

# University Student Place Attachment during the Pandemic

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## Abstract

Knowing how students are attached to their universities, classes, and teachers can help develop new ways for engaging students as higher education uses technology to deliver classes. This study examines three different learning delivery methods utilized during the COVID-19 Pandemic. The delivery methods used were socially distanced face-to-face in an on-campus classroom, fully remote using Zoom with the teacher and students not collocated, and hybrid where some students attended on-campus in a socially distanced face-to-face classroom and some attended remote via Zoom. All classes were delivered synchronously and the remote and hybrid classes had Zoom recordings that were posted on the course management system. This research found that there is a positive relationship between place attachment and learning intention and satisfaction for socially distanced face-to-face learners. It also found that place attachment is mediated by technology issues for students learning with fully remote delivery. It is important to make sure that the technology used to deliver instruction supports student learning and when there are problems it has a negative impact on their learning intention and satisfaction. Place attachment impacts student learning intention and satisfaction, but other factors like individual student differences, teaching methods, and curriculum are involved as well and need further study.

**Keywords:** Place attachment, learning intention/satisfaction, technology issues mediation

## 1. INTRODUCTION

As soon as the COVID-19 Pandemic shut-down started in March 2020, universities and colleges hurriedly had to switch to socially distanced face-to-face classes, remote classes using video tools, fully online, or a hybrid learning model with a mix of all of the learning methodologies. Hybrid learning includes both synchronous and asynchronous options and is inclusive of blended learning, flipped classroom, outcome-based, and student-centered learning (Li et al., 2021; Saichaie, 2020).

The purpose of this research is to examine how student place attachment impacts student learning intention for the modalities of face-to-face, remote, or hybrid and how that impacts student satisfaction.

Place attachment is a complex construct that accounts for a person's affective bonds to places (Holton, 2015; Scopelliti & Tiberio, 2010). Key aspects of place attachment include the role of emotion toward the environment (Low & Altman, 1992). Place attachment is a strong emotional

connection between people and places (Spooner, 2019). Research has shown that place attachment increases with the more time that someone spends at a place (Kyle et al., 2005; Spooner, 2019; Zhang et al., 2018). Place attachment has been studied in neighborhoods, landscapes, communities, tourism, sport, and recreation, (Jorgensen & Stedman, 2001, 2001; Kyle et al., 2005; Lewicka, 2011; Low & Altman, 1992; Morgan, 2010; Ramkissoon, 2021; Ramkissoon et al., 2013; Scannell & Gifford, 2010; Williams & Vaske, 2001) and has most recently been studied in education (Bogdan et al., 2012; Holton, 2015; Huang et al., 2022; Moghisi et al., 2015; Scopelliti & Tiberio, 2010; Strait, 2012; Terrazas-Carrillo et al., 2014; Zhang et al., 2018).

This paper explores if place attachment impacts learning intentions by the impact that the university and its community has on a students' engagement in learning. Dang and Weiss (2021, p. 15) did a review of the place attachment literature and state "place attachment is a particularly relevant construct through which behavioral intentions can be studied." Spooner (2019) found that college and university students and alumni show a strong sense of attachment to their colleges and universities. The COVID Pandemic put stress on higher education to maintain learning with different models (Wargadinata et al., 2020). Several authors have reviewed the place attachment literature and state more studies are needed to verify relationships between place attachment and how it impacts self, personality, and learning (Korpela, 2012; Lewicka, 2011). Jolley et al. (2018) studied place attachment and perceptions of learning of students on field trips. They found a direct link between student place attachment and their perceptions of learning about landscapes. Fischer and Wentz (2021) studied place attachment and learning outcomes with tourist volunteers at a U.S. National Park. They found that volunteers in their program increased their place attachment and learning outcomes. Semken et al. (2017) studied place attachment and learning outcomes in place-based education in geoscience education. They defined learning outcomes as factual knowledge, conceptual knowledge, skills and problem solving. Their case study outlined several examples for conducting place-based education in the geosciences, but they did not test the impact of place attachment on learning outcomes. Johnson et al. (2020) studied place-based learning communities and their ability to improve academic skills and behavior. They found that place-based learning communities improved students' belonging,

academic performance, persistence and narrowed equity gaps.

It is important for educators to understand how students are attached to their universities, classes, and teachers in order to help develop new ways for engaging students. This study adds to place attachment literature and its relationship to learning intention at a college or university. The contribution of this paper is to introduce a new model for learning that tests the effect of place attachment on learning intention as well as establish that place attachment has more than a tangential relationship to learning that has been found in other reserach.

