IE1					0.714						
IE2					0.712						
IE3					0.725						
IE4					0.773						
IE5					0.743						
Competence									0.546	0.857	0.837
COM1						0.770					
COM2						0.763					
COM3						0.707					
COM4						0.769					
COM5						0.682					
Autonomy									0.566	0.887	0.814
ATN1							0.760				
ATN2							0.725				
ATN3							0.771				
ATN4							0.745				
ATN5							0.726				
ATN6							0.785				
Belongingness									0.529	0.771	0.784
BEL1								0.769			
BEL2								0.707			
BEL4								0.704			

"Note: CR, composite reliability; AVE, average variance extracted.

While using SmartPLS3, the most appropriate measure of discriminant validity is the Heterotrait-Monotrait (HTMT) ratio (Henseler, Ringle, and Sarstedt, 2015, Mansoor and Paul, 2022). The HTMT ratio value should be less than 0.9. As depicted in Table 3, all values were less than 0.9 for the entire model. In addition, the square root of the AVE of each latent variable is greater than the correlation coefficients between that latent variable establishing the discriminant validity of the measures.

Table 3: Heterotrait-Monotrait Ratio

Constructs	Mean	STD.	1	2	3	4	5	6	7	8
SDE	3.76	0.81	0.756							
SOCS	4.23	0.33	0.453	0.719						
SIPE	4.08	0.42	0.401	0.494	0.740					
SICS	3.79	0.77	0.387	0.521	0.482	0.742				
IE	4.07	0.38	0.423	0389	0.331	0.319	0.733			
COM	4.18	0.27	0.365	0.342	0.428	0.379	0.501	0.738		
ATN	3.82	0.71	0.423	0389	0.400	0439	0.433	0.297	0.752	
BEL	4.11	0.33	0.565	0.442	0.421	0.429	0.388	0.393	0.446	0.727

Note: The square roots of AVEs of the constructs are shown in bold in diagonal.

Where: SDE= Students' Digital Engagement; SOCS= Students' Online Class Satisfaction; SIPE= Students' On-campus Psychological Engagement; SICS= Students' On-campus Class Satisfaction; IE= Interest/Enjoyment; COM=competence; ATN=Autonomy; BEL=Belongingness

