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THE IMPACT OF BLENDED LEARNING ON THE VALUE PERCEIVED OF HIGHER EDUCATION

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Abstract:

In this paper, the impact of blended learning on the value perceived of higher education is studied. Focusing on Nova SBE Master's programs, the methodology consists of measuring the dichotomy of benefits and sacrifices. A statistical hypothesis testing is used to attest the significance of the difference between blended learning and the face-to-face approach. The three main results of the study are: (i) student's unfavourable overall perception of blended learning, (ii) the extremely adverse impact on conditional and epistemic value and (iii) the contribution of campus and the lack of social interaction with fellow students as major points of concern.

Keywords:

Blended Learning; Perceived Value; Higher Education; Impact;

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Acronyms

AGG Aggregated

BL Blended Learning

CV Conditional value

EMBED European Maturity model for Blended Education

EMV Emotional value

EPV Epistemic value

F2F Face-to-Face

FV Functional value

IM Image

MS Monetary sacrifice

NMS Non-monetary sacrifice

SBE School of Business and Economics

SV Social value

VAL Consumer Value

Figures & Tables

1 Introduction

The coronavirus outbreak in spring of 2020 had a devastating impact on a myriad of industries and sectors all around the globe. As reported by UNESCO, the pandemic and its ruinous consequences affected more than 91.2% of the world's students, in which lockdown measures outlined 192 country-wide closures. In parallel with the rest of the world, Nova School of Business and Economics was obligated to shut down its campus and shift abruptly from face-to-face to distance learning. Education became a focal point of concern, and a universal urge for technology adoption spread in all school levels. While the immediate solution to this emergency context relied exclusively on distance learning, Nova School of Business and Economics and several other universities adopted blended learning as their approach to future academic offerings in COVID-19 times.

Notwithstanding the extraordinary circumstances that led to the generalised adoption of this approach to education, many believe learning will continue to follow this path after the pandemic. The coronavirus outbreak sets a critical juncture for the future of education whose answer lies at the prolonged use of blended learning. In the context of higher education, the future of this approach in the post-COVID-19 era hinges on students' perception of the value of education in this setting. This paper aims to study the impact of blended learning on the value perceived of higher education.

To study this metric, a methodology was built around (Zeithaml 1988, 2-22) findings on the dichotomy of benefits and sacrifices, underpinning a truncated conceptual framework from (Ledden et al. 2007, 965-74). This methodology decomposed the perceived value of higher education in eight dimensions: conditional value, emotional value, epistemic value, functional value, image, social value, monetary sacrifice, and non-monetary sacrifice. A composite score per dimension was computed for blended learning and the face-to-face approach, later

integrated into the calculation of metric delta "δ", the measure of difference between the two learning methods. An aggregated score was computed based on two weighing models: one whose dimensions' weights were equally distributed while the other was distributed in accordance with the model's construct, allocating equally for the components "Benefits" and "Sacrifices". The methodology complemented the elementary descriptive statistics with a statistical hypothesis testing to measure the significance of the difference between blended learning and the face-to-face approach.

The main findings are student's unfavourable overall perception of blended learning and its adverse impact on the value perceived of higher education, the amplification of this general sentiment in conditional and epistemic value, in contrast with non-monetary sacrifices and the most concerning items for students: the contribution of Nova SBE campus and its facilities, and the lack of social interaction with fellow students. This negative perception of blended learning by a sample of students that historically constitute the primary source of applicants suggests prudence on its implementation, especially given Nova SBE's positioning of collaborative values and campus as focal points.

This study contributes to the literature by laying the foundation stone at the intersection of perceived value of higher education before enrolment in a graduate program and blended learning, an unexplored overlap by literature. Furthermore, this study also expands the application of multidimensional approaches to measure the perceived value of higher education by incorporating a control group to measure the object's incremental impact.

An explanation of the paper organization follows. In the next section, the literature review is presented. The methodology is described in section three, while its robustness is discussed in section four. Section five analyses the empirical results. The discussion and conclusions can be found in section six.

2 Literature Review

The designation “blended learning” is arrayed on a large grey area, widening the range of interpretation as a consequence of the interchangeable terms that often prelude learning: distance, e-, flexible, hybrid, integrative, mixed, multi-method, online, and remote. Research echoes this apprehension as (Oliver and Trigwell 2005, 17) and (Khandve and Shelke 2002, 104-10) argue that “blended learning” is vague and erratically used, causing misinterpretations which hinder its use. Additionally, (Stacey and Gerbic 2007, 165-74) make an argument to criticize its ‘umbrella-like’ application, while (Garrison and Kanuka 2004, 95-105) corroborate the hypothesis of implementation, endless possibilities and interpretations as the genesis of such complexity.

In the quest for a clear definition of “blended learning”, (Oliver and Trigwell 2005, 17) refer to a wider range of elements comprising the blend of “e-learning with traditional learning, online learning with face-to-face and different media, contexts, theories of learning, learning objectives, and pedagogic approaches”. Further attempts (Graham 2006) and (Kumar 2012) summarise the term as the amalgamation and consolidation of two quintessential learning paradigms: traditional face-to-face and use of computer technologies. Most recently, (Valkenburg et al. 2019, 20) defined “blended learning” in the European Maturity model for Blended Education (EMBED) as teaching practices with a predesigned mixture of online and face-to-face activities, corroborating the predicament of defining a concept that is vague by nature.

While the definition of concept enjoys points of convergence in the literature, its implementation divides researchers. (López-Pérez et al. 2011) studies advocate blended learning as it registered a positive effect in reducing dropout rates and in improving exam marks. In a similar vein, (Fisher et al. 2018) supports blended learning on the basis of positively

influencing perceptions of engagement, performance, and satisfaction. Contrastingly, (Kwak and Menezes 2014) and (Hewagamage et al. 2007) present arguments against the blended learning initiative, posing concerns on the strong, negative impact experienced on students' performance. Providing a middle ground for discussion, (Moskal et al. 2013) argue that the effective execution of a blended learning program demands the harmonic coordination of institutional, faculty, and student goals.

Given the contradictory angles found on blended learning literature and its unclear conclusion, a critical decision for program managers, strategists, and executives lies ahead. Predicated on the importance of knowing where value resides, (Ulaga and Chacour 2001, 525-40) emphasizes the need to measure customer-perceived value before developing and implementing a strategy as it provides guidance for decision-making. Over the years, value has arisen as a prominent matter due to its role as the driving force of satisfaction and intention in the context of services (McDougall and Levesque 2000).

Contingent on the measurement of this critical metric, the perceived value of higher education has been extensively studied by researchers who intend to fully identify its underpinning layers. Notwithstanding the development of studies about the reliability of a unidimensional approach (Alves 2010, 1943-60), the literature evidences convergence to multidimensional methodologies [Appendix 1].