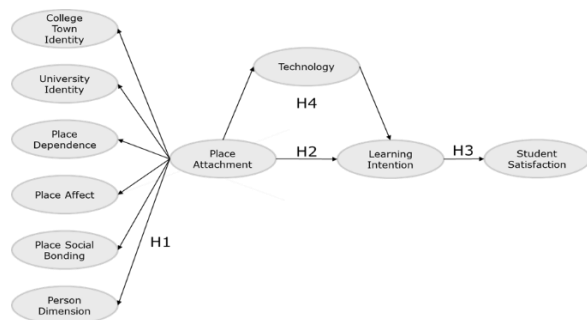
## 2. RESEARCH MODELS & HYPOTHESES

This section examines the research on place attachment and learning to develop research hypotheses. Place attachment includes affect and emotions, knowledge and beliefs, and behaviors and actions for the interactions between people and places (Bogdan et al., 2012; Jorgensen & Stedman, 2001; Kyle et al., 2005; Lewicka, 2011; Low & Altman, 1992; Morgan, 2010; Ramkissoon, 2021; Ramkissoon et al., 2013). Place attachment is made up of place dependence, place identity, place affect and place social bonding (Jorgensen & Stedman, 2001; Kyle et al., 2005; Ramkissoon et al., 2013). Place dependence is a person's strength of association or functional attachment with a place (Jorgensen & Stedman, 2001). Place identity is how a person identifies with a place or their comfort level with the place (Jorgensen & Stedman, 2001; Kyle et al., 2005; Williams & Vaske, 2001). Place affect is grounded in the environmental and social experiences that helps individuals build sentiment about a place (Low & Altman, 1992; Ramkissoon, 2021; Ramkissoon et al., 2013). Place social bonding is the relationship that develops based on experiences with a place (Kyle et al., 2005; Ramkissoon, 2021; Ramkissoon et al., 2013).

Another model associated with place attachment is the person, process, and place model (Scannell & Gifford, 2010; Spooner, 2019). Process and place from this model appear in place dependence, place identity, place affect, and place social bonding. The person dimension is the personal connection and attachment to a place (Hidalgo, 2013; Scannell & Gifford, 2010; Spooner, 2019). The person dimension also has a group component where meaning and attachment are based on shared experiences with the group. Place attachment is a second order factor of place dependence, identity, affect and social bonding (Ramkissoon et al., 2013). The

person dimension adds the personal connection to a place to the Ramkissoon et al. (2013) model. This study adds the person dimension, and splits place identity for a university setting into college town identity and university identity as they were used by Zhang et al. (2018).

This research focuses on college town identity, university identity, place dependence, place affect, place social bonding, and the person dimension. The dependent variables are learning intentions and student satisfaction. Figure 1 shows the place attachment research model for this study.



**Figure 1: Place Attachment Research Model**

H1: The person dimension will be another first-order factor that makes up the second-order construct place attachment in higher education.

Zhang et al. (2018) studied place attachment and how students become attached to universities and their communities. They defined two levels of place identity as college town identity and university identity. College town identity is the emotional attachment at the community where the university resides and university identity is the emotional attachment to the university itself (Zhang et al., 2018). Holton (2015) found that student place attachment with their universities and college towns are layered as they experience different parts of the university and college town experience. Terrazas et al. (2014) showed that students show a sense of mastery as they experience the local community and the university campus. Moghisi (2015) found that place attachment of the university is an emotional connection of the individual rooted in the individual's experiences.

Zhang et al. (2018) studied how place attachment impacts satisfaction of students and alumni by participating in a homecoming event. They found that university identity had a profound role of increasing student and alumni satisfaction. Strait (2012) also found a positive relationship between

place attachment and student satisfaction. Baber (2020) found that student perceived or intention to learn is a precursor to student satisfaction. Since few studies have looked at place attachment and learning a contribution of this study is to establish the relationship that place attachment has on learning intention. Learning intention is measured in this study as a students' intention to take a future class in the same delivery modality.

H2: Place attachment will have a positive impact on student learning intention for face-to-face, remote, and hybrid learning.

H3: Student learning intention will have a positive relationship with student satisfaction for face-to-face, remote, and hybrid learning.

Pituch and Lee (2006) found that technology has a positive relationship with student learning intentions using the technology acceptance model (Davis & Venkatesh, 1996). Research has found that learner familiarity with technologies used for learning were important to user adoption of the system (Pituch & Lee, 2006). The authors also hypothesize that technology issues will be a mediator between place attachment and student learning intention and satisfaction. Baber (Baber, 2020) noted that future research is needed to understand the role that technology plays in learning intentions and student satisfaction.

H4: Place attachment on student learning intention will be mediated by student comfort level with the technology issues they had with remote and hybrid learning.

### 3. METHODOLOGY

This research examined three different teaching delivery methods during the COVID-19 Pandemic in the Fall Semester of 2020. The three methods used were socially distanced face-to-face in an on-campus classroom, fully remote using Zoom with the teacher and students not collocated, and hybrid where some students attended on-campus in a socially distanced face-to-face classroom and some attended remote via Zoom. All classes were delivered synchronously and the remote and hybrid classes had Zoom recordings that were posted on the course management system. There were 93 students that participated in the survey and 83.7% of them were juniors or seniors. The self-reported GPA was 3.42. Only 5% of the students in the sample lived on-campus in dorms. Most of the students in the study were juniors and seniors, so it is not surprising there

was a low percentage that lived in dorms. At the time, the majority of the students had concerns with the Pandemic and catching COVID-19. Some of the students had multiple classes that were delivered in different formats. The data set analyzed for the three learning methodologies included students that took class delivered face-to-face, remote, or hybrid. There were 44 students in the socially distanced face-to-face classes, 50 in the remote classes, and 45 that took the hybrid classes. There were three instructors in the study that taught seven classes (two face-to-face, two remote, and three hybrid). Each instructor only taught one method.

The survey questions that were used to measure place attachment, technology issues, learning intentions and learning satisfaction can be found in the appendices in Table 12. The place attachment and learning measures were used in prior literature (citations are included in Table 12). The technology issues construct was from an Educause DIY Survey Kit (2020). The survey was delivered via Qualtrics. All 93 submissions were used in the analysis and any missing data was coded with "-99" for analysis. The survey was administered after the Fall Semester ended and the students received two follow-up emails. There were 107 total responses and 14 were removed because they did not complete any of the place attachment questions. There were 87% usable submissions for the analysis.

