The Ramifications of COVID-19 in Education: Beyond the Extension of the Kano Model and Unipolar View of Satisfaction and Dissatisfaction in the Field of Blended Learning

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Abstract: With the emergence of COVID-19 worldwide, interest in blended learning in higher education is rapidly increasing. Despite the fact that the unipolar view that satisfaction and dissatisfaction are measured separately has been emphasized in higher education, fewer efforts have been made in a blended learning context. Therefore, this study attempts to document the unipolar view of satisfaction and dissatisfaction in a blended learning context by adopting the Kano model. More specifically, the objectives of this study is to (1) conceptualize online and offline service dimensions in blended learning, (2) examine the asymmetric effect between satisfaction and dissatisfaction, and (3) apply those results to the Kano model. The following results are reported: (1) system quality and assurance are symmetric, functioning as a satisfier; and (2) information quality, responsiveness, and tangibility are asymmetric, functioning as a delighter. Theoretical and practical implications are addressed.

Keywords: blended learning, COVID-19, Kano model, satisfaction and dissatisfaction, service quality
challenging for researchers to understand and interpret our findings and conclusions as intended. Since the conceptual definition of blended learning is often discussed at an abstract level and researchers from different disciplines use a different intensity and scope in blended learning, we restrict the current view to service quality models. Quality in blended learning has been of interest to instructors and students, and it is considered an approach to producing better educational service outcomes for students (McKenzie et al., 2013; Wanner & Palmer, 2015). The issue of quality in blended learning has received more attention from academics and practitioners during the current pandemic situation (i.e., COVID-19), where many universities have been forced to adopt a new approach in place of their existing teaching methods. Thus, the need for social distancing during COVID-19 has motivated researchers to conceptualize the dimensionalities of blended learning in terms of quality. However, quality in blended learning is still viewed as in the early stages, and inconsistent findings have accumulated, probably because multiple streams of literature on the quality of blended learning are available, resulting in few reliable and valid measurements of blended learning. Therefore, this study seeks to explore what constitutes blended learning fundamental components, starting from a review of the traditional service quality assessment tool of SERVQUAL and modifying it for use in our study. Here, we will develop a scale to measure blended learning based on the SERVQUAL framework, categorize it into two groups (i.e., online service quality and offline service quality), each of which has its own subdimensions, and examine the effects of our conceptualization of blended learning quality on (dis)satisfaction and continuance intention.

Second, this study seeks to assess how blended learning quality dimensions influence satisfaction and dissatisfaction. A more critical and urgent need is to understand student satisfaction because, like any other service sector, the higher education sector has also shifted from a provider-side approach to a recipient-side approach. Consequently, universities are struggling to implement meaningful student-oriented quality assessment measures to accurately predict student satisfaction as an indicator of their service level. Since student satisfaction plays a critical role in curriculum planning and maintenance, the characteristics of blended learning that determine student satisfaction and dissatisfaction should be examined to decide where to invest limited resources to improve the quality of blended learning. Previous research has acknowledged that quality considerations elicit emotional responses (i.e., satisfaction and dissatisfaction), which will subsequently generate behavioral intentions and reactions (Morgan & Heise, 1988; Seo & Um, 2019; Um & Kim, 2018; Um & Lau, 2018). In the conceptualization of satisfaction and dissatisfaction, previous studies relied on a bipolar view that satisfaction and dissatisfaction lie at opposite ends of the same continuum (Chen, Lu, Gupta, & Xiaolin, 2014; Um & Kim, 2018): individuals are asked to rate multidimensional attributes of a service on a symmetrical one-dimensional scale (e.g., 1 = very dissatisfied, 4 = indifferent, 7 = very satisfied). This bipolar approach is built upon the assumption that satisfaction and dissatisfaction can occur simultaneously: if an individual marks “very satisfied” on an item, the rating is also simultaneously interpreted that he or she is not very dissatisfied. Despite its convenient and extensive application; however, the bipolar view has been criticized because the bipolar conceptualization allows ambivalence or the simultaneous presence of satisfaction and dissatisfaction, as well as indifference or the absence of both satisfaction and dissatisfaction (i.e., Chen et al., 2014; Ferguson & Johnston, 2011; Um & Lau, 2018). Thus, the bipolar approach is inappropriate to assess customer reactions, indicating that feeling satisfaction does not preclude the presence of dissatisfaction and vice versa. Consumer satisfaction studies have largely used the bipolar approach, with few studies including the simultaneous occurrence of satisfaction and dissatisfaction in a single model. Therefore, this study will extend the understanding of the nature of satisfaction and dissatisfaction by adopting the unipolar approach in which satisfaction and dissatisfaction are measured separately.

Finally, the unipolar view that is one of our research interests is also supported by empirical studies. For example, Bleuel (1990) maintains that the attributes of a service that generate satisfaction are not the same as those for dissatisfaction. Ferguson and Johnston (2011) also argue that not all product or service features generate satisfaction and dissatisfaction in the same manner, meaning that they are not exactly inversely correlated. These arguments are also supported by the Kano model (Kano, Seraku, Takashi, & Tsuji et al., 1984). The Kano model, which was initially proposed for product development and customer satisfaction, identifies three categorizations (i.e., delighters, satisfiers, and dissatisfiers) that serve different purposes. The features that belong to the categorization of delighters are only responsible for generating satisfaction when they are perceived to be good, but their absence does not influence dissatisfaction, whereas the features that belong to the categorization of dissatisfiers only generate dissatisfaction when they are perceived to be poor, but their fulfillment does not increase satisfaction. Finally, the features that belong to the categorization of satisfiers generate both satisfaction if fulfilled and dissatisfaction if not fulfilled. The three categorizations of this theory may advocate that the features of satisfier categorization show that satisfaction and dissatisfaction lie at the opposite ends of a single continuum, consistent with the bipolar view, while the features of delighters or dissatisfiers indicate that satisfaction and dissatisfaction are distinct constructs, consistent with the unipolar view. Since the Kano model indicates that the causes of satisfaction and dissatisfaction are not necessarily identical, it may provide support for the hypothesis that the asymmetric relationship between satisfaction and dissatisfaction in response to certain service attributes may exist in a blended learning context. By applying the logic of the Kano model, this study will test whether satisfaction and dissatisfaction are symmetric or asymmetric in relation to the features of blended learning (i.e., offline learning quality dimensions and online learning quality dimensions).

Therefore, this study attempts to (1) describe the development and refinement of a multidimensional scale of blended learning from the students’ perspective, (2) document the unipolar view of satisfaction and dissatisfaction in a blended learning context by adopting the Kano model, and (3) examine the relationships among blended learning quality, satisfaction and dissatisfaction, and continuance intentions.