These multidimensional frameworks decompose perceived value as the function of a trade-off between benefits and sacrifices, or merely the objective comparison of the "get" and "give" dimensions according to (Zeithaml 1988, 2-22). The former comprises inherent benefits and attributes as well as exogenous features related to the different customer journey stages. In conjunction, the latter contemplates the forfeit, both monetary and non-monetary, needed to thoroughly enjoy the offering (Cronin et al. 1997, 357-91).

3 Methodology

3.1 Research framework

The development of methodologies with the intent of evaluating the perceived value of higher education has been gaining traction in recent years, progressing from a phase of scarce research of students' evaluation of value in higher education (LeBlanc and Nguyen 1999, 187-98). The need for such studies arose from the increasing change faced by higher education institutions (Alves and Raposo 2007, 1261-78; Brown and Mazzarol 2008, 81-95) and led the research community to formulate research methodologies that accurately decompose this crucial metric.

Since then, methodologies have been converging towards a multidimensional approach and built around established dimensions, following the findings of (Zeithaml 1988). As detailed in [Appendix 1], value dimensions have followed a common path in the last two decades of research, studying perceived value in a multitude of settings. To support the conceptual framework of this research, a truncated version of (Ledden et al. 2007, 965-74) will be utilized. Specifically developed to study the perceived value of postgraduate degrees, this methodology has served as the foundation layer for many subsequent studies. Presented in Figure 1, this conceptual framework defines that the value perceived of higher education is the holistic assessment of the service's utility from one's understanding of what is received and given.

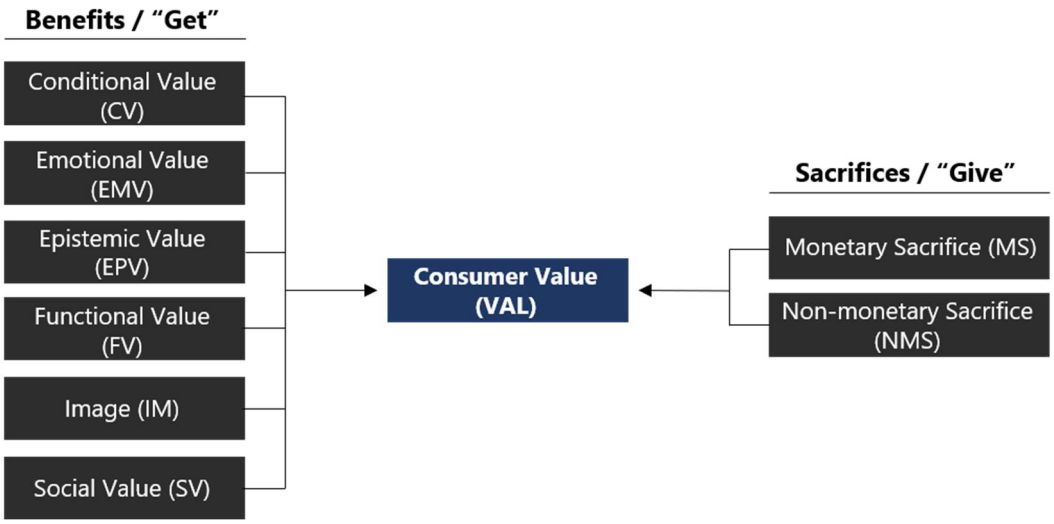

Figure 1 – Conceptual Framework

Predicated on (Zeithaml 1988) recommendations, this methodology classifies six dimensions as an integrating part of the component “Benefits” and two under the frame of the component “Sacrifices”. The former is composed of conditional value, emotional value, epistemic value, functional value, image, and social value. The latter comprises monetary and non-monetary sacrifices. An explanation of the dimensions of the component “Benefits” follows.

Conditional value (CV) refers to benefits provided by a particular situational context. In the educational setting, this dimension alludes to the value perceived by students regarding facilities, group work, and support materials such as textbooks (Unni 2005, 71-9).

Emotional value (EMV) represents the benefits received from an offering's capacity to stimulate emotions or psychological conditions. In the educational setting, this dimension measures the degree of pride, ambition fulfilment, sense of self-achievement and impact on self-confidence (LeBlanc and Nguyen 1999).

Epistemic value (EPV) accounts for benefits obtained from an offering's capacity to stimulate curiosity, maintain interest, and satisfy a desire for knowledge. In the educational setting, this dimension enjoys alignment with the context of this research as it contemplates the acquisition of knowledge, education’s primary benefit (Stafford 1994, 26-33).

Functional value (FV) reflects the offering's perceived performance/utility in its widest form by including not only its capacity to achieve the goal, but also other benefits tied to its ownership. In the educational setting, this dimension measures the students’ expectations on the impact of the degree in their employment and career development (Stafford 1994; LeBlanc and Nguyen 1999). Salary increase, the achievement of career goals, future job performance, job promotion, and contribution to personal development are the focus of research within the scope of this dimension.

The image (IM) accounts for the benefits obtained from the offering's brand value and public recognition (Nguyen and LeBlanc 2001. 303-11). In the educational setting, this dimension measures the benefits of studying at a prestigious institution. The university reputation, its image projected, and the perception of employers constitute factors of study driving the impact of notoriety on degree value.

Social value (SV) refers to benefits originated from inter-personal/group interactions and also contemplates the perception of others around the student. In the educational setting, this dimension firstly measures the value derived from social interactions and forming friendships with colleagues (LeBlanc and Nguyen 1999). Secondly, it assesses the impact of the ones who are important to students and whose influence is relevant in the decision-making process. The social interaction with fellow students, family and friends' expectations and support, and employers' perception is analysed in this dimension.

On the other side of the conceptual framework, consumer value is also significantly impacted by the monetary and non-monetary sacrifices one has to make in order to enjoy the offering's benefits (Cronin et al. 1997, 357-91). An explanation of the dimensions of the component "Sacrifices" follows.

Monetary sacrifice (MS) accounts for the sacrifices made from a financial point of view. In the educational setting, this dimension includes monetary efforts related to tuition and additional fees, textbooks and materials, food and other living expenses, accommodation, and transportation.

Non-monetary sacrifice (NMS) represents the non-pecuniary sacrifices made to thoroughly enjoy the offering. In the educational setting, this dimension not only evaluates the time and energy spent by students but also the forfeit of interests and opportunities to participate in non-academic activities.

3.2 Measures and measurement

Similarly to (Ledden et al. 2007, 965-74) original methodology, measurement have followed the precautions on the use of 'borrowed' scales in marketing research suggested by (Engelland et al. 2001). In the context of this exploratory qualitative research, the scales of the component "Benefits" were modified from the ones developed by (LeBlanc and Nguyen 1999). On a parallel note, the scales of the component "Sacrifices" were adjusted from (Cronin et al. 1997) publication. The scale items can be found in [Appendix 2].