The descriptive statistics were analyzed with SPSS. The research model was analyzed using partial least squares (PLS) as the structural equation modeling (SEM) technique with SmartPLS 4.0. This was used to test both the measurement and structural models. PLS-SEM was considered to be a more suitable method because of the low n in the sample (Chin, 1998; Chin et al., 2003).

**Table 1: Descriptive Statistics**

Description	Statistic	N	Description	Statistic	N	% Agree
Total Students in Sample		93	Scared of catching COVID-19	4.26	93	56.99%
			Scared of the COVID-19 Pandemic	4.29	93	54.84%
GPA (self report)	3.42	91	How strong is your attachment	4.76	93	64.52%
Live in Dorms			Will attachment increase in 1 year?			
Yes	5.38%	5	Increase	22.58%	21	
No	94.62%	88	Decrease	16.13%	15	
Total	100.00%	93	Stay the same	61.29%	57	
				100.00%	93	
Total Students by Delivery Method			Academic Level			
Face-to-Face Socially Distanced	47.83%	44	Sophomore	16.30%	15	
Remote	54.35%	50	Junior	31.52%	29	
Hybrid	48.91%	45	Senior	41.30%	38	
Total	151.09%	139	Graduate	10.87%	10	
			Total	100.00%	92	

#### 4. RESULTS

The first part of results will examine the measurement model and the second part will address the structural model. The three models

analyzed were socially distanced face-to-face, remote delivery, and a hybrid delivery model.

#### Measurement Model

The measurement model was examined for the reliability of items, the composite reliability of the constructs, and the average variance extracted (AVE) by the constructs. This examination of reliability was done for the latent variables within the three research models. Loadings of 0.50 were considered adequate and those values lower than 0.50 were removed (Hair et al., 2011). This operationalization of the place attachment, intention, and satisfaction measures was consistent with past research that used these objective measures in the context of SEM analysis (Baber, 2020; Ramkissoon et al., 2013; Zhang et al., 2018).

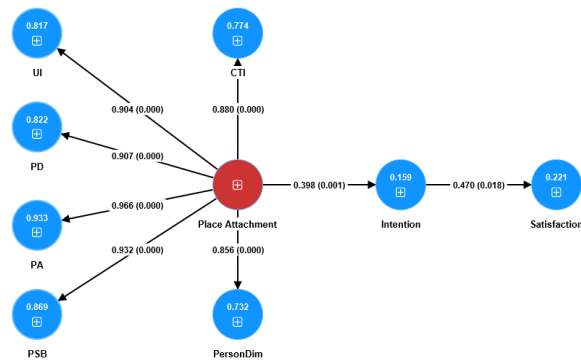
Reliability analysis was used to evaluate the internal consistency of the measurement instrument. Cronbach's alpha at or above 0.70 was the statistic used to evaluate reliability (Fornell & Larcker, 1981a; Hair et al., 2011; Kline, 2005). The instrument provided high reliability for all of the latent factors that were measured (see Tables 2, 3, & 4). This demonstrates that each item converged on the proper latent factor. Composite reliability was analyzed next on the items and all were above the threshold of 0.70 (Fornell & Larcker, 1981b; Nunnally & Bernstein, 1994). Average variance extracted (AVE) was used to evaluate convergent validity and all were above 0.50. Discriminant validity was evaluated with all AVE above 0.50 and the square root of the AVEs being larger than all other cross-correlations. The tables for these three research models are Table 2 for face-to-face, Table 3 for remote, and Table 4 for hybrid. Table 5 shows the factor loadings for the constructs for the three delivery modalities. These tables show that the models have construct and discriminant validity for all of the first order factors. To test discriminant validity for place attachment as a second order factor the latent value scores for college town identity (CTI), university identity (UI), place dependence (PD), place affect (PA), place social bonding (PSB) and person dimension (PerD) were loaded on place attachment (Fornell & Larcker, 1981b; van Riel et al., 2017). The results in Table 6, 7, and 8 show that the correlations among the constructs are all lower than the square root of AVE. The results show that the study's measures were psychometrically adequate.

The person dimension factors have loadings above 0.50, Cronbach's alpha above 0.70 (0.84 for Face-to-Face, 0.87 for Remote, and 0.85 for

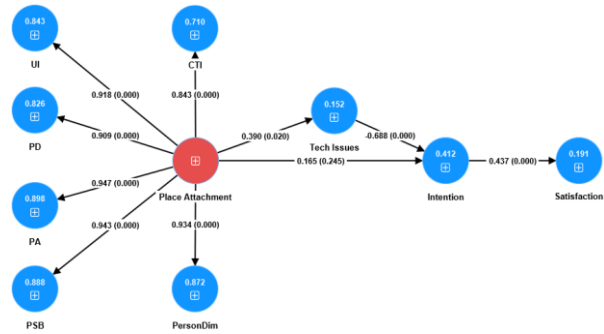
Hybrid), Composite reliability above 0.70 (0.85 for Face-to-Face, 0.88 for Remote, and 0.86 for Hybrid) as well as AVE above 0.50 (0.75 for Face-to-Face, 0.80 for Remote, and 0.76 for Hybrid). Researchers have shown that place attachment is a multi-dimensional construct (Ramkissoon et al., 2013; Scannell & Gifford, 2010). The first-order constructs that make up the second-order construct place attachment in this study are place dependence, place identity measured as college town identity and university identity, place affect, place social bonding, and person dimension. The measurement model shows that these six first-order factors reasonably represent the second-order factor place attachment.