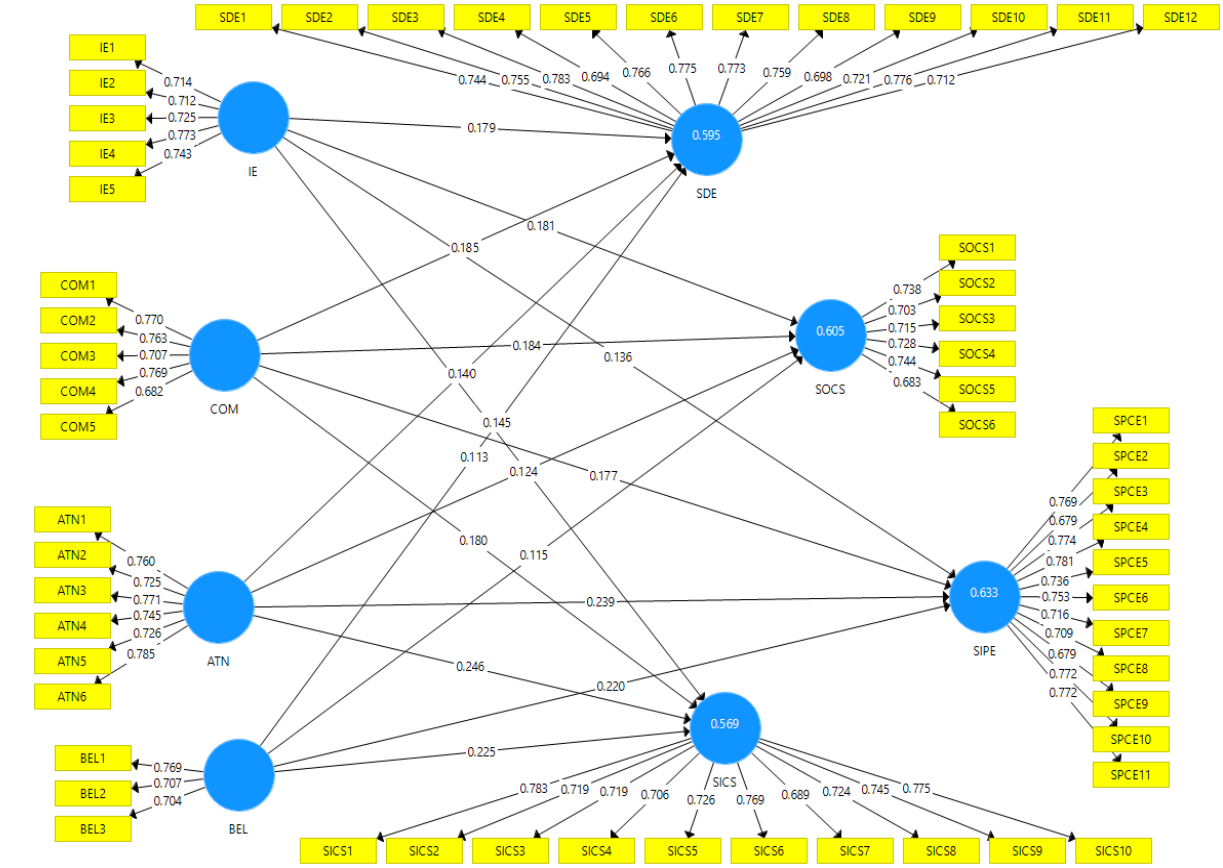

Figure 2: Full Measurement Model

4.2 Assessment of the Structural Model

The Bootstrapping technique was performed to assess the structural paths, and 5000 sub-samples were used to test the hypothesized links. ß-coefficient, t-value, and p-value were recorded to confirm the hypothesized relationships.

4.2.1 Hypothesis Testing

Table 4 depicts the results of the direct as well as an indirect hypothesis. Results reveal a positive and significant impact of interest/enjoyment on digital engagement (ß = .179***, t = 4.121) and online class satisfaction (ß = .181***, t = 4.559), as well as on on-campus psychological engagement (ß = .136**, t = 3.167) and on-campus class

satisfaction (ß = .145**, t = 3.399), with different intensities; as the impact of interest/enjoyment on digital engagement (17.9%) is 4.3% more than that of its impact on on-campus psychological engagement (13.6%). Likewise, the impact of interest/enjoyment on online class satisfaction (18.1%) is 3.6% more than that of its impact on on-campus class satisfaction (14.5%), reflecting that more playful and enjoyment-oriented students get engaged in digital learning with more online learning satisfaction level than traditional on-campus classes. Whereas results depicted a significant and positive impact of competence on students' digital engagement (ß = .185***, t = 4.932) and online class satisfaction (ß = .184***, t = 4.632). Also, almost similar results were found regarding the association of competence with students' on-campus psychological engagement (ß = .177***, t = 4.038) and on-campus class satisfaction (ß = .180***, t = 4.303), showing no predictive differences for the impact of competences on students' engagement and satisfaction in case of both online on-campus learning modes. In contrast, results for the impact of autonomy on students' on-campus psychological engagement (ß = .246***, t = 6.178) and class satisfaction (ß = .239***, t = 6.864), was more than that of its impact on students' digital engagement (ß = .140**, t = 3.211) and online class satisfaction (ß = .124**, t = 2.912); depicting a clear impact size difference of 10.6% for engagement and 11.5% for satisfaction. This shows that on-campus classes give students more confidence and perception of the power of choice compared to the online learning session. Similar to results of autonomy, the impact of belongingness on students' on-campus psychological engagement (ß = .220**, t = 5.333) and class satisfaction (ß = .225**, t = 5.945) was more than that of its impact on students' digital engagement (ß = .113*, t = 2.287) and online class satisfaction (ß = .115*, t = 2.724) depicting a clear impact size difference of 10.7% for engagement and 11% for satisfaction. This further reflects that student feel more related and emotionally attached to on-campus learning, based on coetaneous interactions with the fellows, association with the university environment, etc. Thus, as shown in Table 4, all the hypotheses of the current study were held to be true.