To measure each dimension, multiple item scales were developed and generated a composite score made from 3 to 6 items. Also known as a Likert-scale, this measurement procedure enjoys support from the literature on reducing the standard error and size of the required sample (Ryan et al. 1995, 607-20) and opening the possibility for data retrieved to be treated as interval data (Wu and Leung 2017, 527-32).

At each and every item of the eight dimensions, a 7-point Likert scale was used with anchors at "Strongly Agree" – "Strongly Disagree". The procedure of utilising seven categories in rating scales is suggested to optimise the reliability of studies (Colman et al. 1997, 355-62). Following the binomial face-to-face and blended learning comparison proposed in the methodology, the questionnaire duplicated the measurement presented above to accommodate the study of conditional value, emotional value, epistemic value, functional value, image, social value, monetary sacrifice, and non-monetary sacrifice for both scenarios.

3.3 Research methodology

The scarcity of research at the intersection of perceived value and blended learning urged the methodology to assess the impact of implementing it by measuring the perceived value of higher education in this new paradigm and in the traditional face-to-face approach, used as a control group.

Following the conventional procedure of attributing a numerical score to Likert scale categories, the score "1" matches "Strongly Disagree" and the score "7" corresponds to "Strongly Agree". As such, the composite score (S) was built from the sum of answers in accordance with the dimension's number of items (ni). The composite score (S) of each dimension (d) was computed:

$$S_d = S_1 + S_2 + \ldots + S_{ni}$$

$$ni = 3, 4, \ldots, 6$$

$$S_d = [ni, 7ni]$$

$$d = \{CV, EMV, EPV, FV, IM, SV, MS, NMS\}$$

While composite scores for each dimension allow for a brief comparison between the face-to-face approach (F2F) and blended learning (BL), the metric delta "δ" further clarifies the difference between the perceived value of the two learning methods. The metric delta "δ" between the composite score (S) of each dimension (d) was computed:

$$\delta_d = BL(S_d) - F2F(S_d)$$

$$\delta_d = [-6ni, 6ni]$$

Even though the study of the metric delta "δ" on this level of granularity details the comparison between the two learning methods, the lack of an aggregate benchmark disregards an integrated analysis of both approaches. The overall comparison is challenged by the heterogeneous composition of each dimension, whose number of items (ni) pushes the need to average the metric delta "δ". Only after that correction, the computation of the aggregated delta "δ" takes form and becomes entirely contingent on the weighting model. Within the scope of the conceptual framework, the uncertainty behind the student's mental construct and its relative impact on perceived value, suggests dimensions' weights to be equally distributed or distributed

in accordance with the model's construct. The former weights every dimension at 12.5% while the latter allocates equally for the components "Benefits" and "Sacrifices".

$$\delta_A = \sum \left(\frac{\delta_d}{ni} \times w_d\right) = \left(\frac{\delta_{CV}}{ni} \times w_{CV}\right) + \left(\frac{\delta_{EMV}}{ni} \times w_{EMV}\right) + \ldots + \left(\frac{\delta_{NMS}}{ni} \times w_{NMS}\right)$$

$$w_d = \{1/8\}\ or\ \{1/12; 0.25\}$$

At first instance, this metric's descriptive statistics, by dimension and in aggregate, was the starting point of the comparison of perceived value between the two learning methods. To complement this elementary approach, the methodology adopted a statistical hypothesis testing with the intention of measuring the significance of the difference between blended learning and the face-to-face approach. For the purpose of the study, a significance level of 5% was set. Notwithstanding the ordinal data extracted from Likert scales, the sample size (n=109) grants support from the Central Limit Theorem as the distribution of the sample means will be approximately normally distributed. From a neutral standpoint, the null hypothesis points the metric delta "δ" to be zero, as no difference between the two learning methods should be registered. Opposingly, the alternative hypothesis contradicts the primary belief, suggesting a difference between blended learning and the face-to-face approach:

$$H_0: \delta = 0$$
$$H_a: \delta \neq 0$$

3.4 Population, sampling and data collection

The target population is composed of students enrolled on a bachelor's degree in a Portuguese business school, Nova School of Business and Economics, and that show interest in pursuing a Master's degree. As the primary source of applicants to the Master's program, this group of students comprise the most attainable and controlled group, as their preferences share a lesser

degree of variability when weighted against the ones who did their undergraduate studies in other universities.

In the quest to achieve the goals proposed by this research, a survey subdivided into eight segments was elaborated: conditional value, emotional value, epistemic value, functional value, image, social value, monetary sacrifice, and non-monetary sacrifice. At the end of each section, a demographic question was posed in order to extract insights about the respondent: gender, nationality, enrolment in a bachelor's program, undergraduate university, intention to pursue a Master's program, commute time, previous experience with blended learning and expectation of experience with face-to-face/blended learning.

Of a total of 126 completed surveys, 17 were excluded by not meeting, at least, one of the two main requirements: enrolment in a Nova School of Business and Economics bachelor's program and intention to apply for a Master's program in the foreseeable future. The final sample is made up of 109 students, whose answers were eligible according to the predefined criteria. As the sample size is significant for the context of the research and consistent with (Ledden et al. 2007, 965-74) methodology, the sample enjoys protection from the qualitative research umbrella, where considerations regarding this aspect are contextual and contingent on the research paradigm (Boddy 2016, 426-32).

The sample is characterised by 56.9% female students and 43.1% male students. Concerning nationality, Portuguese takes predominance over other nationalities as it accounts for 96.3% of the sample results versus three German students and one student from Brazil. Relative to its distribution by commute time, approximately 61.5% of the respondents take at least one hour to get to campus. Regarding previous experience with Blended Learning, 86.2% of students confirm that they were already taught under this approach. Demographic characteristics of students from the sample can be found in [Appendix 3].

4 Robustness

Preceding the analysis of results, questions are posed at the reliability of the methodology, challenging its robustness. To evaluate the methodology's reliability, the Cronbach's alpha is used. Consistently adopted in science education's research, this coefficient was applied numerous times to assess internal consistency in leading science education journals (Taber 2017, 1273-96). For each dimension, the total variance of composite scores (σ_X^2) and the average of inter-item covariances ($\overline{\sigma_{ij}}$) supported the computation of the Cronbach's alpha:

$$\rho_t = \frac{ni^2\,\overline{\sigma_{ij}}}{\sigma_X^2}$$

The resulting coefficients can be found in [Appendix 4]. With the exception of social value, all dimensions in both face-to-face and blended learning registered a coefficient between 0.525 and 0.854. Although some authors classify coefficients between 0.5 and 0.69 as of questionable reliability, (Perry et al. 2004) argues that the evaluation of a Cronbach's alpha should follow a contextual assessment of the data rather than applying a hasty threshold. As a small number of items negatively impacts the value of alpha, short scales usually present low-reliability coefficients. While the context legitimates the reliability of these dimensions, the social value's coefficient is not entirely justifiable by this reasoning. This low score is mainly influenced by the fourth item: "My family and friends will see me in a better light when I will have finished the Master's program", whose answers were divergent and inconsistent among themselves and with other items. Given the detrimental effect of this item in social value's internal consistency and methodology's reliability, this item was removed from the model [Tables 1 and 2].