**Structural Model**

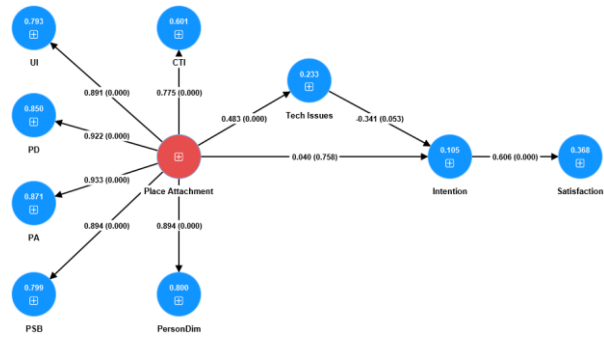
The three structural models are in Figures 2, 3, and 4 and path coefficients and the p values are shown on the diagrams. Tables 9, 10, and 11 show the total effects for the face-to-face, remote, and hybrid delivery models. The hypotheses were evaluated with path coefficients, r-squared (R2), f-squared (F2), and p-values (Chin, 2010; Chin et al., 2003). According to Cohen (1988a), F2 values are measured as: 0.26 (substantial), 0.13 (moderate), and 0.02 (weak). The results indicate support of all of the four hypotheses as they relate to face-to-face socially distanced and remote learning. The hybrid learning model was approaching statistical significance, but no inferences were made with this model.



**Figure 2 F2F Socially Distanced Model**



**Figure 3 Remote Learning Model**



**Figure 4 Hybrid Learning Model**

**5. DISCUSSION & CONCLUSION**

This section discusses the findings of this research, limitations, opportunities for further research, and conclusions. This section also addresses the contributions of the research and implication for institutions and instructors on the importance of place attachment for learning.

Ramkissoon et al. (2013) validated that place attachment as a second-order reflective factor. This study tested the addition of the personal dimension (PerD) and splitting place identity into college town identity (CTI) and university identity (UI) the same way that Zhang et al. (2018) operationalized it in their research. The other first-order factors were place dependence (PD), place affect (PA), and place social bonding (PSB). The R2 (CTI: 0.77, UI: 0.82, PD: 0.82, PA: 0.93, PSB: 0.87, and PerD: 0.73) path coefficients (CTI: 0.88, UI: 0.90, PD: 0.91, PA: 0.97, PSB: 0.93, and PerD: 0.86) and F2 (CTI: 3.42, UI: 4.46, PD: 4.62, PA: 13.96, PSB: 6.63, and PerD: 2.74) show that the model fits the data and that the six dimensions accurately represent the second-order place attachment construct. H1 is confirmed and the person dimension is another first-order factor of place attachment. This finding is in line with what Ramkissoon et al.

(2013) and Kyle et al. (2005) found in their research.

H2 stated that place attachment will have a positive impact on student learning intention. There is only support for H2 with the socially distanced face-to-face model. This was evaluated with R2 (0.159 for learning intention and 0.221 for satisfaction), path coefficients (0.398 for learning intention and 0.470 for satisfaction, F2 (0.189 for learning intention and 0.283 for satisfaction) and p-values (0.001 for learning intention and 0.018 for satisfaction). According to Cohen (1988b) these R2 are moderate and the F2 are large. Table 9 shows the total effects of place attachment on learning intention with a t-statistic of 3.389 and a p-value of 0.001. The remote delivery model does not have a significant direct relationship between place attachment and student learning intention and satisfaction. This relationship is mediated by technology issues.

H3 was student learning intention will have a positive relationship with student satisfaction for face-to-face, remote, and hybrid learning. This hypothesis is supported for all three learning models. This was evaluated with R2 (0.221 for face-to-face, 0.191 for remote and 0.368 for hybrid), path coefficients (0.470 for face-to-face, 0.437 for remote and 0.606 for hybrid), F2 (0.283 for face-to-face, 0.236 for remote and 0.581 for hybrid) and p values (0.018 for face-to-face, 0.000 for remote and 0.000 for hybrid). The R2 are moderate to substantial and the F2 are large (Cohen, 1988b). Tables 9, 10, and 11 show the total effects for intention on satisfaction. The t-statistics and p-values are statistically significant for all three models (face-to-face t-statistic of 2.371 & p-value of 0.018, remote t-statistic of 4.217 & p-value of 0.000, and hybrid t-statistic of 8.375 & p-value of 0.000). Learning intention has a positive relationship with learning satisfaction in all delivery models in this study.

H4 stated that place attachment on student learning outcomes would be mediated by technology issues for remote and hybrid learning models. This hypothesis is supported for the remote learning model. This was evaluated with R2 (0.152 for tech issues and 0.412 for intention), path coefficients (0.390 for tech issues and -0.688 for intention), F2 (0.179 for tech issues and 0.682 for intention) and p-values (0.020 for tech issues and 0.000 for intention). Table 10 shows the total effects for the technology issues mediation (place attachment on tech issues t-statistic of 2.328 and p-value of 0.020, tech issues on intention has a t-statistic of 9.166 and a p-value < .001). The test for

significance of place attachment on intention had a t-statistic of 0.538 and a p-value of 0.590. Since this path is not statistically significant, place attachment is fully mediated by technology issues on learning intention. The mediation shows the importance of making sure the course delivery technology does not have a negative impact on the course. The hybrid model is approaching significance for mediation of place attachment with a p-value of 0.053, but since this is not statistically significant, the mediation is not supported with this learning model.