Table 4: Hypothesis Testing Results

	Hypotheses	Std. Beta	t-Value	p-values	Findings
H1a1	IE → SDE	0.179***	4.121	0.000	Supported
H1b1	IE→ SOCS	0.181***	4.559	0.000	Supported
H1a2	COM→ SDE	0.185***	4.932	0.000	Supported
H1b2	COM→ SOCS	0.184***	4.632	0.000	Supported
H1a3	ATN → SDE	0.140**	3.211	0.007	Supported
H1b3	ATN→ SOCS	0.124**	2.912	0.010	Supported
H1a4	BEL→ SDE	0.113*	2.287	0.017	Supported
H1b4	BEL→ SOCS	0.115*	2.724	0.014	Supported
H2a1	IE → SIPE	0.136**	3.167	0.009	Supported
H2b1	IE → SICS	0.145**	3.399	0.006	Supported
H2a2	COM → SIPE	0.177***	4.038	0.000	Supported
H2b2	COM → SICS	0.180***	4.303	0.000	Supported
H2a3	ATN → SIPE	0.246***	6.178	0.000	Supported
H2b3	ATN → SICS	0.239***	6.864	0.000	Supported
H2a4	BEL → SIPE	0.220***	5.333	0.000	Supported
H2b4	BEL → SICS	0.225***	5.945	0.000	Supported

Where; *** presents a significance level at <0.000; ** a significance level at <0.01; * a significance level at <0.05.

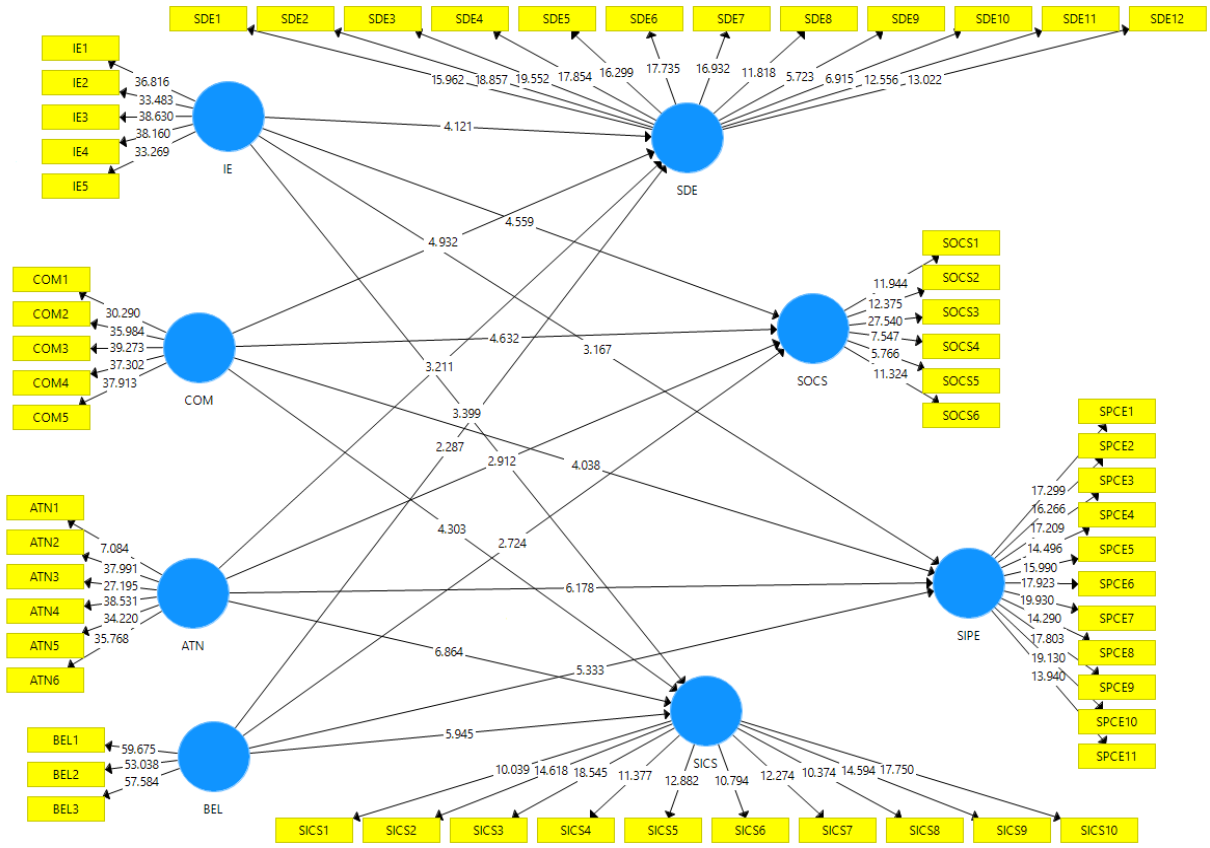

Figure 3: Full Structural Model

5. Discussion, implications, limitations, and future directions

5.1 Findings of the Study

The current study was conducted to analyze the impact of intrinsic motivational factors on students' engagement and satisfaction with online vs. on-campus classes. Post COVID-19 era will bring the pressing question of institutions to continue online learning to save costs, reach students far away at convenience, or return to traditional face-to-face learning approaches. Many studies investigated factors relating to students' online satisfaction, but very few focused on comparing traditional on-campus psychological engagement and class satisfaction with online class satisfaction and digital engagement. Therefore, the current study has been conducted to bridge this existing gap in the literature and address the policymakers' and educational leaders' concern for the efficient and effective adoption of the mode of learning.