Scale Reliability Statistics	
	Cronbach's α
scale	0.283
if item dropped	
"BL SOC4"	0.5349

Table 1 – Blended Learning SV coefficient

Scale Reliability Statistics	
	Cronbach's α
scale	0.485
if item dropped	
"F2F SOC4"	0.784

Table 2 – Face-to-Face SV coefficient

5 Analysis and results

5.1 Dimension

5.1.1 Conditional Value

Conditional value (CV) represents the dimension whose difference is more prominent between blended learning and the face-to-face approach. This discrepancy between the two methods heavily favours the latter as students attributed, on average, 2.3 points less to blended learning. The statistics of Conditional value (CV) can be found in Table 3.

As initially hinted, the hypothesis test suggests that the difference in Conditional value (CV) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of blended learning and the face-to-face approach sharing the same performance in this dimension of perceived value. Accordingly, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Conditional value (CV).

	N	Mean	SD	SE	Z-score	p-value
CV δ	109	-2.30	3.06	0.293	-7.85	<.001

Table 3 – Conditional Value (CV) Statistics

This result evidences the lesser perception of value in the context of benefits associated with support materials, group work, facilities, and campus' location. From the four questions posed to evaluate this component, the one referring to the Nova SBE campus and its facilities drove this effect, shortly followed by the added value to the Master's program from the development of group work. On a neutral note, support material such as slides and bibliography did not display any significant result, suggesting parity.

5.1.2 Emotional Value

Emotional value (EMV) brought another negative perception of blended learning to the analysis. Once again, blended learning was not able to match face-to-face in a direct comparison, suggesting that the emotional benefits resulting from higher education are different between the two learning methods. From the sample, this dimension was classified by students with 1.5 points less, on average, for blended learning as compared to the control group. The statistics of Emotional value (EMV) can be found in Table 4.

Alluded by descriptive statistics, the hypothesis test denotes that the difference in Emotional value (EMV) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of blended learning and the face-to-face approach sharing the same performance in this dimension of perceived value. As such, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Emotional value (EMV).

	N	Mean	SD	SE	Z-score	p-value
EMV δ	109	-1.50	2.61	0.250	-6.00	<.001

Table 4 – Emotional value (EMV) Statistics

This result reveals the incapacity of blended learning to rival face-to-face on the generation of emotions or psychological conditions of the same degree. From the six questions posed to evaluate this component, the one referring to the performance on the program depending upon personal effort generated the largest disparity, implying a resentment against blended learning evaluation methods. The scores of ambition fulfilment also heavily favoured the control group, as the average student did not feel that taking this Master's program in a blended learning setting would fulfil an ambition to the same extent.

5.1.3 Epistemic Value

Epistemic value (EPV) also registered an extremely negative outcome for blended learning. Yet again, a contrasting judgement by students ranked the perceived value of higher education of blended learning undeniably worse than its counterpart. Benefits associated with curiosity, maintaining interest, and satisfying a desire for knowledge suffered different evaluations as students attributed, on average, 2.29 points less to blended learning. The statistics of Epistemic value (EPV) can be found in Table 5.

In line with the first sentiment, the hypothesis test suggests that the difference in Epistemic value (EPV) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of blended learning and the face-to-face approach sharing the same performance in this dimension of perceived value. Accordingly, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Epistemic value (EPV).

	N	Mean	SD	SE	Z-score	p-value
EPV δ	109	-2.29	2.70	0.259	-8.85	<.001

Table 5 – Epistemic value (EPV) Statistics

This result demonstrates student's unfavourable perception of blended learning in education's primary benefit, the acquisition of knowledge. Each of the four questions posed to evaluate this component moved in this direction, with the most discordant item being the academic guidance received from lecturers and its connection to the enhanced value of the Master's program. Further in this dimension, students negatively evaluated the content of the program and the possibility of learning new things under this new paradigm when weighted against the face-to-face approach.

5.1.4 Functional Value

Functional value (FV) continued the negative trend of blended learning on the perceived value of higher education. Once more, this learning method was unfavourably assessed by students from this sample, specifically questioning its performance/utility and benefits tied to completing the Master's program. As such, blended learning was evaluated, on average, with 1.95 points less than the face-to-face approach. The statistics of Functional value (FV) can be found in Table 6.

In parallel with descriptive statistics, the hypothesis test indicates that the difference in Functional value (FV) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of blended learning and the face-to-face approach sharing the same performance in this dimension of perceived value. As such, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Functional value (FV).

	N	Mean	SD	SE	Z-score	p-value
FV δ	109	-1.95	3.02	0.289	-6.74	<.001

Table 6 – Functional value (FV) Statistics

This result evinces the lesser expectation of blended learning on the impact of the degree in their employment and career development. From the six questions posed to evaluate this component, the contribution to personal development played the major role in this deviation, followed by the utility of knowledge in current/future jobs. Equally impactful, students' perception of blended learning on salary progression and the achievement of career goals was considerably unfavourable, contributing to a pessimistic viewpoint towards this learning method when compared to the face-to-face approach.

5.1.5 Image

Image (IM) followed the negative evaluation of blended learning, even though to a much lesser degree. While the difference was significantly lower than the first four dimensions, this outcome continues to widen the gap between the two learning methods. Concerning the benefits associated with brand value and public recognition, the face-to-face approach was again favoured as students attributed, on average, 0.44 points less to blended learning. The statistics of Image (IM) can be found in Table 7.

Introduced by descriptive statistics, the hypothesis test provides clarification by denoting that the difference in Image (IM) between the two learning methods is significant. With a p-value lower than the significance level, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of both approaches sharing the same performance in this dimension of perceived value. Accordingly, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Image (IM).

	N	Mean	SD	SE	Z-score	p-value
IM δ	109	-0.44	1.73	0.166	-2.66	0.008

Table 7 – Image (IM) Statistics

This result evidences a slightly lesser perception of value blended learning in the context of benefits associated with studying at a prestigious institution. Each of the five questions posed to evaluate this component contributed to this negative trend, with one of the most disparate items being the reputation of Nova SBE. Student's perception of Nova SBE and their opinion on the perception of employers was equally impactful, as the image projected by the university drove the conclusions. Furthermore, students considered that blended learning makes the reputation and image projected of Nova SBE less impactful on the program's value.