**Literature Review**

**Unipolar View of (Dis)satisfaction**

Most researchers have used the bipolar view to consider satisfaction and dissatisfaction lying at opposite ends of one continuum (Chen et al., 2014; Seo & Um, 2019; Um & Kim, 2018). The issue of quality in blended learning has received more attention from academics and practitioners during the current pandemic situation (i.e., COVID-19), where many universities have been forced to adopt a new approach in place of their existing teaching methods. Thus, the need for social distancing during COVID-19 has motivated researchers to conceptualize the dimensionalities of blended learning in terms of quality. However, quality in blended learning is still viewed as in the early stages, and inconsistent findings have accumulated, probably because multiple streams of literature on the quality of blended learning are available, resulting in few reliable and valid measurements of blended learning. Therefore, this study seeks to explore what constitutes blended learning fundamental components, starting from a review of the traditional service quality assessment tool of SERVQUAL and modifying it for use in our study. Here, we will develop a scale to measure blended learning based on the SERVQUAL framework, categorize it into two groups (i.e., online service quality and offline service quality), each of which has its own subdimensions, and examine the effects of our conceptualization of blended learning quality on (dis)satisfaction and continuance intention.

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Although the bipolar view is widely used due to its practicability and thus is prevalent in the various service satisfaction studies as a method to determine a consumer’s assessment of a service, it has been criticized (Chen et al., 2014; Ferguson & Johnston, 2011; Um & Lau, 2018) since it does not easily explain the absence and the concurrent occurrence of both satisfaction and dissatisfaction (Namkung & Jang, 2010). For example, when a respondent scores 7 on a seven-point Likert scale with 1 = very dissatisfied, 4 = neither agree nor disagree, and 7 = very satisfied, the marked score represents “very satisfied,” which is simultaneously and automatically interpreted as “not very dissatisfied” based on the assumption that those discrete variables lie at the ends of the same continuum. While this approach appears to be easy to apply to a service evaluation context to assess customer satisfaction, the interpretation of those values, such as indifference and ambivalence (i.e., 4 = neither agree nor disagree), appears challenging both in theory and practice.

The unipolar view has been highlighted as a method of providing a more systematic approach to understanding the nature of satisfaction and dissatisfaction and to address the deficiency of the bipolar conceptualization of satisfaction and dissatisfaction. The unipolar approach denotes that satisfaction and dissatisfaction are measured and analyzed in a single model based on the assumption that they are not exactly inversely correlated; for example, “very satisfied” does not necessarily mean “not very dissatisfied.” Some evidence in support of the unipolar view of satisfaction and dissatisfaction has been produced. For example, Bleuel (1990) and Johnston (1995) argue that the features of generating satisfaction should not be the same as those of generating dissatisfaction, indicating that satisfaction and dissatisfaction do not lie on opposite ends of the same continuum. Similarly, Babin, Darden, and Babin (1998) insist that the bipolar approach to describing satisfaction and dissatisfaction has less explanatory power. Those earlier findings have emphasized the possibility that satisfaction and dissatisfaction are distinct and thus should be examined separately. Recent empirical outcomes have also provided support for the unipolar view that the attributes of service can generate satisfaction, dissatisfaction, both, or neither, signaling that satisfaction and dissatisfaction are different constructs (Namkung & Jang, 2010; Seo & Um, 2019; Um & Lau, 2018). Due to its powerful predictability and theoretical and practical reasoning, the unipolar view has been extensively used to assess customer satisfaction and dissatisfaction in various service areas (e.g., service recovery situations [Chebat & Slusarczyk, 2005], food services [Jang & Namkung, 2009], and health care services [Um & Lau, 2018]). Even in a higher education context, the unipolar view has been applied and shown to be a validated and reliable measure to understand student satisfaction and dissatisfaction (e.g., lecturer and course characteristics [Mikulić, Dužević, & Baković, 2015]; an interdisciplinary program [Seo & Um, 2019]; and a learning management system [Islam, 2014]).

While this unipolar approach is prevalent in other service fields, notably, fewer efforts have been made in a blended learning context. Since blended learning is composed of multiple attributes, including online learning and offline learning environments, exploring students’ satisfaction and dissatisfaction with the unipolar view may fill the theoretical research gap and generate more practical insights. Therefore, this study views satisfaction and dissatisfaction as distinct constructs and examines satisfaction and dissatisfaction separately.

### Kano Model

The Kano model is a theory that provides support for the causes of customer satisfaction based on the product features perceived by a customer (Kano et al., 1984). The original Kano model was designed as a tool to prioritize product features that are likely to increase customer satisfaction on a roadmap. Then, product teams can make a strategic decision by recognizing a high-satisfaction feature and comparing it with its cost. Consequently, the Kano model can identify certain product features that will dissatisfy, satisfy, and even delight their customers. The Kano model categorizes three elements that serve a different role in generating customer satisfaction: delighters, satisfiers, and dissatisfiers.

A delighter is a factor that only works toward generating satisfaction when fulfilled, but its absence is not related to the occurrence of satisfaction (Füller & Matzler, 2008). Satisfiers work toward either generating satisfaction once fulfilled or triggering dissatisfaction if not fulfilled (Kano et al., 1984). Finally, dissatisfiers represent a factor that generates dissatisfaction when it is below the standard level but does not increase satisfaction, even when it is above the standard (Xu & Li, 2016). By applying the logic of the Kano model, Yang (2005) attempted to group the multiple attributes of air conditioners into Kano’s three categorizations. The results reveal that of a total of 24 attributes, 5 factors are delighters (e.g., wired and wireless control function, and four key functions in one), 12 factors are satisfiers (e.g., compressor noise, durability of fan motor, and outlet noise of air conditioner), 4 factors are dissatisfiers (e.g., stainless base and inverter compressor), and 1 factor did not belong to any category (i.e., preorder function of starting time). The Kano model, which originated in the assessment of product features in relation to customer satisfaction, has been shown to be applicable to various fields, including service areas such as restaurants (e.g., Namkung & Jang, 2010), healthcare (e.g., Um & Lau, 2018), medical tourism (e.g., Um & Kim, 2018), and higher education (e.g., Seo & Um, 2019). For example, of the 26 quality attributes of the public hospitals, 3 factors were identified as delighters (e.g., quick and appropriate staff response for the patient), 4 factors as dissatisfiers (e.g., employee provides clear and understandable information), 3 factors as indifferent (e.g., available and adequate visiting hours for the patient family as scheduled), and 16 factors as one-dimensional service quality attributes (e.g., the efficiency of service procedures and appointment system). Another example of the application of the Kano model to higher education reveals findings such as distributive fairness and interactional fairness that are considered delighters, personal quality and administrative quality as satisfiers, and procedural fairness as dissatisfiers (Seo & Um, 2019).