The study results showed that students who possessed feelings of interest and enjoyment were more engaged digitally and were more satisfied with online classes than traditional on-campus classes. This is because online classes provide increased interaction through multiple mediums, including audio, video, and instant messaging, promoting a collaborative and interactive environment (Khalil et al., 2020). Especially through gamification, learning is made full of fun and joy, with clear learning objectives established (Zahedi et al., 2021). Students can also boost their creativity by engaging online, and teachers can develop the content for easy understanding through various technology apps like Learning Management System (LMS). Moreover, students may find traditional class systems monotonous and reason for boredom due to passive learning. In contrast, they feel digital engagement enables them to active learning and increase interaction (Lee and Lee, 2020).

On the other hand, competence was found to show similar positive results for on-campus and online class satisfaction and digital engagement and on-campus psychological engagement. This represents that students who

are competent and possess a variety of skills and knowledge to participate in class actively can adjust to any learning mode regardless of the system, as their intrinsic motivation is high to achieve learning-based goals (Shernoff, 2010). Therefore, the post-COVID-19 curriculum needs to be developed to polish students' skills and knowledge and help them achieve learning objectives by providing opportunities for increased engagement. Simultaneously, autonomy and belongingness results are more inclined towards on-campus class satisfaction and psychological engagement than online learning. This shows that students feel more control and perceive to have the power of choice during on-campus classes compared to online due to the design and structure of these classes and familiarity with methodology, teacher, campus, and class setup (Gutiérrez and Tomás, 2019). This can also be explained since a student during on-campus classes feels more in control of the environment and resources, whereas in an online class, a student relies more on technology apps and internet connectivity to engage digitally or online (Evans and Boucher, 2015).

Moreover, the study results related to belongingness advocate that students feel more related and emotionally attached to on-campus learning. This is because of a sense of being, close-knit relationships with fellow students through face-to-face interactions, association with the university environment and facilities, and virtual online learning. Previously research showed that virtual online learning could sometimes develop feelings of alienation and loss of touch due to lower interaction between friends and peers than in traditional systems (Ganesha, Nandiyanto, and Razon, 2021). In contrast, many studies advocate that online learning increases interaction, which is mostly virtual (Yakhshieva and Sidiqova, 2020). Whereas, based on the current study results, it is asserted that a sense of belonging arises from emotional well-being and attachment developed through supportive relationships based on time spent, mutual interests, and face-to-face interaction. These results are supported by the findings of Van Ryzin, Gravely, and Roseth (2009).

Finally, based on the mixed findings, the current study suggests a hybrid model for institutions and educational managers who wish to foresee which learning model will engage students more effectively to gain their ultimate satisfaction in the post-COVID-19 era of the new normal education system. Study results show that interest and competence greatly impacted digital engagement and online class satisfaction, whereas the sense of belongingness and autonomy was more associated with on-campus psychological engagement and satisfaction. This suggests that the post-COVID-19 era can take advantage of incorporating a hybrid mix of blended learning to achieve the best learning outcomes and students' satisfaction (Blaine, 2019). Simultaneously, educational institutions always need to keep in mind to carefully design the content and mode of learning to meet students' intrinsic motivation needs to enhance learning opportunities based on self-determination theory.

5.2 Theoretical Implications

The current study offers multiple significant theoretical implications for scholars and educational leaders. Firstly, it compares online vs. traditional learning modes of learning to determine factors leading to student engagement and satisfaction, which has not been previously investigated. Secondly, it investigates the impact of interest and enjoyment towards online and traditional teaching methods in terms of digital engagement in online classes vs. psychological engagement in traditional classes, which have not been explored previously. Thirdly, this study investigates the role of competence in determining which mode of teaching engages students effectively and which mode of learning increases their satisfaction based on the students' competence. This study's fourth major contribution is exploring autonomy's role in increasing engagement and satisfaction in on-campus and online learning modes. Fifth, the sense of belongingness was explored in this framework to investigate how students feel engaged and satisfied during on-campus learning compared to online learning due to a sense of emotional attachment and strong interpersonal relationships developed over time. Finally, this study suggests a blended learning model achieve learning objectives in the post-pandemic era. Thus, academic researchers can benefit from this study by further investigating these factors' influence on students' satisfaction and student engagement along with multiple other theories and models famous in current literature. This study can also help contribute to the literature by providing strong empirical evidence on intrinsic motivation inventory and its relationship with student satisfaction and engagement digitally and psychologically.