This paper adds to the body of research in several ways. First, it supports that place attachment is a second-order factor in the higher education domain and has the first-order factors of college town identity, university identity, place dependence, place affect, place social bonding, and personal dimension. Second, place attachment has a positive impact on learning intention for face-to-face and fully remote course delivery. Third, learning intention has a positive impact on student satisfaction for the same delivery methods. The fourth contribution is that technology issues mediates the relationship between place attachment and learning intentions for fully remote course delivery. The final contribution is this paper introduced a new model for place attachment and learning intention as well as establish that place attachment has more than a tangential relationship to learning.

Research has found that face-to-face classrooms and labs have a significant impact on student place attachment (Spooner, 2019). Student place attachment is low in their freshman year, develops more in the sophomore year and peaks in the junior year and is maintained at a high level through the senior year (Spooner, 2019). This study had mainly juniors and seniors in the sample and they demonstrated high place attachment with the university and the community. The COVID-19 Pandemic reinforced to students that they prefer to learn face-to-face after spending a semester learning at home. They are willing to learn with other methods, but they have a strong preference for learning in a traditional on-campus classroom. This study found that place attachment has a strong positive impact on student learning intentions and their satisfaction with their learning experiences in a face-to-face classroom.

Understanding place attachment and how students are attached to their universities, classes, and teachers can help develop new ways for engaging students in face-to-face and technology delivery of classes. Educators should

know that place attachment can have a positive impact on students and their ability to be successful academically (Spooner, 2019; Strait, 2012). Bogdan et al. (2012) found that faculty had a significant role in helping students cope with their environment and place attachment. This study supports those findings especially in face-to-face learning environments. The mediation found in a remote class shows that technology issues have a negative effect between place attachment and student learning intention. It is important to make sure that the technology used to deliver instruction supports student learning and when there are problems it has a negative impact on their learning intention and satisfaction. The technology issues with the most negative impact for students were reliable internet and difficulty downloading materials. They were less concerned with discomfort with technology or reliable software and devices.

Zhang et al. (2018) found that university identity had a profound impact on student and alumni satisfaction. Hasan and Bao (2020) found that college students suffered from psychological distress due to ineffective e-learning systems and fear of academic year loss during the Pandemic. Teachers must focus on student learning as they manage the online and face-to-face classrooms (Purwanto, 2020). Those responsible for learning management systems and other technologies used to deliver synchronous and asynchronous learning instruction need to make sure the student technology issues are addressed so they do not have a negative impact on the student learning experience.

Huang et al. (2022) found that student engagement and place attachment are important to understand for the post-COVID-19 learning in colleges and universities. Ramkisson (2021) noted the importance of understanding place attachment and its impact on education post-pandemic. It is important to understand how students interact with place and its impact on academic motivation (Moghisi et al., 2015). Wargadinata et al. (2020) recommended that other researchers uncover obstacles experienced by students while learning during the COVID-19 Pandemic. This research showed that there are problems with hybrid courses. Having some students learning face-to-face while there are other students in their class that are at a distance distracts from the learning experience. The COVID-19 Pandemic required that universities had to be flexible and deliver classes in a hybrid model to accommodate students that could not attend class because of exposure to COVID-19. This required flexibility by faculty and the ability

to manage a face-to-face class and a remote class at the same time. This is very difficult for a faculty member to manage on their own and universities should make sure there is an operator present to monitor the remote students and let the faculty member know when there are questions in the chat, if students have their hands raised on the remote system, or if the instructor is not sharing the computer screen. The faculty member in this study found it difficult to monitor the face-to-face students and the remote students at the same time.

Baber (2002) noted that future research is needed to understand the role that technology plays in learning intentions and student satisfaction. They also found that student engagement is a strong determinant of student learning outcomes. This study found that technology issues mediate place attachment on student learning intention and satisfaction and that technology issues have a negative impact. Future research should replicate this study with a larger n to use more robust structural equation modeling to test the impact that place attachment has on learning intention and satisfaction. This study used PLS to analyze the learning models because of the lower n. A limitation of this study is there were three different instructors each teaching in a different modality. It will be difficult, if not impossible, to hold the instructor constant for all learning modalities in order to get a larger n. Future research should look at how student place attachment is impacted by individual instructors and their teaching style. Place attachment does impact learning intention of students, but there are other factors like individual student differences, teaching methods, and curriculum that are involved with student learning intention that need further study.

This study demonstrated the importance of place attachment in university learning environments and that technology issues mediate place attachment on learning outcomes. How students learn with technology is a complex process and future studies need to explore how these technology issues impact the learning process. Students are emotionally attached to their university and the community where it resides. Universities need to have programs and events that fosters place attachment as students matriculate towards graduation. Universities need to highlight the uniqueness of the university experience to help students emotionally connect to their university and community. Student attachment to their university helps them while they are participating in the college experience and that effect continues as they become alumni

(Bogdan et al., 2012; Spooner, 2019; Strait, 2012; Zhang et al., 2018). Universities need to use positive comments by current students and point out the unique experiences have both academically and socially in their recruiting efforts to attract future students.