5.1.6 Social Value

Social value (SV) completed the overall negative evaluation of component "Benefits" within the context of blended learning. Pre-emptively considered as one of the most prominent question marks regarding this new learning method, this dimension evidenced the reduction of benefits from inter-personal/group interactions. The face-to-face approach was, once again, scored higher as students attributed, on average, 1.14 points less to blended learning. The statistics of Social value (SV) can be found in Table 8.

Alluded by descriptive statistics, the hypothesis test further suggested that the difference in Social value (SV) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of blended learning and the face-to-face approach sharing the same performance in this dimension of perceived value. As such, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Social value (SV).

	N	Mean	SD	SE	Z-score	p-value
SV δ	109	-1.14	2.05	0.196	-5.81	<.001

Table 8 – Social value (SV) Statistics

This result reveals the, already expected, incapacity of blended learning to rival face-to-face on the value created from social interactions. After the removal of the fourth item due to robustness concerns, the remaining five questions displayed different assessments. Social interaction with fellow students contributed heavily to the overall score as just this item registered a difference of 0.96 in favour of the face-to-face approach. The opinion of the ones who influence student's decision and the importance of the support of their friends and family during the Master's program was slightly positive and neutral, respectively.

5.1.7 Monetary Sacrifice

Monetary sacrifice (MS) started the evaluation of blended learning in the component "Sacrifices" on a negative note, giving continuity to the unfavourable trend displayed previously. However, this dimension's metric delta "δ" is the smallest among the study as the perception of financial efforts between the two learning methods was not discrepant. The difference derives from student's attribution, on average, of 0.21 points less to blended learning. The statistics of Monetary sacrifice (MS) can be found in Table 9.

Despite the first impression, the hypothesis test indicates that the difference in Monetary sacrifice (MS) between the two learning methods is significant. With a p-value lower than the significance level, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of both approaches sharing the same performance in this dimension of perceived value. Accordingly, this statistical method suggests that face-to-face is significantly better than blended learning in the context of Monetary sacrifice (MS).

	N	Mean	SD	SE	Z-score	p-value
MS δ	109	-0.21	0.69	0.066	-3.18	0.001

Table 9 – Monetary sacrifice (MS) Statistics

This result demonstrates student's slight unfavourable perception of blended learning in the context of sacrifices made under a financial point of view. From the three questions posed to evaluate this component, the most discordant item was the reasonability of the monetary price paid for the Master's program when weighted against what students perceived they are getting out of it. On a similar note, the assessment of the ratio price/quality of the Master's program was a differentiating factor in this analysis, skewing the overall result to favour the face-to-face approach.

5.1.8 Non-Monetary Sacrifice

Non-monetary sacrifice (NMS) represents the first and only dimension whose evaluation is favourable to blended learning. From a theoretical deduction, non-pecuniary sacrifices are made to a lesser degree in this new paradigm in comparison to the traditional face-to-face approach. Empirical observation in this study confirms this sentiment as students attributed, on average, 1.69 points more to blended learning. The statistics of Non-monetary sacrifice (NMS) can be found in Table 10.

In line with the first sentiment, the hypothesis test denotes that the difference in Non-monetary sacrifice (NMS) between the two learning methods is significant. With a p-value close to zero, this statistical test hints the rejection of the null hypothesis, consequently rejecting the possibility of both approaches sharing the same performance in this dimension of perceived value. As such, this statistical method suggests that blended learning is significantly better than face-to-face in the context of Non-monetary sacrifice (NMS).

	N	Mean	SD	SE	Z-score	p-value
NMS δ	109	1.69	2.56	0.245	6.89	<.001

Table 10 – Non-monetary sacrifice (NMS) Statistics

This result confirms student's favourable perception of blended learning in the context of sacrifices related to time and energy spent. While each of the three questions posed to evaluate this component contributed to this result, the reduction of time spent with family caused by the Master's program was the pivotal metric that gave shape to this conclusion. This concern was extended to the forfeit of interests in order to do the program, where students revealed their preference for blended learning as the natural upside of mitigating commute time and rigidity of face-to-face classes alleviates the negative impact of non-monetary sacrifices.

5.2 Aggregated

Despite both scenarios revealing results of different magnitudes [Table 11], the general conclusion points towards a decrease in the perceived value of higher education upon the implementation of blended learning. As the final output of the equally distributed weighing and conceptual model's distribution, students attributed, on average, 0.19 and 0.05 points less per item to blended learning, respectively [Table 12].

	CV	EMV	EPV	FV	IM	SV	MS	NMS
δ/ni	-0.576	-0.251	-0.573	-0.326	-0.088	-0.228	-0.07	0.563

Table 11 – Average delta "δ" per dimension, adjusted to number of items

The weighting criteria influence the conclusions of the hypothesis testing. The equal consideration of every dimension hints a significant difference between the two learning methods since the statistical test alludes the rejection of the null hypothesis. On the other hand, the model's conceptual weighting suggests that the face-to-face approach is not significantly better than blended learning as the p-value is higher than the significance level.

	N	Mean	SD	SE	Z-score	p-value
AGG: All equal	109	-0.19	0.33	0.032	-6.12	<.001
AGG: 50-50		-0.05	0.32	0.031	-1.52	0.129

Table 12 – Aggregated (All equal and 50-50) Statistics

These results confirm student's unfavourable overall perception of blended learning and its adverse impact on the value perceived of higher education. The difference between the final results of the two models is mostly predicated by the considerable weight (25%) given to the dimension of Non-monetary sacrifice (NMS), whose assessment attenuates the negative evaluation of blended learning on the other seven dimensions.

6 Discussion

6.1 Conclusion

This paper studies the impact of blended learning on the value perceived of higher education. The main contributions are the beginning of the discussion of blended learning and the impact on student's perception upon its implementation, a first inference on its performance when benchmarked against the traditional face-to-face approach, and the comprehensive analysis of perceived value's dimensions by item, its lowest level of granularity.

There are three main results of this study. The first one conveys student's unfavourable overall perception of blended learning and its adverse impact on the value perceived of higher education. The second result spotlights this general sentiment in conditional and epistemic value, the two most negatively impacted dimensions, in contrast with non-monetary sacrifices. The third main result details this unfavourable conclusion by emphasising the items that pose the biggest concern for students: the contribution of Nova SBE campus and its facilities, and the lack of social interaction with fellow students.

The adoption of blended learning for future academic offerings after the pandemic is called into question. This study reveals student's general unfavourable perception of this learning method, questioning its impact on the value and competitiveness of the Master's program upon its implementation. As the decision to enrol in a Master's degree program happens *a priori* and without experiencing the blended learning envisioned by the academic director, student's unfavourable anticipation of their experience with this learning method negatively impacts the value proposition of the Master's program in their eyes. Notwithstanding the embryonic nature of this study, the negative perception of blended learning by a sample of students that historically constitute the primary source of applicants suggests prudence, especially given Nova SBE's positioning of collaborative values and campus as focal points.