5.3 Practical Implications

There are various practical implications of this study for higher education institutions and universities as well as basic and school-level education systems. Firstly, after such challenging times experienced due to the current pandemic, institutions and policymakers are not engrossed in deciding which learning mode to carry forward in the post-COVID-19 era. Thus, providing a future road map for effective learning mode is a primary advance made by this research. As this study suggests, students' feelings of interest and enjoyment increase their digital engagement and online satisfaction; therefore, policymakers can incorporate gamification and other interactive digital tools that activate students' sense of joy and help them achieve their learning objectives. Based on this, finding both traditional and distance learning methods can re-evaluate intrinsic motivational factors in their current learning mode and incorporate the missing intrinsic factors. Secondly, this study shows similar results for the impact of student's competence on both traditional and online class satisfaction and digital engagement and psychological engagement, suggesting that course content and design should be carefully implemented to support students' skills and knowledge in both online and traditional system. Thus, both distance learning and on-campus approaches should observe the set of competencies required by their students to achieve desired learning outcomes. Then devising strategies to facilitate, ensure and train to equip their students with those competencies will help to advance the practice in the education system further. Also, policymakers can benefit from this study by decentralizing the learning system to suit students' capabilities and choices by supporting flexibility and collaboration to achieve satisfaction in-campus. Moreover, universities and administrative staff should focus on developing infrastructure and facilities that increase students' sense of belongingness and decrease the sense of alienation to support diversity in culture, religion, and ethnic origin. This can be achieved by providing a representative environment and inclusive culture to all international and local students through language, food, ethics, and teaching. Additionally, distance learning programs should look for inclusive approaches and programs that may improve students' belongingness to class while they are digitally engaged in the online education system. Conclusively, this research provided an overview of intrinsic motivational factors and their role in the post-COVID-19 era education system to help policymakers and educational managers create a learning-oriented environment where students are digitally and psychologically engaged and satisfied.

5.4 Limitations and Future Directions

Although this is a very comprehensive study that focused on various factors in detail to thoroughly investigate students' engagement and satisfaction in online vs. traditional on-campus learning in the post-COVID-19-era, there are still a few limitations to be considered in the future studies. This study focused on students' satisfaction, but further studies can explore the impact of students' academic performance to investigate whether the sense of enjoyment and other psychological needs impact it and which mode of learning best boosts students' academic performance. Among intrinsic motivation inventory, which factor is more linked to students' academic performance than others, can be an interesting future study. Moreover, this study explored the student's perspective; future studies can investigate teachers' perception of online vs. on-campus learning in the context of intrinsic motivation inventory. Furthermore, future studies can also explore which mode of learning effectively evaluates students' performance through examination and assessment and in which mode students feel more comfortable while taking exams. Finally, the current study focused on higher education; therefore, only university students were surveyed. Future studies can focus on primary, high school, and college-level contexts to investigate the students' preferences for online versus on-campus learning modes. Another major limitation of this research was a cross-sectional study design which was adopted due to a lack of time and financial resources. Future studies may adopt a longitudinal design to determine better causality among study variables.

References

Agung, A. S. N., Surtikanti, M. W. and Quinones, C. A., 2020. Students' Perception of Online Learning during COVID-19 Pandemic: A Case Study on the English Students of STKIP Pamane Talino. SOSHUM: Jurnal Sosial Dan Humaniora, 10(2), pp. 225-235.

Alamri, H., Lowell, V., Watson, W. and Watson, S. L., 2020. Using personalized learning as an instructional approach to motivate learners in online higher education: Learner self-determination and intrinsic motivation. Journal of Research on Technology in Education, 52(3), pp. 322-352.

Alqurashi, E., 2019. Predicting student satisfaction and perceived learning within online learning environments. Distance Education, 40(1), pp. 133-148.