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**APPENDIX A**

**Model results and measurement instrument**

**Table 1: Estimated Factor Correlation Matrix for Face-to-Face Measurement Model**

	Mean	SD	CA	CR	AVE	CTI	UI	PD	PA	PSB	PerD	Place Attach	Learn Intent	Learn Sat
CTI	5.51	1.21	0.89	0.90	0.75	<b>0.87</b>								
UI	4.73	1.61	0.90	0.92	0.84	0.76	<b>0.91</b>							
PD	4.86	1.62	0.85	0.88	0.77	0.87	0.93	<b>0.88</b>						
PA	4.93	1.73	0.95	0.95	0.92	0.92	0.89	0.91	<b>0.96</b>					
PSB	5.21	1.59	0.92	0.93	0.87	0.87	0.87	0.89	0.98	<b>0.93</b>				
PerD	4.35	1.62	0.84	0.85	0.75	0.72	0.90	0.83	0.90	0.84	<b>0.87</b>			
Place Attach	4.93	1.57	0.97	0.98	0.67	0.95	0.96	0.99	1.00	0.98	0.94	<b>0.82</b>		
Intention	5.61	1.60	0.89	0.91	0.75	0.49	0.38	0.41	0.35	0.29	0.48	0.43	<b>0.87</b>	
Satisfaction	6.35	0.97	0.94	0.97	0.90	0.22	0.27	0.32	0.15	0.10	0.20	0.20	0.50	<b>0.95</b>

Note: Square Root of AVE is on the diagonal

**Table 2: Estimated Factor Correlation Matrix for Remote Measurement Model**

	Mean	SD	CA	CR	AVE	CTI	UI	PD	PA	PSB	PerD	Place Attach	Place Tech	Learn Intent	Learn Sat
CTI	5.08	1.44	0.90	0.91	0.76	<b>0.87</b>									
UI	4.57	1.67	0.84	0.86	0.76	0.77	<b>0.87</b>								
PD	4.68	1.62	0.82	0.84	0.74	0.93	0.93	<b>0.86</b>							
PA	4.83	1.68	0.94	0.94	0.89	0.90	0.92	0.93	<b>0.94</b>						
PSB	5.18	1.59	0.90	0.90	0.83	0.83	0.99	0.95	0.95	<b>0.91</b>					
PerD	4.34	1.63	0.87	0.88	0.80	0.80	1.02	0.94	0.94	0.96	<b>0.89</b>				
Place Attach	4.78	1.61	0.97	0.97	0.69	0.90	1.01	1.02	0.99	1.01	1.01	<b>0.83</b>			
Tech	3.13	1.88	0.69	0.74	0.51	0.39	0.44	0.46	0.39	0.46	0.53	0.47	<b>0.72</b>		
Intention	5.10	1.65	0.93	0.95	0.87	0.16	0.06	0.12	0.07	0.11	0.13	0.12	0.72	<b>0.93</b>	
Satisfaction	6.30	0.78	0.82	0.95	0.61	0.19	0.17	0.20	0.18	0.19	0.21	0.19	0.34	0.38	<b>0.78</b>

Note: Square Root of AVE is on the diagonal

**Table 3: Estimated Factor Correlation Matrix for Hybrid Measurement Model**

	Mean	SD	CA	CR	AVE	CTI	UI	PD	PA	PSB	PerD	Place Attach	Place Tech	Learn Intent	Learn Sat
CTI	5.22	1.22	0.80	0.81	0.63	<b>0.79</b>									
UI	4.59	1.65	0.87	0.88	0.79	0.61	<b>0.89</b>								
PD	4.87	1.53	0.68	0.79	0.62	0.92	1.01	<b>0.79</b>							
PA	4.93	1.55	0.91	0.91	0.85	0.84	0.85	0.97	<b>0.92</b>						
PSB	5.41	1.40	0.85	0.87	0.77	0.74	0.89	0.99	0.97	<b>0.88</b>					
PerD	4.37	1.54	0.85	0.86	0.76	0.69	1.02	1.11	0.86	0.82	<b>0.87</b>				
Place Attach	4.90	1.48	0.96	0.96	0.57	0.90	0.97	1.13	0.99	0.98	0.99	<b>0.75</b>			
Tech	3.44	1.92	0.71	0.97	0.60	0.54	0.34	0.50	0.47	0.44	0.54	0.50	<b>0.77</b>		
Intention	4.47	1.97	0.96	0.97	0.90	0.23	0.12	0.18	0.13	0.21	0.10	0.17	0.33	<b>0.95</b>	
Satisfaction	5.35	1.45	0.91	0.99	0.77	0.30	0.32	0.38	0.30	0.27	0.36	0.34	0.23	0.58	<b>0.88</b>

