

# The Blended Quality Development Curve: A Comparative and Longitudinal Study on the Improvement Rate by Using Blended Methodologies in Management Masters

Adolfo Montalvo-García\*, Frank Longo, Adrià Peña-Molina, Harold Torrez-Meruvia

EAE Business School, Barcelona, Spain

Received January 30, 2019; Revised April 8, 2020; Accepted April 27, 2020

Copyright©2020 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

**Abstract** The highly diverse cultural and social backgrounds of students from around the world, in this case, from Spanish-speaking countries, has driven a redesign of traditional, f2f (face-to-face) Master's programs in a business school, leading to a blended learning format. Identifying how much time is needed to reach the optimum quality level, looking at mirror (compared) with the f2f is essential for the process of improving overall teaching and optimal use of blended strategies. A satisfaction survey was administered and data was analyzed using the Mann Whitney test. How many editions does it take to obtain the best quality level? How do the different quality factors evolve over time? And how is the comparison with f2f program's evolution over time? Some unexpected results were found, including that, when compared to f2f programs, general satisfaction was statistically higher in the blended modality even from the first edition, and waiting until the second edition shows higher results in almost all of the factors considered. Comparing different editions of the same blended program, the highest level of improvement in the perception of quality occurs when comparing the first and third edition. In this comparison, the most essential factors are those involving people: professors and students. This research provides valuable insights for institutions and/ or faculty members who are considering or currently offering online or blended learning.

**Keywords** Blended vs. f2f Master's Programs, Student Satisfaction, Teaching Presence, Social Presence, Management Education

## 1. Introduction

The implementation of new technologies, such as new teaching tools, has opened the door to an array of possible combinations of f2f (face-to-face) and online interactions. These hybrid approaches are generically described in published literature using the term "blended models" and they come from the business sector [1]. Power & Gould-Morven [2] brief the situation of the online training as a paradox that at the same time is "*booming and breaking*" (p.19); on one hand some authors directly talks about "*e-learning failure*" [1], while others report good quality if it has been adopted a social constructivist approach [3]. As a result of this wide range of different quality possibilities, the consequence which is a sizable offer of such courses is resulting in varying students' satisfaction levels. What are the clues for high-quality blended programs then?

A high-quality blended learning program requires tight coordination between the institution, instructors and students [4]. For a higher education institution, blended learning is by no means a trivial endeavor; such a quality learning experience will necessarily be the result of – and be supported by- a broader institutional strategy. With regards to students, and their adjustment to such an initiative, high-performing students find blended learning courses more convenient and a better match and come away with the perception that they have a better grasp of essential course content than in traditional learning settings, but is it blended learning that only fits to them? From the faculty's point of view, blended learning offers a broad and constantly evolving range of options, however, they need training to lead the teaching and learning process in these scenarios [5]. Integrating such options seems inevitable to

some extent, but actual blended learning strategies use may range from basic to the cornerstone of the future of education [4].

Looking for quality, from a theoretical point of view the approach chosen corresponds with the Social Learning Theory of Bandura, where learning is fostered and shaped by the social contact [6]. This is why this intervention is led to extensive use of videoconference in this teaching strategy, as it enhances both instructor-student and student-student bonds.

To make effective a complex social learning scenario for learning, a teaching strategy is needed; this design draws on a number of linked factors that are all necessary – but, do students appreciate all those factors equally in comparison with f2f? Diet, Zhu, Struyven, & Blicek [7] faced the question: what contributes to blended student satisfaction? And their research showed that a wide range of qualities can be delivered, such as considering the persons, both faculty and students, as the main quality factor contributor.

Another relevant question in this research is: how long does it take to achieve the highest level of student's satisfaction? As the multiple references incorporated in this paper, it seems clear that applying quality standards blended modality provides high levels of student's satisfaction, but still does not address how this satisfaction is built in time with a longitudinal approach, and how the different main factors that foster satisfaction evolve in a time line setting.

## 2. Conceptual Framework

The concept of satisfaction is defined as the feedback obtained from those who have received a service, such as the experience of training. Wu et al., established that satisfaction is commonly used to measure the quality of the teaching and learning process [8], therefore in order to have a general approach, it is considered also the general satisfaction.

Communities of Inquiry [9] is a construct configured by three elements: social presence, teaching presence and cognitive load. These three components of the model are developed in the forthcoming lines, and serve well to introduce under the constructivism paradigm, the role expected for students, faculty and the curriculum.