Since the Kano model proposes that the causes of satisfaction and dissatisfaction are not necessarily identical, this theoretical evidence motivates us to identify factors that function as delighters, satisfiers, and dissatisfiers in a blended learning context. Thus, this study applies the Kano model as a theoretical lens through which to view the asymmetrical relationship between satisfaction and dissatisfaction.
Service quality refers to consumers’ overall judgment of excellence or superiority of service (Bitner & Hubbert, 1994; Boulding, Kalra, Staelin, & Zeithaml, 1993; Cronin & Taylor, 1992; Parasuraman, Zeithaml, & Berry, 1985, 1988). Parasuraman et al. (1985), for example, define service quality as the difference between what is expected and what is perceived toward a service. In this view, service quality is regarded as a precursor to customer satisfaction (Seo & Um, 2019). The SERVQUAL scale developed by Parasuraman et al. (1985, 1988) has received much attention from academics and practitioners who regard the scale as a diagnostic tool to assess customer satisfaction (e.g., Carr, 2007; Chiu, Chiu, & Chang, 2007; Um & Lau, 2018). The scale has been extensively discussed both in theory, such as the customer satisfaction and service evaluation literature, and in practice, including many service areas, such as travel and tourism services (e.g., Fick & Brent, 1991), hospital services (e.g., Nekoei-Moghadam & Amiresmailli, 2011), shipping services (e.g., Durvasula, Lysonski, & Mehta, 1999), online services (e.g., Yang & Peterson, 2004), e-services (e.g., Li & Suomi, 2009), and education services (e.g., Brochado, 2009).

The original SERVQUAL model consists of five dimensions: reliability, assurance, tangibles, empathy, and responsiveness. These factors cover the diverse aspects of a service, such as environments, consistency, and employees’ attitudes and willingness to assist in a timely manner with sufficient knowledge. Despite the wide application of this scale to diverse service areas (Brady & Cronin, 2001; Jiang, Klein, & Carr, 2002; Pitt, Watson, & Kavan, 1995; Seo & Um, 2019), the SERVQUAL model has been criticized due to its use of the “difference score,” its dimensionality, and its applicability (Babakus & Boller, 1992; Cronin & Taylor, 1992; Um & Kim, 2018; Um & Lau, 2018). First, regarding the use of the score obtained from the difference between expectation and perception, Brown et al. (1993) argue that the positive correlation between expectation and perception may weaken the reliability of the “difference score,” and the validity and reliability of the “difference score” cannot be secured (e.g., Chatterjee & Chatterjee, 2005). Second, regarding its dimensionality and applicability, the five generic dimensions that are applicable to one service area are not fully replicable to another service area (Um & Kim, 2018; Um & Lau, 2018). Thus, its modification for use is necessary based on contextual backgrounds. Based on the theoretical and empirical evidence, this study does not rely on the difference score but on the student perception of blended learning as a method of conceptualizing and assessing the characteristics of blended learning. This study develops the dimensionality of blended learning by conceptualizing online and offline service features separately, since the predictability of the original SERVQUAL model to accurately assess customer satisfaction largely depends on its modification for use (e.g., Seo & Um, 2019).

Online Service Quality

The rapid development of information technology and web resources has significantly contributed to the dynamic expansion of online teaching and learning, exerting a substantial effect on the quality of teaching and learning (Krämer, 2000). As learning technology and its associated fields continue to evolve, terms such as online, web-based, and e-learning are interchangeably used (Lee, 2010; Moore, Dickson-Deane, & Galyen, 2011); those terms overlap and are divided by hierarchical organization, media type, access type, correspondence, and interaction type (Moore et al., 2011). The dearth of coherence of theoretical and empirical evidence has accumulated, thus increasing the challenge of understanding the main insights into the online learning side of blended learning. Since our motivation for this study is to consider identifying the online dimensions of blended learning rather than addressing the characteristics of each terminology, this study uses the term online service quality for two reasons. First, an increasing interest in enhancing the quality of service in blended learning has prompted education scholars to adopt a student-centered approach (Stodnick & Rogers, 2008). By viewing students as customers, this approach motivates universities to provide the best educational services for students to make them satisfied and eventually loyal to their universities (Stodnick & Rogers, 2008). Second, the conceptualization of service quality has been extensively addressed and discussed in the field of education, including online learning (e.g., Ward, Peters, & Shelley, 2010), web-based teaching (e.g., Chiu, Chiu, & Chang, 2007), and e-learning (e.g., Uppal, Ali, & Gulliver, 2018); various quality assessment models have been established, such as SERVQUAL, LBIQUAL, SERVPERF, and WEBQUAL (Asogwa, Asadu, & Ezema, 2014).

However, the concept of assessing service quality in blended learning is still in its infancy. In the conceptualization of blended learning, most current research tends to predominantly focus on its online learning attributes as an extension of online education and measures the online dimension of learning with some modifications of the existing scales. To date, a consensus on the measurement of online dimensions of blended learning is far from being reached. The existing evidence reveals that factors that have been examined in a blended learning context overlap and are interchangeably used, and emerge and disappear over time (Ellis, Pardo, & Han, 2016; Ginns & Ellis, 2007). Despite the emergence of various factors from different authors, those factors are generally categorized into two higher dimensions: a system-related dimension and content-related dimension. On the one hand, regarding the system-related dimension, existing studies inspired by the technology adoption model (TAM) (Davis, 1989) reveal factors that facilitate both information flows and networked systems. For example, Wolfinbarger and Gilly (2002) discovered four factors: website design, reliability, privacy/security, and customer service. Yang and Fang (2004) identified three essential factors: ease of use, timeline of information, and security. On the other hand, other studies that have modified the original SERVQUAL scale for use (Zeithaml, Parasuraman, & Malhotra, 2000) reveal content-related factors. For example, Jung (2011) reveals seven dimensions in e-learning: interaction, staff support, institutional QA mechanism, institutional credibility, learner support, information and publicity, and learning tasks. Liaw (2008) highlights the interactions between instructors and e-learners and identifies three factors: instructor availability, response time, and effective communication.

By analyzing and synthesizing previous research, this study measures the online service quality of blended learning by considering two different aspects: information quality and system quality. Information quality refers to the extent to which the content of the online course developed in a blended learning class is complete, easy to comprehend, provided in a timely manner, and relevant to the topic, whereas system quality focuses on online course websites such as...
the interface, loading time, navigation, response time, and responsiveness (DeLone & McLean, 2003; Mckinney, Yoon, & Zahedi, 2002).

Previous literature has provided support for the relationship between service quality and satisfaction. On the one hand, expectations-confirmation theory denotes that satisfaction is determined by positive or negative disconfirmation between expectations and performance (Oliver, 1980): positive disconfirmation (perceptions > expectations) generates satisfaction, while negative disconfirmation (expectations > perceptions) triggers dissatisfaction. This logic has motivated many researchers to explore the effect of service quality on satisfaction in many areas. Empirical evidence that has been produced and accumulated also provides support for the relationship. For example, Chiu et al. (2007) reveal that both information quality and system quality are positively related to students’ satisfaction. According to Okzan and Koseler (2009), both the system quality and the content quality of the online learning system are significantly and positively related to students’ overall perceived satisfaction.

However, most of the existing research has examined the relationship between service quality and satisfaction, but not the relationship between service quality and dissatisfaction. This lack of evidence prompted us to explore whether those two different factors can contribute to the occurrence of satisfaction and/or dissatisfaction. Therefore, based on the bipolar view and the Kano model mentioned above, this study develops the following hypotheses to investigate the symmetry or asymmetry of satisfaction and dissatisfaction.