Note: Square Root of AVE is on the diagonal

**Table 4: Outer Factor Loadings for the Latent Constructs**

Factors <- Construct	F2F Loadings	Remote Loadings	Hybrid Loadings
CTI-1 <- CTI	0.760	0.821	0.741
CTI-2 <- CTI	0.942	0.921	0.875
CTI-3 <- CTI	0.896	0.907	0.817
CTI-4 <- CTI	0.853	0.843	0.719
UI-2 <- UI	0.922	0.889	0.856
UI-3 <- UI	0.857	0.787	0.866
UI-4 <- UI	0.963	0.940	0.947
PD-1 <- PD	0.783	0.946	0.504
PD-2 <- PD	0.924	0.923	0.856
PD-3 <- PD	0.923	0.958	0.938
PA-1 <- PA	0.964	0.768	0.923
PA-2 <- PA	0.938	0.893	0.894
PA-3 <- PA	0.968	0.904	0.942
PSB-1 <- PSB	0.942	0.931	0.948
PSB-2 <- PSB	0.968	0.937	0.920
PSB-3 <- PSB	0.884	0.867	0.749
PerD-1 <- PersonDim	0.841	0.898	0.885
PerD-2 <- PersonDim	0.920	0.949	0.905
PerD-3 <- PersonDim	0.842	0.830	0.830
RecmndF2F <- Intention	0.854		
RecmndHyb <- Intention			0.962
RecRmote <- Intention		0.906	
Willing <- Intention	0.921	0.929	0.964
Future <- Intention	0.775		0.928
Intend <- Intention	0.922	0.962	0.948
SatKnow <- Satisfaction	0.928	0.810	0.916
SatLearned <- Satisfaction	0.957	0.828	0.906
SatLrnExp <- Satisfaction	0.956	0.606	0.878
SatRemote <- Satisfaction		0.846	
SatHyb <- Satisfaction			0.811
TechIssues <- Tech Issues		0.832	0.920
ReliableInt <- Tech Issues		0.759	0.809
Discomfort <- Tech Issues		0.654	
ReliableSoft <- Tech Issues		0.597	
ReliableDev <- Tech Issues			0.537

**Table 5: Face-to-Face Discriminant Validity Place Attachment 2nd Order Construct**

	Place		
	Attachment	Intention	Satisfaction
Place Attachment	<b>0.91</b>		
Intention	0.41	<b>0.87</b>	
Satisfaction	0.22	0.47	<b>0.95</b>

Note: Square Root of AVE is on the diagonal. Off-diagonal are correlations among constructs.

**Table 6: Remote Discriminant Validity Place Attachment 2nd Order Construct**

	Place			
	Attachment	Tech Issues	Intention	Satisfaction
Place Attachment	<b>0.92</b>			
Tech Issues	0.38	<b>0.72</b>		
Intention	-0.09	-0.62	<b>0.93</b>	
Satisfaction	-0.10	-0.31	0.44	<b>0.78</b>

Note: Square Root of AVE is on the diagonal. Off-diagonal are correlations among constructs.

**Table 7: Hybrid Discriminant Validity Place Attachment 2nd Order Construct**

	Place			
	Attachment	Tech Issues	Intention	Satisfaction
Place Attachment	<b>0.89</b>			
Tech Issues	0.49	<b>0.77</b>		
Intention	-0.132	-0.322	<b>0.95</b>	
Satisfaction	0.21	-0.032	0.61	<b>0.88</b>

Note: Square Root of AVE is on the diagonal. Off-diagonal are correlations among constructs.

**Table 8: Total Effects for Socially Distanced Face-to-Face Learning Structural Model**

	Original sample	Sample mean	Standard deviation	T statistics	P values
Place Attachment -> UI	0.904	0.907	0.024	37.139	0.000
Place Attachment -> CTI	0.880	0.884	0.028	31.643	0.000
Place Attachment -> PD	0.907	0.908	0.024	38.275	0.000
Place Attachment -> PA	0.966	0.965	0.009	103.950	0.000
Place Attachment -> PSB	0.932	0.931	0.019	49.262	0.000
Place Attachment -> PersonDim	0.856	0.861	0.055	15.608	0.000
Place Attachment -> Intention	0.398	0.415	0.118	3.389	0.001
Place Attachment -> Satisfaction	0.187	0.189	0.103	1.809	0.071
Intention -> Satisfaction	0.470	0.450	0.198	2.371	0.018

**Table 9: Total Effects for Remote Learning Structural Model**

	Original sample	Sample mean	Standard deviation	T statistics	P values
Place Attachment -> CTI	0.843	0.842	0.048	17.668	0.000
Place Attachment -> UI	0.918	0.920	0.022	41.779	0.000
Place Attachment -> PD	0.909	0.909	0.024	37.321	0.000
Place Attachment -> PA	0.947	0.947	0.015	61.760	0.000
Place Attachment -> PSB	0.943	0.942	0.015	64.990	0.000
Place Attachment -> PersonDim	0.934	0.934	0.018	52.419	0.000
Place Attachment -> Tech	0.390	0.379	0.167	2.328	0.020
Place Attachment -> Intention	-0.103	-0.106	0.191	0.538	0.590
Place Attachment -> Satisfaction	-0.045	-0.057	0.101	0.446	0.656
Tech -> Intention	-0.688	-0.707	0.075	9.166	0.000
Tech -> Satisfaction	-0.301	-0.343	0.079	3.790	0.000
Intention -> Satisfaction	0.437	0.486	0.104	4.217	0.000

**Table 10: Total Effects for Hybrid Learning Structural Model**

	Original sample	Sample mean	Standard deviation	T statistics	P values
Place Attachment -> CTI	0.775	0.780	0.062	12.465	0.000
Place Attachment -> UI	0.891	0.891	0.041	21.659	0.000
Place Attachment -> PD	0.922	0.922	0.023	40.782	0.000
Place Attachment -> PA	0.933	0.932	0.024	39.111	0.000
Place Attachment -> PSB	0.894	0.894	0.030	30.086	0.000
Place Attachment -> PersonDim	0.894	0.892	0.036	24.844	0.000
Place Attachment -> Satisfaction	-0.076	-0.075	0.097	0.783	0.434
Place Attachment -> Intention	-0.125	-0.123	0.148	0.845	0.398
Place Attachment -> Tech	0.483	0.492	0.096	5.054	0.000
Tech -> Intention	-0.341	-0.357	0.177	1.933	0.053
Tech -> Satisfaction	-0.207	-0.223	0.113	1.836	0.066
Intention -> Satisfaction	0.606	0.631	0.072	8.375	0.000