Alsancak Sirakaya, D. and Ozdemir, S., 2018. The Effect of a Flipped Classroom Model on Academic Achievement, Self-Directed Learning Readiness, Motivation and Retention. Malaysian Online Journal of Educational Technology, 6(1), pp. 76-91.
Appleton, J. J., Christenson, S. L., Kim, D. and Reschly, A. L., 2006. Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. Journal of school psychology, 44(5), pp. 427-445.
Azzajjad, M. F., Tendrita, M. and Ahmar, D. S., 2021. Effect of animation and review video making (arvima) in non-classical learning model on independent learning and students' learning outcome. Linguistics and Culture Review, 5(S3), pp. 967-976.
Blaine, A. M., 2019. Interaction and presence in the virtual classroom: An analysis of the perceptions of students and teachers in online and blended Advanced Placement courses. Computers Education, 132, pp. 31-43.
Boyle, E. A., Connolly, T. M., Hainey, T. and Boyle, J. M., 2012. Engagement in digital entertainment games: A systematic review. Computers in human behavior, 28(3), pp. 771-780.
Cahapay, M. B., 2020. Rethinking education in the new normal post-COVID-19 era: A curriculum studies perspective. Aquademia, 4(2), pp. ep20018.
Cerasoli, C. P. and Ford, M. T., 2014. Intrinsic motivation, performance, and the mediating role of mastery goal orientation: A test of self-determination theory. The Journal of psychology, 148(3), pp. 267-286.
Chang, M. J., 2001. The Positive Educational Effects of Racial Diversity on Campus. Evidence on the Impact of Affirmative Action.
Chik, A., 2018. Learner autonomy and digital practices. Autonomy in language learning and teaching: Springer, pp. 73-92.
Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. and Lam, S., 2020. COVID-19: 20 countries' higher education intra-period digital pedagogy responses. Journal of Applied Learning Teaching, 3(1), pp. 1-20.
Dalle, J., Raisinghani, M. S., Putra, A. P., Suriansyah, A., Hadi, S. and Sahara, B., 2021. A technology acceptance case of Indonesian senior school teachers: Effect of facilitating learning environment and learning through experimentation. International Journal of Online Pedagogy and Course Design (IJOPCD), 11(4), pp. 45-60.
Dalle, J., Siyoto, S., Astika, N. D., Negara, D. J., Chandra, T. and Anam, K., 2020. Moderating role of IT adoption and mechanism of dynamic capabilities on Indonesian pharmaceutical firms performance. Systematic Reviews in Pharmacy, 11(9), pp. 982-992.
De Las Heras, A., Luque-Sendra, A. and Zamora-Polo, F., 2020. Machine Learning Technologies for Sustainability in Smart Cities in the Post-COVID Era. Sustainability, 12(22), pp. 9320.
Deci, E. L. and Ryan, R. M., 2012. Self-determination theory. Handbook of theories of social psychology, pp. (p. 416–436).
deJonge-Kannan, K., 2021. Religious, secular, and spiritual diversity on campus: Book review of Goodman, Giess & Patel (2019) Educating about religious diversity and interfaith engagement. Journal on Empowering Teaching Excellence, 5(1), pp. 6.
Evans, M. and Boucher, A. R., 2015. Optimizing the power of choice: Supporting student autonomy to foster motivation and engagement in learning. Mind, Brain, Education, 9(2), pp. 87-91.
Fischer, C., Xu, D., Rodriguez, F., Denaro, K. and Warschauer, M., 2020. Effects of course modality in summer session: Enrollment patterns and student performance in face-to-face and online classes. The Internet Higher Education, 45, pp. 100710.
Foltz, K. A., Clements, M., Fallon, A. and Stinson, A., 2021. Extra Credit and Decision-Making: Understanding College Students' Motivation to Attend On-Campus Events. Journal of Campus Activities Practice and Scholarship, 3(2), pp. 5-15.
Frenzel, A. C., Becker-Kurz, B., Pekrun, R., Goetz, T. and Lüdtke, O., 2018. Emotion transmission in the classroom revisited: A reciprocal effects model of teacher and student enjoyment. Journal of Educational Psychology, 110(5), pp. 628.
Ganesha, P., Nandiyanto, A. B. D. and Razon, B. C., 2021. Application of online learning during the Covid-19 pandemic through zoom meeting at elementary school. Indonesian Journal of Teaching in Science, 1(1), pp. 1-8.
Gray, J. A. and DiLoreto, M., 2016. The effects of student engagement, student satisfaction, and perceived learning in online learning environments. International Journal of Educational Leadership Preparation, 11(1), pp. n1.
Gunawardena, C. N. and Zittle, F. J., 1997. Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. American journal of distance education, 11(3), pp. 8-26.
Gunuc, S. and Kuzu, A., 2015. Student engagement scale: development, reliability and validity. Assessment & Evaluation in Higher Education, 40(4), pp. 587-610.
Gutiérrez, M. and Tomás, J. M., 2019. The role of perceived autonomy support in predicting university students' academic success mediated by academic self-efficacy and school engagement. Educational Psychology, 39(6), pp. 729-748.
Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., Samira, A.-H. and Shaheen, A. M., 2021. University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). International Journal of Educational Management, 35(3), pp. 713-725.
Havice, P. A., Davis, T. T., Foxx, K. W. and Havice, W. L., 2010. The impact of rich media presentations on a distributed learning environment: Engagement and satisfaction of undergraduate students. Quarterly Review of Distance Education, 11(1), pp. 53.
Henseler, J., Ringle, C. M. and Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the academy of marketing science, 43(1), pp. 115-135.