**H1:** The relationship between the effect of information quality on satisfaction and dissatisfaction is asymmetric.

**H2:** The relationship between the effect of system quality on satisfaction and dissatisfaction is asymmetric.

### Offline Service Quality

Various factors to measure the offline quality of blended learning have emerged and disappeared, making it challenging to reach a consensus among scholars. For example, Abdullah (2006) identifies five factors: academic aspects, nonacademic aspects, program issues, reputation, and access. Sultan and Wong (2010) describe eight factors: dependability, effectiveness, capability, efficiency, competencies, assurance, unusual situation management, and semester syllabus. The emergence of these various factors is mainly due to the nature of higher education, which involves multiple stakeholders, such as faculty members, administrative staff, and students (Seo & Um, 2019).

The present study measures offline service quality by relying solely on college students' perspectives to avoid conceptual confusion. Based on the prior literature and empirical outcomes (e.g., Seo & Um, 2019), five factors that have been empirically tested and shown to be reliable and validated in a higher educational context serve to conceptualize offline service quality in this study (i.e., assurance, responsiveness, empathy, reliability, and tangibility).

In the field of education, a growing body of research has focused on examining the relationship between service quality and satisfaction (Brochado, 2009; Yang & Peterson, 2004) and relatively less on the relationship between service quality and dissatisfaction (Islam, 2014; Mikulić et al., 2015), but research that simultaneously considers satisfaction and dissatisfaction is generally lacking. Again, insufficient empirical evidence motivates us to examine whether five different factors are the source of satisfaction and/or dissatisfaction. Similar to the proposed relationships above, the following hypotheses are established to investigate whether the effect of each offline service quality dimension on satisfaction and dissatisfaction is symmetric or asymmetric.

**H3:** The relationship between the effect of assurance on satisfaction and dissatisfaction is asymmetric.

**H4:** The relationship between the effect of responsiveness on satisfaction and dissatisfaction is asymmetric.

**H5:** The relationship between the effect of empathy on satisfaction and dissatisfaction is asymmetric.

**H6:** The relationship between the effect of reliability on satisfaction and dissatisfaction is asymmetric.

**H7:** The relationship between the effect of tangibility on satisfaction and dissatisfaction is asymmetric.

### Satisfaction, Dissatisfaction, and Continuance Intention

In this study, continuance intention refers to the degree to which a college student has formulated specific plans to continue his or her blended learning class in the future. Continuance intention is treated as a consequent variable that results from those emotional states or (dis)satisfaction (Chiu & Wang, 2008; Seo & Um, 2019). In this research, we use a model of expectation confirmation theory (Oliver, 1980) for the relationship between satisfaction/dissatisfaction and continuance intention. In this model, students’ satisfaction with online and offline service quality is formed when their perceptions exceed their expectations, whereas dissatisfaction occurs when their perceptions are worse than prior expectations. In addition to the theoretical evidence, McGorry (2003) and Chiu et al. (2007) produce empirical outcomes of a linear relationship between students’ satisfaction and online learning course continuance intention. Thus, we test the following hypotheses.

**H8:** Satisfaction will increase continuance intention toward blended learning.

**H9:** Dissatisfaction will decrease continuance intention toward blended learning.

The conceptual framework of our research is depicted in Figure 1.

### Research Methodology and Survey Design

We identified several colleges in South Korea where a blended learning class had operated over 3 years, which is a sufficient period to potentially signal assurance of the stability of the online lecture system, to obtain appropriate samples to assess the objectives of this study. South Korea may serve as one of the best research target sites because the number of colleges that embrace blended learning is increasing annually due to the cost-effectiveness and flexibility of
this learning modality (Park, Yu, & Jo, 2016). Regarding the
design of a survey questionnaire, we reviewed and synthe-
sized prior studies and adapted measurement items whose
reliability and validity had been demonstrated. The question-
naire was designed using the following procedures: (1) we
performed five in-depth interviews with education service
quality experts and university professors; (2) we translated
the initial English version of the questionnaire back into
a Korean version and then translated it back to English to
assess conceptual equivalence by asking three academicians
bilingual in English and Korean to review the questionnaire;
(3) a pretest of the final Korean version of the questionnaire
was conducted with 20 college students who had already
taken a blended learning class previously; and (4) based on
their feedback, we modified, rearranged, and removed some
items, thereby increasing accuracy, clarity, and readability.

Measurement Development
Ten theoretical variables were chosen to test the proposed re-
lationships and were measured on a 7-point Likert scale (i.e.,
1 = strongly disagree to 7 = strongly agree). Regarding the
conceptualization of online service quality, two variables (i.e.,
information quality and system quality) serve as independent
variables and were measured with five items derived from De-
Lone and McLean (2003) and McKinney et al. (2002). The
other independent variable of offline service quality is con-
ceptualized from the studies by Parasuraman et al. (1988)
and Seo and Um (2019). Five factors (i.e., assurance, re-
sponsiveness, empathy, reliability, and tangibility) were iden-
tified and measured with a single item each. Satisfaction
and dissatisfaction, each serving as a mediating variable in
this study, were measured with three items adapted from the
study by Seo and Um (2019). Finally, continuance intention
was measured with two items adapted from the study by Re-
spondek, Seufert, Stupnisky, & Nett (2017).

While we cannot fully get rid of a third variable interven-
tion that may impact our observed relationships, we did our
best to validate our research findings by adding some control
variables to generate more reliable and validated results. We
added three control variables, namely previous experiences
of blended learning, computer skills, and the degree of
internet usage, to analyze the pure causality of the proposed
relationships. First, previous experiences of blended learn-
ing, which refers to the number of times a respondent had
taken a blended learning class by the time the respondent
was asked to take part in the research, was controlled be-
cause more experiences may indicate that the respondent is
already familiar with blended learning environments. There-
fore, since previous experiences of blended learning may
increase the familiarity with an ongoing blended learning
class, which may determine the level of satisfaction and
dissatisfaction, we chose previous experiences of blended
learning as a control variable in this study to minimize its
alternative explanations for the observed relationships. In
addition, an individual’s computer skills are another factor
that should be controlled because the extent to which the on-
line lecture of blended learning is utilized depends on his or
her personal computer skills. Finally, the degree of internet
usage should be controlled because the amount of time a col-
lege student uses the internet is proportional to the degree
to which he or she is familiar with the online environment.

Data Collection
Data collection started by distributing a cover letter that pre-
sented the purpose of this study, the researcher’s contact in-
f ormation, and private and confidential issues to contact the
chief administrator of each college. Several colleges agreed
to participate in this research and subsequently provided a
list of blended learning classes and the student contact infor-
mation. We used a random sampling technique to avoid sam-
ple selection bias and identify target students. In addition,
we did not consider the students from our lists who were not
participating in a blended learning class at the time of sur-
vey distribution. Thus, students who were taking part in an
ongoing blended learning class were only included. We bene-
fit ed from the designed samples because they are more likely
to provide information and would easily be able to recall their
ongoing experience in a blended learning class. The names of
the colleges cannot be disclosed because of confidentiality.