**Table 11: Place Attachment Measures Survey Instrument**

Dimensions	Description of Concern	Major Literature References
College Town Identity (CTI)	<ul style="list-style-type: none"> <li>I really miss (College Town) and the (University Name) when I am away from it for too long. (1=strongly disagree; 7=strongly agree).</li> <li>I feel attached to (College Town) and the (University Name).</li> <li>(College Town) and the (University Name) means a lot to me.</li> </ul>	Zhang et al. 2018
University Identity (UI)	<ul style="list-style-type: none"> <li>The (University Name) says a lot about who I am. (1=strongly disagree; 7=strongly agree).</li> <li>I feel that I can really be myself at the (University Name).</li> <li>I identify strongly with the (University Name).</li> </ul>	Zhang et al. 2018
Place Dependence (PD)	<ul style="list-style-type: none"> <li>(College Town) and the (University Name) is the best place for doing the things that I enjoy most. (1=strongly disagree; 7=strongly agree).</li> <li>I would not substitute any other university for the experiences I had here.</li> <li>(University Name) is the best place for spending ones' student life.</li> </ul>	Kyle et al. 2005 Zhang et al. 2018
Place Affect (PA)	<ul style="list-style-type: none"> <li>I am very attached to the (University Name). (1=strongly disagree; 7=strongly agree).</li> <li>I feel a strong sense of belonging to the (University Name) and its settings/facilities.</li> <li>The (University Name) means a lot to me.</li> </ul>	Ramkissoon et al. 2013
Place Social Bonding (PSB)	<ul style="list-style-type: none"> <li>I have a lot of fond memories about the (University Name) (1=strongly disagree; 7=strongly agree).</li> <li>I have a special connection to the (University Name) and the people who are here.</li> <li>I tell many people about the (University Name).</li> </ul>	Kyle et al. 2005 Ramkissoon et al. 2013
Person Dimension (PerD)	<ul style="list-style-type: none"> <li>People like me are at the (University Name). (1=strongly disagree; 7=strongly agree).</li> <li>The (University Name) Community reflects who I am.</li> <li>Everything about the (University Name) is a reflection of me.</li> <li>Self-report:</li> </ul>	Scannell & Gifford 2010 Hidalgo 2013 Spooner 2019
Place Attachment (Place Attach)	<ul style="list-style-type: none"> <li>How strong is your level of attachment to the (University Name) at the present time. (1=very low; 7=very high).</li> </ul>	Spooner 2019

	<ul style="list-style-type: none"> <li>One year from now, do you think your level of attachment to the University will? (1=increase, 2=decrease, 3=stay the same)</li> </ul>	
Technology Issues (Tech Issues)	<ul style="list-style-type: none"> <li>Technological issues (slow in Internet, difficulty downloading material, etc.) negatively impacted the online course delivery experience for me (1=strongly disagree; 7=strongly agree).</li> <li>My own discomfort or lack of familiarity with required technologies or applications.</li> <li>My access to reliable communication software/tools (e.g., Zoom, Skype, Google)</li> <li>My access to reliable internet/service.</li> <li>My access to a reliable digital device (e.g., laptop, mobile device)</li> </ul>	Educause DIY Survey Kit 2020
Satisfaction	<ul style="list-style-type: none"> <li>Rate your overall level of satisfaction with the learning experience this semester. (1=extremely dissatisfied; 7=extremely satisfied)</li> <li>Rate your level of satisfaction with what you learned in class this semester.</li> <li>Rate your level of satisfaction with knowledge you gained in class this semester.</li> <li>Rate your level of satisfaction with the learning experience in class being remote/hybrid/socially distanced face-to-face learning compared to traditional face-to-face learning experiences.</li> </ul>	Bashir 2019 Clouse et al. 2015
Learning Intention (Remote, Hybrid, Socially Distanced Face-to-Face)	<ul style="list-style-type: none"> <li>Remote only: Based on your class being remote/hybrid/socially distanced face-to-face, if you have the option of online vs. in-person courses in the future, you are (1=much more likely online; 7=much more likely in-person).</li> <li>Hybrid only: Based on your class being hybrid, you are more likely to choose this format in the future (1=not likely; 7=much more likely).</li> <li>SD Face-to-Face only: Based on your class being socially distanced face-to-face, if you have the option of online vs. in-person courses in the future, you are (1=much more likely online; 7=much more likely in-person).</li> <li>Would you recommend learning with remote, hybrid/in-person socially distanced methods to</li> </ul>	Alharbi and Drew 2014 Bashir 2019 Clouse et al. 2015 Park 2009



	<p>others (1=strongly disagree; 7=strongly agree).</p> <ul style="list-style-type: none"><li>• Specify the extent to which you intend to take another class with remote/hybrid/in-person socially distanced methods.</li><li>• Specify the extent to which you are willing to take another class with remote/hybrid/in-person socially distanced methods.</li></ul>	
Other Questions	<ul style="list-style-type: none"><li>• I was scared of catching Covid-19 during the Fall of 2020 (1=strongly disagree; 7=strongly agree).</li><li>• I was scared of the Covid-19 pandemic during the Fall of 2020</li><li>• What is your current overall GPA?</li><li>• Did you live in a dorm during majority of the Fall 2020 semester?</li></ul>	