Imlig-Iten, N. and Petko, D., 2018. Comparing serious games and educational simulations: effects on enjoyment, deep thinking, interest and cognitive learning gains. Simulation Gaming, 49(4), pp. 401-422.
Karakose, T., Ozdemir, T. Y., Papadakis, S., Yirci, R., Ozkayran, S. E. and Polat, H., 2022a. Investigating the Relationships between COVID-19 Quality of Life, Loneliness, Happiness, and Internet Addiction among K-12 Teachers and School Administrators—A Structural Equation Modeling Approach. International Journal of Environmental Research and Public Health, 19(3), pp. 1052.
Karakose, T., Polat, H. and Papadakis, S., 2021. Examining Teachers' Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic. Sustainability, 13(23), pp. 13448.
Karakose, T., Yirci, R. and Papadakis, S., 2022b. Examining the associations between COVID-19-related psychological distress, social media addiction, COVID-19-related burnout, and depression among school principals and teachers through Structural Equation Modeling. International journal of environmental research and public health, 19(4), pp. 1951.
Khalil, R., Mansour, A. E., Fadda, W. A., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., Alkhalifah, A. and Al-Wutayd, O., 2020. The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' perspectives. BMC medical education, 20(1), pp. 1-10.
Kim, Y., Kim, B., Hwang, H.-S. and Lee, D., 2020. Social media and life satisfaction among college students: A moderated mediation model of SNS communication network heterogeneity and social self-efficacy on satisfaction with campus life. The Social science journal, 57(1), pp. 85-100.
Kwun, D. J.-W., Ellyn, E. and Choi, Y., 2013. Campus foodservice attributes and their effects on customer satisfaction, image, and word-of-mouth. Journal of foodservice business research, 16(3), pp. 276-297.
Lee, J. S. and Lee, K., 2020. The role of informal digital learning of English and L2 motivational self system in foreign language enjoyment. British Journal of Educational Technology.
Luczak, C. and Kalbag, A., 2018. The appropriateness and effectiveness of cross-aged peer mentoring in the learning environment. International Journal of Humanities, Arts and Social Sciences, 4(2), pp. 76-84.
Mädamürk, K., Tuominen, H., Hietajärvi, L. and Salmela-Aro, K., 2020. Adolescent students' digital engagement and achievement goal orientation profiles. Computers & Education, 161, pp. 104058.
Mansoor, M., 2021. Citizens' trust in government as a function of good governance and government agency's provision of quality information on social media during COVID-19. Government Information Quarterly, pp. 101597.
Mansoor, M. and Paul, J., 2022. Mass prestige, brand happiness and brand evangelism among consumers. Journal of Business Research, 144, pp. 484-496.
McFarland, D. and Hamilton, D., 2005. Factors affecting student performance and satisfaction: Online versus traditional course delivery. Journal of Computer Information Systems, 46(2), pp. 25-32.
Mohd Shahali, E. H., Halim, L., Rasul, M. S., Osman, K. and Mohamad Arsad, N., 2019. Students' interest towards STEM: a longitudinal study. Research in Science & Technological Education, 37(1), pp. 71-89.
Muslim, M. H., Karim, H. A. and Abdullah, I. C., 2012. Satisfaction of students' living environment between on-campus and off-campus settings: A conceptual overview. Procedia-Social Behavioral Sciences, 68, pp. 601-614.
Nania, T., Dellafiore, F., Caruso, R. and Barello, S., 2020. Risk and protective factors for psychological distress among Italian university students during the COVID-19 pandemic: The beneficial role of health engagement. International Journal of Social Psychiatry, pp. 0020764020945729.
Ostrow, K. S. and Heffernan, N. T. 'Testing the validity and reliability of intrinsic motivation inventory subscales within assistments'. International Conference on Artificial Intelligence in Education: Springer, 381-394.
Park, C. and Kim, D.-g., 2020. Perception of instructor presence and its effects on learning experience in online classes. Journal of Information Technology Education: Research, 19, pp. 475-488.
Parmigiani, D., Benigno, V., Giusto, M., Silvaggio, C. and Sperandio, S., 2021. E-inclusion: online special education in Italy during the Covid-19 pandemic. Technology, pedagogy and education, 30(1), pp. 111-124.
Pena, M. I. C. and Yeung, A. S., 2010. Satisfaction with online learning: Does students' computer competence matter? International Journal Of Technology, Knowledge Society, 6(5).
Rands, M. L. and Gansemer-Topf, A. M., 2017. The room itself is active: How classroom design impacts student engagement. Journal of Learning Spaces, 6(1), pp. 26.
Sarstedt, M., Ringle, C. M. and Hair, J. F., 2017. Partial least squares structural equation modeling. Handbook of market research, 26(1), pp. 1-40.
Shearer, R. L., Aldemir, T., Hitchcock, J., Resig, J., Driver, J. and Kohler, M., 2020. What students want: A vision of a future online learning experience grounded in distance education theory. American Journal of Distance Education, 34(1), pp. 36-52.
Shernoff, D. J., 2010. Engagement in after-school programs as a predictor of social competence and academic performance. American journal of community psychology, 45(3), pp. 325-337.
Spencer, R., Sinno, J., Hatfield, K., Biderman, M., Doria, N. and Numer, M., 2020. Exploring top hat's impact on undergraduate students' belongingness, engagement, and self-confidence: A mixed methods study. Journal of Research on Technology in Education, 52(2), pp. 197-215.