Through those procedures, contact information for 383 in-
dividuals was initially obtained, but contact information from
70 of these students was inaccurate; thus, valid contact infor-
mation for 313 students was obtained. Of the 313 potential
respondents, 249 respondents were included for data analy-
sis and hypothesis testing for the following reasons: (1) 28
students were excluded because they were unwilling to par-
ticipate in the survey, (2) 12 students were excluded because
they dropped out, and (3) 24 students did not appear to an-
swer seriously or had missing information. The demographics
of the final sample dataset are summarized in Table 1.

Nonresponse Bias and Common Method Bias
When a sample fails to represent the population, nonresponse
bias can occur, which weakens the generalizability of re-
search findings. Nonresponse bias may be tested by compar-
ing demographic differences between the actual and poten-
tial respondents (Armstrong & Overton, 1977): if a significant
difference is observed in the answers, nonresponse bias is
likely to occur. We conducted a t-test by comparing the demo-
graphic information of the early and late respondents, such as
sex, age, grade, and previous experiences with a blended
learning class. The results showed no statistically significant
differences between the two groups. Therefore, nonresponse
bias may not be a problem in this study.

Common method bias is another concern that should be
addressed due to single respondent survey construction with
a self-administered questionnaire. Because single respon-
dents speak for themselves, it is not sure whether they move
beyond the individual level to appropriately addresses more
complex units of analysis (Montabon, Daugherty, & Chen,
2018). While this approach has some potential difficulties, we
adopted this approach due to time and cost savings on data
collection (Montabon et al., 2018). To detect the common
method bias, this study used a common latent factor analysis
suggested by Podsakoff, MacKenzie, Lee, & Podsakoff (2003)
as a statistical remedy. This technique compares the model
fit indices between the initial CFA measurement model and
the identical model to which a common latent factor is
added. The fit indices calculated from both models did not
significantly differ for the initial model, $\chi^2/df = 3.442; CFI =
.911; IFI = .912; RMSEA = .096$, whereas for the extended
model, $\chi^2/df = 3.444; CFI = .912; IFI = .913; RMSEA = .099$.
The lack of significant differences between the two models
provides statistical evidence that common method bias is minimized (Satorra & Bentler, 2001).

Measurement Reliability and Validity

Construct validity and reliability are prerequisites for hypothesis testing. We conducted several statistical analyses using Amos 22.0 and SPSS 23.0 software programs to test whether the constructs were validated and reliable because all the constructs employed in this study used latent variables.

Regarding reliability, which refers to the extent to which measurement items are consistent to represent a latent variable, we estimated the reliability of each construct by computing Cronbach’s α. The calculated scores ranged from .836 (i.e., continuance intention) to .940 (i.e., satisfaction), and the lowest score was higher than the cutoff of .70, indicating that a high degree of internal consistency was achieved (Johnson & Wichern, 2002). Since offline quality factors were measured with a single item, Cronbach’s α score of each variable was not calculated.

Regarding validity, which refers to the extent to which measurement items represent a latent variable accurately, we tested unidimensionality, convergent validity, and discriminant validity. Unidimensionality, which shows whether a set of items measures the same construct, was assessed by performing a confirmatory factor analysis (i.e., CFA) (Hattie, 1985). The results of the CFA measurement model were as follows: \( \chi^2 = 430.265, df = 125, \chi^2/df = 3.442, \) CFI = .911, IFI = .912, NFI = .880, RMR = .096, and RMSEA = .099. These fit indicators have been shown to be an acceptable model fit (Bagozzi & Yi, 1988). In addition to the acceptable model fit of the whole measurement model, we then computed three indicators, namely, standardized factor loadings, composite reliability (i.e., CR), and average variance explained (i.e., AVE), to assess the convergent validity of each construct (Bagozzi & Yi, 1988). Convergent validity tests whether constructs that are predicted to be theoretically related appear to be, in fact, related. As summarized in Table 2, the scores of each indicator revealed acceptable ranges: (1) all standardized factor loadings were greater than the threshold of .50 and significant at .01; (2) the CR of each latent variable was greater than the benchmark of .70 (i.e., range of .852-.944); and (3) the AVE of each latent variable was greater than the cutoff of .50 (i.e., the range was .553–.849). Those calculated scores provide strong statistical evidence that the variables used in this study appear to show high convergent validity. Finally, discriminant validity indicates that constructs that are not theoretically related are actually unrelated. We compared the AVE value of each variable to all the corresponding squared correlations to examine the discriminant validity (see Table 3). Based on the results, the lowest AVE score was greater than the highest coefficient of the squared correlation, indicating discriminant validity (Fornell & Larcker, 1981) (see Tables 2 and 3).

Results of the Regression Analysis

We tested the hypothesized relationships by conducting a hierarchical regression analysis, a statistical method of providing statistical predictability in stages from control variables to main predictors, by examining the statistical significance of variance in an outcome variable. This statistical analysis may benefit social science researchers who frequently encounter variables that are correlated. This analysis allows researchers to identify the actual effect of a predictor on a consequent variable after potential influencing factors are controlled. For hypothesis testing, we established two models, namely, \( M_1 \) and \( M_2 \), to examine the effects of online service quality and offline service quality factors on satisfaction. \( M_1 \) served as a baseline model in which only control variables were entered, whereas \( M_2 \) included main predictors: two from the online service dimension (i.e., online information quality and online system quality) and five from the offline service dimension (i.e., assurance, responsiveness, empathy, reliability, and tangibility). The same procedures were applied to test those seven predictors of dissatisfaction, thereby establishing two other models (i.e., \( M_3 \) and \( M_4 \)). Finally, we established two additional models, namely, \( M_5 \) and \( M_6 \), where only control variables were entered and satisfaction and dissatisfaction were additionally entered in \( M_5 \).
Table 2. Measurement Items and Confirmatory Factor Analysis Results