6.2 Implications for practice

The findings of this introductory study on the perceived value of higher education upon the implementation of blended learning strike the flagships of Nova SBE's value proposition, threatening the "Nova Way of Life", built around a collaborative community on a campus designed to maximize interaction.

While blended learning does not thoroughly remove campus contribution to learning experience like fully remote learning did in quarantine, its significant reduction and the decrease of social interaction with fellow students move against Nova SBE's strategy. However, the implementation of blended learning enables the scalability of graduate programs to a degree impossible to achieve in the traditional face-to-face approach, leveraged on the reusability of learning materials and time flexibility at the expense of benefits from other dimensions. As evidenced in Table 11, the heterogenous impact of the implementation of blended learning puts the reasonability of the trade-off contingent on the strategy defined by Nova SBE and its capacity to mitigate the perceived downside.

The consideration of technological solutions in the design of a Master's program is of paramount importance in the competitive business environment, where students look for online courses by its price competitiveness and time flexibility. At first instance, the optimization of the traditional Master's program structure can be achieved by condensing classes to specific days by area of expertise and also providing class recordings, allowing the conciliation of student's schedules with other activities or interests. Moreover, the implementation of blended learning as a parallel learning option for students widens the pool of applicants by incorporating untargeted prospects. Candidates that given their personal or professional circumstances are not able to assume the time commitment of a face-to-face program but still intend to pursue a Master's degree would have the opportunity to enjoy Nova SBE's outstanding education.

6.3 Limitations and suggestions for future research

As the first study at the intersection of blended learning and perceived value of higher education, the results of this study and the derivative consequences are contingent on a generalised methodology of value perceived of higher education that does not include the specific characteristics of services in the environment of blended learning. Following the limitation intrinsic to the conceptual framework, this study suffers from the fact of being done in the middle of the pandemic, whose negative sentiments may be associated with online learning, hurting the rational evaluation of this learning method. Further on this matter, the urge for technology adoption and the rush caused by the necessity of quickly transitioning to online learning has caused many students to have a poor experience with remote learning due to inadequate conditions at home or university's abrupt transition to digital channels.

Another significant limitation of this study lies at the statistical empowerment of ordinal data. Firstly, the usage of a Likert scale may skew answers from extremes and not correctly provide an equal distance between answer options, both extremely damaging to studies built around averaged scores. Secondly, the normality assumption over the converted numerical data and the probability of incurring in a Type II error on the non-rejection of the second aggregate result. As evinced by the overall analysis of results, a substantial limitation comes from the weighing model and the incapacity to mimic student's mental constructs of perceived value, resulting in inconsistent conclusions.

Given the study's limited sample selection, further research may include the analysis of this metric on other demographic groups, such as students from other Portuguese universities and from abroad. Avenues for further research also rest at the bridge between the perceived value of higher education and the elasticity of the Master's program, as well as the quest for a weighting model adjusted to student's characteristics and motivations.

7 References

Alves, Helena. 2011. "The Measurement Of Perceived Value In Higher Education: A Unidimensional Approach". The Service Industries Journal 31 (12): 1943-1960. doi:10.1080/02642069.2011.550042.

Alves, Helena, and Mário Raposo. 2007. "Conceptual Model Of Student Satisfaction In Higher Education". Total Quality Management & Business Excellence 18 (5): 1261-1278. doi:10.1080/14783360601074315.

A. Kumar. 2012. "Blended learning in higher education: A comprehensive study," in Proceeding of International Conference on Business Management & Information Systems, doi:10.4018/978-1-5225-5472-1.ch075.

Boddy, Clive Roland. 2016. "Sample Size For Qualitative Research". Qualitative Market Research: An International Journal 19 (4): 426-432. doi:10.1108/qmr-06-2016-0053.

Brown, Robert M., and Timothy William Mazzarol. 2008. "The Importance Of Institutional Image To Student Satisfaction And Loyalty Within Higher Education". Higher Education 58 (1): 81-95. doi:10.1007/s10734-008-9183-8.

Colman, Andrew M., Claire E. Norris, and Carolyn C. Preston. 1997. "Comparing Rating Scales Of Different Lengths: Equivalence Of Scores From 5-Point And 7-Point Scales". Psychological Reports 80 (2): 355-362. doi:10.2466/pr0.1997.80.2.355.

Cronin, J., Brady, M., Brand, R., Hightower, R. and Shemwell, D., 1997. A cross-sectional test of the effect and conceptualization of service value. Journal of Services Marketing, 11(6), pp.375-391.

C. R. Graham. 2006. "Blended Learning Systems: Definition, Current Trends, and Future Direction," in Handbook of Blended Learning, C. Bonk and C. R. Graham, Eds.
"Education: From Disruption To Recovery". 2020. UNESCO. Accessed September 30. https://en.unesco.org/covid19/educationresponse.

Engelland, B., Alford, B. and Taylor, R. 2001. "Cautions and precautions on the use of 'borrowed' scaled in marketing research. 152–156. New Orleans: Society for Marketing Advances.

Fisher, Rosemary, Áron Perényi, and Naomi Birdthistle. 2018. "The Positive Relationship Between Flipped And Blended Learning And Student Engagement, Performance And Satisfaction". Active Learning In Higher Education, 146978741880170. doi:10.1177/1469787418801702.

Garrison, D.Randy, and Heather Kanuka. 2004. "Blended Learning: Uncovering Its Transformative Potential In Higher Education". The Internet And Higher Education 7 (2): 95-105. doi:10.1016/j.iheduc.2004.02.001.

Hewagamage, K., S. Premaratne and K. Peiris. 2007. "Design and Development of Blended Learning through LMS."

Hinton, Perry R, Isabella McMurray, and Charlotte Brownlow. n.d. SPSS Explained.

Kwak, Do Won, Flavio M. Menezes, and Carl Sherwood. 2014. "Assessing The Impact Of Blended Learning On Student Performance". Economic Record 91 (292): 91-106. doi:10.1111/1475-4932.12155.

LeBlanc, Gaston, and Nha Nguyen. 1999. "Listening To The Customer'S Voice: Examining Perceived Service Value Among Business College Students". International Journal Of Educational Management 13 (4): 187-198. doi:10.1108/09513549910278106.

Ledden, Lesley, Stavros P. Kalafatis, and Phillip Samouel. 2007. "The Relationship Between Personal Values And Perceived Value Of Education". Journal Of Business Research 60 (9): 965-974. doi:10.1016/j.jbusres.2007.01.021.