Strachota, E. 'The use of survey research to measure student satisfaction in online courses'. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, University of Missouri-St. Louis, MO.

Sumarliah, E., Usmanova, K., Mousa, K. and Indriya, I., 2021. E-commerce in the fashion business: the roles of the COVID-19 situational factors, hedonic and utilitarian motives on consumers' intention to purchase online. International Journal of Fashion Design, Technology and Education, pp. 1-11.

Tice, D., Baumeister, R., Crawford, J., Allen, K.-A. and Percy, A., 2021. Student Belongingness in Higher Education: Lessons for Professors from the COVID-19 Pandemic. Journal of University Teaching and Learning Practice, 18(4), pp. 2.

Ting, Y.-L., 2015. Tapping into students' digital literacy and designing negotiated learning to promote learner autonomy. The Internet Higher Education, 26, pp. 25-32.

Tsai, C.-W., 2020. Applying online competency-based learning and design-based learning to enhance the development of students' skills in using PowerPoint and Word, self-directed learning readiness, and experience of online learning. Universal Access in the Information Society, 19(2), pp. 283-294.

Van Ryzin, M. J., Gravely, A. A. and Roseth, C. J., 2009. Autonomy, belongingness, and engagement in school as contributors to adolescent psychological well-being. Journal of youth adolescence, 38(1), pp. 1-12.

Widikasih, P. A., Widiana, I. W. and Margunayasa, I. G., 2021. Online Learning Problems for Elementary School Students. Journal of Education Research and Evaluation, 5(3), pp. 1-10.

Yakhshieva, Z. and Sidiqova, S., 2020. Formation of teachers' competence in accordance with international programs. Mental Enlightenment Scientific-Methodological Journal, 2020(2), pp. 1-7.

Yoh, T., Mohr, M. and Gordon, B., 2008. Assessing satisfaction with campus recreation facilities among college students with physical disabilities. Recreational Sports Journal, 32(2), pp. 106-113.

Yu, C., Li, X. and Zhang, W., 2015. Predicting adolescent problematic online game use from teacher autonomy support, basic psychological needs satisfaction, and school engagement: A 2-year longitudinal study. Cyberpsychology, Behavior, Social Networking, 18(4), pp. 228-233.

Zahedi, L., Batten, J., Ross, M., Potvin, G., Damas, S., Clarke, P. and Davis, D., 2021. Gamification in education: A mixed-methods study of gender on computer science students' academic performance and identity development. Journal of Computing in Higher Education, 33(2), pp. 441-474.