| Construct and Instruments                                      | Standardized Factor Loadings | Standard Error | Source                          |
|---------------------------------------------------------------|------------------------------|----------------|---------------------------------|
| **Online service quality (Information)**                      |                              |                |                                 |
| The content of the course materials provided by the blended   | Cronbach’s α = .851;         |                | McKinney et al. (2002) and       |
| learning class web site is complete. #                       | CR = .858; AVE = .553        |                | DeLone and McLean (2003)        |
| The content of the course materials provided by the blended   | .735                         |                |                                 |
| learning class web site is easy to comprehend.               | .826 .104                    |                |                                 |
| The course materials provided by the blended learning class   | .519 .100                    |                |                                 |
| web site are well represented with text and graphics.        | .817 .109                    |                |                                 |
| The content of course materials provided by the blended      | .777 .119                    |                |                                 |
| learning class web site is relevant to the topic.            |                              |                |                                 |
| **Online service quality (System)**                          |                              |                |                                 |
| The user interface of the blended learning class web site is   | Cronbach’s α = .856;         |                | McKinney et al. (2002) and       |
| well designed. #                                             | CR = .861; AVE = .560        |                | DeLone and McLean (2003)        |
| The blended learning class web site can quickly load all the | .494                         |                |                                 |
| text and graphics.                                           | .759 .212                    |                |                                 |
| It is easy to navigate the blended learning class web site.  | .844 .226                    |                |                                 |
| The blended learning class web site functions well all the   | .854 .243                    |                |                                 |
| time.                                                        | .735 .201                    |                |                                 |
| The blended learning class web site provides quick response  |                              |                | Parsons et al. (1988) and        |
| to my requests.                                              |                              |                | Seo and Um (2019)                |
| **Offline service quality**                                   |                              |                |                                 |
| Assurance: The instructor has good education attitude,       |                              |                |                                 |
| knowledge, and lecturing skills.                             |                              |                |                                 |
| Responsiveness: The instructor gives prompt and voluntary    |                              |                |                                 |
| response to students’ questions and demand.                  |                              |                |                                 |
| Empathy: The instructor gives good attention, understanding, |                              |                |                                 |
| and manner for each individual student.                      |                              |                |                                 |
| Reliability: The instructor has accuracy of deliver of       |                              |                |                                 |
| appointment, fairness, and accuracy of grading, and          |                              |                |                                 |
| attendance records.                                          |                              |                |                                 |
| Tangibility: The classroom provides comfortable study        |                              |                |                                 |
| environments with student.                                   |                              |                |                                 |
| **Satisfaction**                                             |                              |                |                                 |
| My decision to take a blended learning class is a wise one.  |                              |                |                                 |
| I am pleased with the experience of taking a blended learning|                              |                |                                 |
| class.                                                       |                              |                |                                 |
| Overall, I feel good after taking a blended learning class.  |                              |                |                                 |
| #                                                            |                              |                |                                 |
| **Dissatisfaction**                                          |                              |                |                                 |
| I am disappointed with the experience of taking a blended    |                              |                |                                 |
| learning class.                                              |                              |                |                                 |
| I am dissatisfied with the delivery of the service of a      |                              |                |                                 |
| blended learning class.                                       |                              |                |                                 |
| Overall, I feel regret after taking a blended learning class |                              |                |                                 |
| #                                                            |                              |                |                                 |
| **Continuance intention**                                    |                              |                |                                 |
| I intend to continue a blended learning class in the future. |                              |                |                                 |
| I will continue taking a blended learning class as much as   |                              |                |                                 |
| possible in the future. #                                    |                              |                |                                 |

Note. Offline service quality did not produce any score regarding standardized factor loadings, standard error, Cronbach’s α, CR, and AVE because each factor was measured with a single item. An item marked with # did not produce standard error because it was constrained to be one.
Table 3. Correlation Matrix

| Constructs                      | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      |
|--------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. Online service quality      | .343    | .305    | .302    | .244    | .302    | .340    | .391    | .114    | .105    |         |
| (Information)                  |         |         |         |         |         |         |         |         |         |         |
| 2. Online service quality      | .586*** | .106    | .118    | .120    | .133    | .113    | .226    | .081    | .040    |         |
| (System)                       |         |         |         |         |         |         |         |         |         |         |
| 3. Assurance                   | .552*** | .326*** | .578    | .528    | .496    | .485    | .420    | .157    | .135    |         |
| 4. Responsiveness              | .550*** | .343*** | .760*** | .640    | .494    | .458    | .387    | .130    | .134    |         |
| 5. Empathy                     | .549*** | .346*** | .727*** | .703*** | .690*** | .518    | .277    | .112    | .065    |         |
| 6. Reliability                 | .583*** | .336*** | .696*** | .677*** | .690*** | .720*** | .380    | .151    | .107    |         |
| 7. Tangibility                 | .625*** | .476*** | .648*** | .622*** | .567*** | .526*** | .616*** | .311    | .296    |         |
| 8. Satisfaction                | –.338***| –.285***| –.396***| –.361***| –.372***| –.335***| –.389***| –.557***| .146    |         |
| 9. Dissatisfaction             | –         |         |         |         |         |         |         |         |         |         |
| 10. Continuance intention      | .324*** | .201*** | .367*** | .366*** | .320*** | .254*** | .328*** | .544*** | –.382***|         |

Note. Correlations were below the diagonal and squared correlations were above the diagonal.

**Significant at .05.
***Significant at .01.

Table 4. Regression Results

| Dependent Variable | Satisfaction (Y₁) | Dissatisfaction (Y₂) | Continuation Intention (Y₃) |
|--------------------|-------------------|----------------------|-----------------------------|
|                    | M1                | M2                   | M3                           | M4                           | M5                           | M6                           |
| Control variables  |                   |                      |                              |                              |                              |                              |
| Previous experiences| –.061             | –.012                | .054                         | .018                         | –.010                        | .026                         |
| Computer level (normal) | .052              | .003                 | –.016                        | –.004                        | –.019                        | –.046                        |
| Computer level (professional) | .093             | .039                 | .084                         | .118**                       | .090                         | .056                         |
| Weekly average hours (between 10 and 15) | .040             | .049                 | –.074                        | –.074                        | .056                         | .028                         |
| Weekly average hours (between 15 and 20) | .113             | .015                 | –.087                        | –.031                        | .028                         | –.036                        |
| Weekly average hours (greater than 20) | –.059            | –.016                | –.048                        | –.077                        | –.030                        | –.008                        |
| Independent variables |                   |                      |                              |                              |                              |                              |
| X₁: Information quality | .232***           | –.057                |                              |                              |                              |                              |
| X₂: System quality     | .160***           | –.146**              |                              |                              |                              |                              |
| X₃: Assurance          | .281***           | –.189**              |                              |                              |                              |                              |
| X₄: Responsiveness     | .180**            | .001                 |                              |                              |                              |                              |
| X₅: Empathy            | –.012             | –.102                |                              |                              |                              |                              |
| X₆: Reliability        | –.015             | .057                 |                              |                              |                              |                              |
| X₇: Tangibility        | .210***           | –.046                |                              |                              |                              |                              |
| Mediators              |                   |                      |                              |                              |                              |                              |
| Satisfaction          |                   |                      |                              |                              |                              |                              |
| Dissatisfaction        |                   |                      |                              |                              |                              | .475***                      |
| Change in R²          | .035              | .578                 | .017                         | .226                         | .015                         | .314                         |
| Change in F value     | 1.448             | 43.153***            | .689                         | 9.065***                     | .619                         | 52.293***                    |

***Path significant at .01.
**Significant at .05.

and M6, respectively, to examine the effects of satisfaction and dissatisfaction on continuance intention. Notably, the averaged item scores for information quality, system quality, satisfaction, dissatisfaction, and continuance intention were entered in the regression model. Finally, the control variables were entered as follows: (1) prior experience with a blended learning class (actual numbers entered); (2) the level of computer skills (beginner, normal, and professional, with beginner serving as a reference point); and (3) the average weekly hours of internet use (less than 10 hours, between 10 and 15 hours, between 15 and 20 hours, and greater than 20 hours, with less than 10 hours serving as a reference point).

The predictability from the reference model to the predictor-attached model was determined using the F-statistic that signals a significant improvement in R² between stages (Pedhazur & Schmelkin, 2013). As described in Table 4, the scores of “Change in R²” in response to the F-statistics of the established models (i.e., M1 and M2, M3 and M4, M5 and M6) were statistically significant, suggesting that the regression results were statistically validated and reliable (see Table 4).