López-Pérez, M. Victoria, M. Carmen Pérez-López, and Lázaro Rodríguez-Ariza. 2011. "Blended Learning In Higher Education: Students' Perceptions And Their Relation To Outcomes". Computers & Education 56 (3): 818-826. doi:10.1016/j.compedu.2010.10.023.

McDougall, Gordon H.G., and Terrence Levesque. 2000. "Customer Satisfaction With Services: Putting Perceived Value Into The Equation". Journal Of Services Marketing 14 (5): 392-410. doi:10.1108/08876040010340937.

Moskal, Patsy, Charles Dziuban, and Joel Hartman. 2013. "Blended Learning: A Dangerous Idea?". The Internet And Higher Education 18: 15-23. doi:10.1016/j.iheduc.2012.12.001.

Nguyen, Nha, and Gaston LeBlanc. 2001. "Image And Reputation Of Higher Education Institutions In Students' Retention Decisions". International Journal Of Educational Management 15 (6): 303-311. doi:10.1108/eum0000000005909.

Oliver, Martin, and Keith Trigwell. 2005. "Can 'Blended Learning' Be Redeemed?". E-Learning And Digital Media 2 (1): 17-26. doi:10.2304/elea.2005.2.1.17.

P. Khandve and M. Shelke. 2002. "45th Annual National Convention at Interactive Teaching and Learning Activities," in Blended Learning: The Future of Education Industry, pp. 104–110.

Schmit, Mark J., Ann Marie Ryan, Sandra L. Stierwalt, and Amy B. Powell. 1995. "Frame-Of-Reference Effects On Personality Scale Scores And Criterion-Related Validity.". Journal Of Applied Psychology 80 (5): 607-620. doi:10.1037/0021-9010.80.5.607.

Stacey, Elizabeth, and Philippa Gerbic. 2007. "Teaching For Blended Learning—Research Perspectives From On-Campus And Distance Students". Education And Information Technologies 12 (3): 165-174. doi:10.1007/s10639-007-9037-5.

Stafford, Thomas F. 1994. "Consumption Values And The Choice Of Marketing Electives: Treating Students Like Customers". Journal Of Marketing Education 16 (2): 26-33. doi:10.1177/027347539401600204.

Taber, Keith S. 2017. "The Use Of Cronbach'S Alpha When Developing And Reporting Research Instruments In Science Education". Research In Science Education 48 (6): 1273-1296. doi:10.1007/s11165-016-9602-2.

Ulaga, Wolfgang, and Samir Chacour. 2001. "Measuring Customer-Perceived Value In Business Markets". Industrial Marketing Management 30 (6): 525-540. doi:10.1016/s0019-8501(99)00122-4.

Unni, Ramaprasad M. 2005. "Value Perceptions And Retention Of Textbooks Among Marketing And Other Business Majors". Marketing Education Review 15 (2): 71-79. doi:10.1080/10528008.2005.11488909.

W. F. Van Valkenburg, W. P. Dijkstra, and B. De Los Arcos. 2019. "European Maturity Model for Blended Education," p. 20.

Wu, Huiping, and Shing-On Leung. 2017. "Can Likert Scales Be Treated As Interval Scales?—A Simulation Study". Journal Of Social Service Research 43 (4): 527-532. doi:10.1080/01488376.2017.1329775.

Zeithaml, Valarie A. 1988. "Consumer Perceptions Of Price, Quality, And Value: A Means-End Model And Synthesis Of Evidence". Journal Of Marketing 52 (3): 2-22. doi:10.1177/002224298805200302.

8 Appendix

8.1 Multidimensional methodologies on perceived value in higher education

Author/s (Year) [Reference code]	*Educational Level*	*Students' Origin*	*Country*	*Methodology*	*Value dimensions*
LeBlanc & Nguyen (1999) [18]	Bachelor	Domestic	Not mentioned	Quantitative	Functional Value (future goals), Epistemic Value (knowledge), Image, Emotional Value, Functional Value (price/quality), Social Value
Ledden et al. (2007) [4]	Master	Domestic	United Kingdom	Quantitative	Get/Benefits: Image, Functional Value, Social Value, Epistemic Value, Emotional Value, Conditional Value Give/Sacrifices: Monetary Sacrifice, Non-Monetary Sacrifice
Brown & Mazzarol (2009) [20]	Bachelor and Master	Domestic	Australia	Quantitative	Emotional Value, Social Value, Price/Value, Quality/Performance
Alves (2011) [5]	Bachelor	Domestic	Portugal	Quantitative	Unidimensional: Price/Quality, Price/Quality compared to other universities
Bowden & D'Alessandro (2011) [12]	Bachelor	Domestic	Australia	Quantitative and Qualitative	Functional Value, Social Value
Kubat (2011) [19]	Bachelor	Domestic	Turkey	Quantitative	Get/Benefits: Image, Functional Value, Social Value, Epistemic Value, Emotional Value, Conditional Value Give/Sacrifices: Monetary Sacrifice, Non-Monetary Sacrifice
Lai et al. (2012) [7]	Bachelor	International	China	Quantitative	Functional Value (the usefulness of a degree), Social Value, Emotional Value, Epistemic Value, Functional Value (the experiential aspect), Epistemic Value, Functional Value (the image)
Jiménez-Castillo et al. (2013) [17]	Bachelor	Domestic	Spain	Quantitative	Economic Value (university facilities and services), Economic value (academic training), Social Value, Hedonic Value, Altruistic Value
Li et al. (2016) [21]	Bachelor and Master	International	China, Spain and United Kingdom	Qualitative	Get/Benefits: Functional Value, Social Value, Emotional Value Give/Sacrifices: Monetary Costs (Price) And Non-Monetary Costs (Time and Efforts)
Gallarza et al. (2017) [1]	Bachelor	International	Spain	Qualitative	Benefits: Functional, Social, Emotional Sacrifices: Monetary Sacrifices and Costs
Gallarza et al. (2019) [6]	Bachelor	International	Multiple European countries	Quantitative	Benefits: Expected Functional Value, Expected Social Value, Expected Emotional Value Sacrifices: Expected Monetary Sacrifice, Expected Non-Monetary Sacrifice

Source:

Gallarza, Martina G., Ana Isabel Rodrigues, Raquel Sánchez-Fernández. 2020. "How students' perceive value of the higher education Experience during the coronavirus 19 crisis?" Proceedings of EDULEARN20 Conference

8.2 Scale items

Conditional value (ni = 4)

The support materials on the Master's program (e.g. slides/bibliography) will help my learning.

Group work will be a beneficial part of the Master's program.

The Nova SBE campus and its facilities contributes to the value of the Master's program.

The convenience of the campus's location contributes to the value of the Master's program.

Emotional value (ni = 6)

I will feel proud if I take the Master's program.

Taking the Master's program will boost my self-confidence.

Taking the Master's program will fulfill an ambition.