This study relies on the significant sign of the coefficient (i.e., significantly positive or negative) produced from the regression analysis to determine whether the effect of a predictor on satisfaction and dissatisfaction is asymmetric. The interpretation of whether satisfaction and dissatisfaction are symmetrical or asymmetrical to the effect of a predictor (i.e., the seven different dimensions identified in this study) is described below. On the one hand, if the relationship between satisfaction and dissatisfaction to the effect of a predictor such as information quality is symmetrical, then satisfaction and dissatisfaction appear to lie at opposite ends of one continuum. In this scenario, the coefficient values for satisfaction and dissatisfaction are positive and negative, respectively, and both are significant. On the
other cases are predicted: (1) as information quality increases, satisfaction increases (i.e., the coefficient is significant and positive) but dissatisfaction does not change (i.e., the coefficient is not significant) or (2) as information quality increases, satisfaction does not change (i.e., the coefficient is not significant) but dissatisfaction decreases (i.e., the coefficient is positive). While other symmetrical and asymmetrical cases exist from the perspective of mathematical analysis, this study focuses solely on the symmetrical and two asymmetrical cases, which are consistent with the Kano model.

Regarding H1, in which the relationship between the effect of information quality on satisfaction and dissatisfaction is asymmetric, we regressed information quality on satisfaction and dissatisfaction. Although the coefficient value for satisfaction was significant and positive ($\beta_{\text{information quality}} = .232, p < .01$ in M2), the coefficient value for dissatisfaction was nonsignificant ($\beta_{\text{information quality}} = -.057, p > .1$ in M4). Therefore, this evidence provides support for H1. Regarding H2 and H3, we applied the same procedure, and the following results were produced: the coefficient values on satisfaction were significant and positive ($\beta_{\text{system quality}} = .160, p < .01$; $\beta_{\text{assurance}} = .281, p < .01$ in M2), and the respective value for the coefficient of dissatisfaction was significant and negative ($\beta_{\text{system quality}} = -1.46, p < .01$; $\beta_{\text{assurance}} = -1.89, p < .01$ in M4). Based on this evidence, the relationship between satisfaction and dissatisfaction with a predictor (i.e., system quality and assurance, respectively) was inversely correlated, thereby showing a symmetrical relationship. Thus, H2 and H3 are not supported. Regarding H4, in which the relationship between the effect of responsiveness on satisfaction and dissatisfaction is asymmetric, we regressed responsiveness on satisfaction and dissatisfaction. The results showed a symmetrical relationship based on the statistical findings that the coefficient value for satisfaction was significant and positive ($\beta_{\text{responsiveness}} = .180, p < .01$, in M2), and the coefficient value for dissatisfaction was nonsignificant ($\beta_{\text{responsiveness}} = .001, p > .1$ in M4). Therefore, this evidence provides support for H4. Regarding H5 and H6, we did not observe statistically significant effects of empathy or reliability on satisfaction and dissatisfaction. Thus, H5 and H6 are not supported. Regarding H7, in which the relationship between the effect of tangibility on satisfaction and dissatisfaction is asymmetric, we found that the coefficient value for satisfaction was significant and positive ($\beta_{\text{tangibility}} = .210, p < .00$, in M2), and the coefficient value for dissatisfaction was nonsignificant ($\beta_{\text{tangibility}} = -.046, p > .1$ in M4). Therefore, this evidence provides support for H7.

Then, we tested the effects of satisfaction and dissatisfaction on combined intention. The results from M6 show that satisfaction and dissatisfaction exert opposite effects on combined intention: satisfaction was positively correlated with combined intention ($\beta_{\text{satisfaction}} = .475, p < .01$ in M6), whereas dissatisfaction was negatively correlated with combined intention ($\beta_{\text{dissatisfaction}} = -.125, p > .05$ in M6). Thus, H8 and H9 are supported.

In addition to hypothesis testing, we attempted to interpret the results according to the Kano model (Kano et al., 1984). As three distinct factors are identified in the Kano model, namely, delighters, satisfiers, and dissatisfiers, we grouped the service quality dimensions using the approach described below. Based on the regression results, information quality, responsiveness, and tangibility were regarded as delights because they positively influence satisfaction and are unlikely to decrease dissatisfaction. Moreover, system quality and assurance were classified as satisfiers, indicating that the presence of system quality and assurance may increase satisfaction and decrease dissatisfaction. Finally, our results did not reveal any factor that was classified as a dissatisfier.

To ensure that our findings are statistically reliable and validated, regardless of the statistical methods used, this study also conducted structural equation modeling (SEM) to test whether the overall patterns, including the significance and direction of each hypothesis, remain salient irrespective of the statistical methods (see Table 5). The overall fits were calculated as follows: $\chi^2 = 587.396$; $df = 198$; $\chi^2/df = 2.967$; RMSEA = .089; CFI = .916; and IFI = .917. The SEM results show that similar patterns are also observed regarding the significance and direction for each hypothesis, providing support to the robustness of our study findings. Table 6 summarizes the results for hypothesis testing, and Figure 2 shows the application of the Kano model. We will provide details of the findings in the discussion section.

### Implications and Discussion

This study has contributed to the literature in several ways. First, we redefine online and offline service dimensions through the literature review and then conduct several statistical procedures to show that each dimension is validated and reliable. We measure the online service quality of blended learning by embracing information quality and system quality and the offline service quality of blended learning by adopting the SERVQUAL scale, which consists of five distinct factors (i.e., assurance, responsiveness, empathy, reliability, and tangibility). Unlike previous research on student satisfaction with blended learning (Brochado, 2009; Chiu et al. 2007; Okzkan & Koseler, 2009; Yang & Peterson, 2004), we identify subdimensions of each level (i.e., offline and online learning, respectively) and document that our redefined blended learning measurements that were subjected to a series of rigorous statistical procedures are workable in the context of blended learning. Thus, our scale of blended learning service quality will broaden the current understanding of the dimensionality of blended learning by simultaneously considering offline learning and online learning.

Second, we examine the relationships among blended learning quality, satisfaction, and dissatisfaction to assess...
Table 5. SEM Results

| Variables        | Satisfaction | Dissatisfaction | Continuance Intention |
|------------------|--------------|-----------------|-----------------------|
| Independent variables |              |                 |                       |
| Information quality | .248*** (.107) | −.161 (.138)    |                       |
| System quality    | .168*** (.104) | −.089 (.131)    |                       |
| Assurance         | .319*** (.069) | −.147** (.090)  |                       |
| Responsiveness    | .173*** (.071) | .023 (.093)     |                       |
| Empathy           | −.023 (.063)  | −.135 (.082)    |                       |
| Reliability       | −.137 (.062)  | .035 (.081)     |                       |
| Tangibility       | .203*** (.060) | −.139 (.078)    |                       |
| Mediators |                      |                 |                       |
| Satisfaction      | .498*** (.075) |                 |                       |
| Dissatisfaction   | −.169*** (.073) |                 |                       |
| Model fitness     |              |                 |                       |
| Chi-square/d.f.   | 2.967        |                 |                       |
| p Value           | .00          |                 |                       |
| RMSEA             | .089         |                 |                       |
| CFI               | .916         |                 |                       |
| IFI               | .917         |                 |                       |

Note. Standardized path coefficients are entered. Standard errors are displayed in parentheses.

***Path significant at .01.
**Significant at .05.

Table 6. The Results for Hypotheses Testing and the Application to the Kano Model

| Hypotheses | Results | Kano Model Application |
|------------|---------|------------------------|
| H1: The relationship between the effect of information quality on satisfaction and dissatisfaction will be asymmetric. | Supported: asymmetric Delighter |
| H2: The relationship between the effect of system quality on satisfaction and dissatisfaction will be asymmetric. | Supported: symmetric Satisfier |
| H3: The relationship between the effect of assurance on satisfaction and dissatisfaction will be asymmetric. | Supported: symmetric Satisfier |
| H4: The relationship between the effect of responsiveness on satisfaction and dissatisfaction will be asymmetric. | Supported: asymmetric Delighter |
| H5: The relationship between the effect of empathy on satisfaction and dissatisfaction will be asymmetric. | not supported N/A |
| H6: The relationship between the effect of reliability on satisfaction and dissatisfaction will be asymmetric. | not supported N/A |
| H7: The relationship between the effect of tangibility on satisfaction and dissatisfaction will be asymmetric. | Supported: asymmetric Delighter |
| H8: Satisfaction will increase continuance intention toward blended learning. | Supported |
| H9: Dissatisfaction will decrease continuance intention toward blended learning. | Supported |

whether satisfaction and dissatisfaction are distinct by comparing the effects of blended service quality on satisfaction with the effects on dissatisfaction. The rationale behind our proposals is based on the assumption that if one factor significantly increases (decreases) satisfaction and significantly decreases (increases) dissatisfaction, the relationship between satisfaction and dissatisfaction is symmetric, consistent with the bipolar view, but any other case will confirm the unipolar view of satisfaction, which is consistent with our research propositions. Our empirical findings show that system quality and assurance result in the symmetrical relationship of satisfaction and dissatisfaction, as system quality and assurance are both positively associated with satisfaction and negatively associated with dissatisfaction. However, in the examination of the relationships between five other factors (i.e., information quality, responsiveness, empathy, reliability, and tangibility) with satisfaction and dissatisfaction, we find that the relationship of satisfaction and dissatisfaction is asymmetric: (1) information quality, responsiveness, and tangibility are positively related only to satisfaction but not significantly related to dissatisfaction, and (2) empathy and reliability have no significant effect on satisfaction and dissatisfaction. These findings are consistent with the Kano model, whose main premise is that the causes of satisfaction and dissatisfaction are not necessarily the same and that their relationship depends on their antecedents (Kano et al., 1984). In addition, our findings are similar to the outcomes of previous studies showing that various service quality dimensions work toward the occurrence of satisfaction, dissatisfaction, and/or neither (e.g., Namkung & Jang, 2010; Seo & Um, 2019; Um & Lau, 2018). Thus, the findings of this research corroborate that the symmetric or asymmetric relationship of satisfaction and dissatisfaction varies by their antecedents.

Third, the results of this study are interpreted within the Kano framework to obtain better insights. The Kano model reveals three distinct factors (i.e., delighters, satisfiers, and dissatisfiers), each of which plays a different role in causing satisfaction and dissatisfaction (Xu & Li, 2016; Seo...
According to our findings, system quality and assurance function as a satisfier, information quality, responsiveness, and tangibility serve as delighters, and no factor is categorized as a dissatisfier. These findings again confirm the applicability of the Kano model to different service settings and the distinct constructs of satisfaction and dissatisfaction.

Finally, the results of this study also show that empathy and reliability are not related to the generation of satisfaction and dissatisfaction. The findings may be interpreted based on the theoretical notion of a zone of tolerance (Berry, Parasuraman, & Zeithaml 1993), which represents the range of customer perceptions of a service between the desired and minimum acceptable standards. Therefore, any service quality dimension that is included in a zone of tolerance is deemed neither particularly good nor bad. In other words, any factor that is predicted to increase or decrease satisfaction (dissatisfaction) will cause a marginal effect as long as it lies in the zone of tolerance. Applying the notion of zone of tolerance, we assume that the respective perceptions of empathy and reliability in offline learning appear to be minimally accepted and thus are less likely to be related to the occurrence of satisfaction and dissatisfaction.

In addition to the theoretical implications described above, practical implications should be addressed. First, under the global impact of the COVID-19 pandemic, blended learning has a high possibility of becoming a new norm in higher education (Lowenthal, Borup, West, & Arachambault, 2020). The pandemic will not allow students and teachers to exclusively participate in offline classes, forcing them to engage in online classes, regardless of their preferences. While the pandemic is posing a significant threat to face-to-face interaction, including all aspects of human activities, the unprecedented challenges for higher education have resulted in a transition from traditional offline learning to blended learning. In this sense, college administrators and lecturers must take a student-oriented approach to the design and delivery of a blended learning course. With the application of the current measurement scale on blended learning, course designers and administrators can identify whether course delivery has been successful.

Second, the results of this study confirm that survey results from the unipolar view of measuring service consumers’ (dis)satisfaction are different from the bipolar view. In the context of higher education, however, the bipolar view that satisfaction and dissatisfaction are on opposite sides of a single continuum (i.e., 5- or 7-point Likert scale) has been predominantly adopted in most surveys to measure students’ satisfaction with the educational service they receive (Seo & Um, 2019; Um & Lau 2018). Therefore, in various higher education contexts, including blended learning, the unipolar view of measuring students’ (dis)satisfaction must be applied. Furthermore, comparisons of the unipolar view with the bipolar view in any survey study of service consumer satisfaction is worth investigating.

Finally, our findings may help resources to be effectively deployed by identifying what must be invested and avoided based on satisfier and delighter categories to fulfill student needs and maximize student satisfaction. As the findings reveal that system quality and assurance are satisfiers and that information quality, responsiveness and tangibility are delighters, those categorizations will help college operation managers identify ways to improve student satisfaction and deploy financial resources for efficient blended learning as the COVID-19 pandemic continues to evolve.

Limitations and Future Directions

Like any other study, this study has several limitations. First, the proposed relationships were examined with cross-sectional survey data, which have lower predictability for determining whether our proposed relationships change over time. Since students complete a course after several months, the course quality evaluation will differ before, during, and after the class. Thus, future research is recommended to test the proposed effects with time-series data to produce more convincing insights into the asymmetric relationship of satisfaction and dissatisfaction. Second, regarding the target respondents, this study included only colleges in South Korea that have acknowledged the importance of blended learning and thus have used this model for several years. The reliance on data collection from one country may weaken the generalizability of our findings. Had this study been conducted in different segments, the results may have shown different effects among the identified variables. Therefore, future research should include many countries with different conditions in colleges to increase confidence.

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