My performance on the Master's program depends upon my personal effort.

Taking the Master's program will give me a sense of self-achievement.

I will take the Master's program for the personal challenge.

Epistemic value (ni = 4)

The content of the Master's program keeps me interested.

I will learn new things from the Master's program.

The Master's program content contributes to the high value of my education.

The academic guidance I will receive from lecturers will enhance the value of the Master's program.

Functional value (ni = 6)

The Master's program will allow me to earn a good/better salary.

The Master's program will allow me to achieve my career goals.

The knowledge I will have acquired on the Master's program will enable me to do my current/future job better.

The Master's program will lead to promotion in my current/future job.

The Master's program is a good investment in my future.

Taking the Master's program will contribute to my personal development.

Image (ni = 5)

The reputation of Nova SBE influences the value of the Master's program.

The image projected by Nova SBE has an influence on the value of the Master's program.

I believe that employers would have positive things to say about Nova SBE.

I have heard positive things about Nova SBE.

I believe that Nova SBE has a good reputation.

Social value (ni = 5*)

People who are important to me think that taking the Master's program is a good thing to do.

People who influence what I do, think that taking the Master's program is a good idea.

My current/future employer will see me in a better light when I will have finished my degree.

~~My family and friends will see me in a better light when I will have finished the Master's program.~~

The social interaction with fellow students on the Master's program makes studies more interesting.

The support of my friends and family will be important in helping me through the Master's program.

Monetary sacrifice (ni = 3)

I'm happy to make financial sacrifices in taking the Master's program because I believe I will benefit from it in the long term.

The monetary price paid for the Master's program is reasonable when I consider what I am getting out of it.

When considering the monetary price of the Master's program, I believe that the quality is good.

Non-monetary sacrifice (ni = 3)

I will have to give up some other interests of mine in order to do the Master's program.

The Master's program will reduce the time I spend with my family.

The Master's program will reduce the time I spend with my friends.

Other - Demographic

Are you currently enrolled in a Bachelor's program?

Are you considering applying for a Master's program in the foreseeable future?

Are you a Nova SBE student?

How long do you take to get to Campus?

What is your Nationality?

What is your gender?

Have you already experienced Blended Learning?

If so, how do you classify your experience on a numerical scale? (0-100)

8.3 Demographic Statistics

Gender

Female	Male
62	47
56.9%	43.1%

Nationality

Portuguese	German	Brazilian
105	3	1
96.3%	2.8%	0.9%

Commute time

0-30 min	30min-1h	>1h
18	24	67
16.5%	22.0%	61.5%

Previous blended learning experience

Previous BL	No BL
94	15
86.2%	13.8%

Average expectation of experience with face-to-face and blended learning [0-100%]

Expectation F2F	Expectation BL
81.95%	66.10%

8.4 Robustness Coefficients

Conditional value

Scale Reliability Statistics	
	Cronbach's α
scale	0.606

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F CON1"	0.608
"F2F CON2"	0.573
"F2F CON3"	0.485
"F2F CON4"	0.462

Scale Reliability Statistics	
	Cronbach's α
scale	0.529

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL CON1"	0.558
"BL CON2"	0.516
"BL CON3"	0.238
"BL CON4"	0.463

Emotional value

Scale Reliability Statistics	
	Cronbach's α
scale	0.696

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F EM1"	0.605
"F2F EM2"	0.627
"F2F EM3"	0.646
"F2F EM4"	0.754
"F2F EM5"	0.603
"F2F EM6"	0.667

Scale Reliability Statistics	
	Cronbach's α
scale	0.543

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL EM1"	0.377
"BL EM2"	0.373
"BL EM3"	0.450
"BL EM4"	0.659
"BL EM5"	0.447
"BL EM6"	0.584

Epistemic value

Scale Reliability Statistics	
	Cronbach's α
scale	0.556

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F EP1"	0.530
"F2F EP2"	0.518
"F2F EP3"	0.347
"F2F EP4"	0.508

Scale Reliability Statistics	
	Cronbach's α
scale	0.525

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL EP1"	0.547
"BL EP2"	0.416
"BL EP3"	0.313
"BL EP4"	0.526

Functional value

Scale Reliability Statistics	
	Cronbach's α
scale	0.697

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F FV1"	0.765
"F2F FV2"	0.545
"F2F FV3"	0.650
"F2F FV4"	0.667
"F2F FV5"	0.639
"F2F FV6"	0.616

Scale Reliability Statistics	
	Cronbach's α
scale	0.578

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL FV1"	0.628
"BL FV2"	0.455
"BL FV3"	0.463
"BL FV4"	0.615
"BL FV5"	0.500
"BL FV6"	0.475

Image

Scale Reliability Statistics	
	Cronbach's α
scale	0.851

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F IMG1"	0.806
"F2F IMG2"	0.758
"F2F IMG3"	0.817
"F2F IMG4"	0.871
"F2F IMG5"	0.831

Scale Reliability Statistics	
	Cronbach's α
scale	0.816

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL IMG1"	0.739
"BL IMG2"	0.706
"BL IMG3"	0.783
"BL IMG4"	0.845
"BL IMG5"	0.797

Social value

Scale Reliability Statistics	
	Cronbach's α
scale	0.485

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"F2F SOC1"	0.476
"F2F SOC2"	0.179
"F2F SOC3"	0.336
"F2F SOC4"	0.784
"F2F SOC5"	0.376
"F2F SOC6"	0.309

Scale Reliability Statistics	
	Cronbach's α
scale	0.283

Item Reliability Statistics	
	if item dropped
	Cronbach's α
"BL SOC1"	0.3023
"BL SOC2"	−0.0329
"BL SOC3"	0.1088
"BL SOC4"	0.5349
"BL SOC5"	0.3415
"BL SOC6"	0.1042

Monetary sacrifice

Scale Reliability Statistics

	Cronbach's α
scale	0.644

Item Reliability Statistics

	if item dropped Cronbach's α
"F2F MS1"	0.710
"F2F MS2"	0.488
"F2F MS3"	0.335

Scale Reliability Statistics

	Cronbach's α
scale	0.573

Item Reliability Statistics

	if item dropped Cronbach's α
"BL MS1"	0.583
"BL MS2"	0.491
"BL MS3"	0.265

Non-monetary sacrifice

Scale Reliability Statistics

	Cronbach's α
scale	0.835

Item Reliability Statistics

	if item dropped Cronbach's α
"F2F NMS1" [a]	0.902
"F2F NMS2" [a]	0.774
"F2F NMS3" [a]	0.594

Scale Reliability Statistics

	Cronbach's α
scale	0.854

Item Reliability Statistics

	if item dropped Cronbach's α
"BL NMS1" [a]	0.933
"BL NMS2" [a]	0.711
"BL NMS3" [a]	0.703