Besides these three already introduced factors, this research also explores where the online part of a blended course happens, its LMS, and how the teaching and learning process is supported under the label of “students support services”.

These five factors constitute the conceptual framework of this research; they have been already considered as the most crucial ones dealing with students' satisfaction, derived from the most used concepts in the literature, specifically those selected in the research paper: “*Who or*

*what contributes to student satisfaction in different blended learning modalities?*” [7].

### 2.1. Students

One of the main advantages of blended learning, as supported by published results, is that it gives students much greater autonomy in terms of managing and pacing their learning process [5] [10] [11]. The primary shortcoming is that students may feel isolated in online learning phases [12] [13]. Effective learning will require generating opportunities for real-life preparation and through social learning [6]. We can therefore conclude that a satisfactory blended learning environment will enable “*connecting with other students and developing strong bonds (such as friendship), which are predictors of strong learning communities that extend beyond the classroom*” [14. p.2]

Mature students are better adjusted to this form of learning [15] as they believe it can better meet their learning needs, compared to conventional brick-and-mortar classroom education [14]. Published results also confirm the link between personal maturity, engagement with the learning process and results in a blended setting [15]; where the key differential point seems to be dedication, a greater invested effort and more abundant feedback [16].

Actually, according to Ozkan and Koseler [cited in 7], success in the online modality is conditioned by the people who use it, both students, but also faculty. This use acquires a social perspective, in the sense of how participants in a blended modality are able to collaborate, developing a positive affective relationship with the rest; this construct is known as “social presence” [17].

### 2.2. Faculty

The primary advantage of blended learning is that it creates a setting that enables a broad range of student-centered teaching strategies, providing ample flexible options in terms of schedules and location. As already said, it also makes ongoing and direct feedback and communication possible [14] [18]. The degree of satisfaction with instructors and the perception of actually being supported by faculty is greater in blended learning settings [7]. Among other considerations, is the most valued quality factor which is the dialogue between professor and students [19].

Instructors who engage in blended learning courses are above to start a complex task, therefore it is very important for them to be aware that they need support students [4] [7] [20] in order to attain a high level of teaching quality. Going in detail and according to the Online Instructor Role and Behaviour Scale (OIRBS), they will have to deal with five roles: course design and organization, discussion facilitation, social facilitation, technological facilitation

and evaluation design [21].

However, most of the studies focused on technology-related issues. Badía, Garcia & Meneses [21] pointed out the importance of the role of professor; in their results professor occupy the first places in the variables that best explain quality in the online modality, such as age, academic background, being a full-time professor and, as was pointed out earlier, involvement in social interaction management, course design, technology use facilitation, learning outcomes evaluation and student learning support.

When a professor develops these tasks, he is providing “teaching presence”, the construct refers to the extent of activities taken by a professor in order to provoke participation among students within encouraging role.

### 2.3. Curriculum

Finalmente y para completar, el “Cognitive load” es el último elemento del modelo de Community of Inquiry [9], y hace referencia al esfuerzo que realiza el alumno para progresar por el currículum. Por lo tanto, el currículum no queda restringido a los contenidos que componen el programa, sino a la experiencia educativa pensada para el aprendizaje del alumno, de esta manera también hay que considerar las actividades que realiza en forma de evaluación continua: y este es precisamente el origen etimológico de la palabra: “camino”.

Adoptar un enfoque socio-constructivista supone diseñar un “camino” en primera persona del singular para el alumnado que les dote de un conocimiento individual y socialmente útil, además de aplicable profesionalmente y en la vida [22]. En este sentido, si bien es cierto que la dimensión de objetivos de aprendizaje, contenidos y perfil profesional de salida son lo mismo que su versión presencial anterior que se desdobra, donde ya se desarrolla a partir de los principios del student centered learning, la aplicabilidad y una actualización constante al entorno VUCA, y la adaptación a un alumnado muy diverso [23].

Por otro lado, las dimensiones del currículum que han tenido cambios se corresponden con las actividades de aprendizaje, si que han repensado para poderse situar en las coordenadas de la modalidad blended. The main benefits are to provide the change of deciding where and when to learn [24] the asynchronous part of the teaching and learning process.

### 2.4. Learning Management Systems (LMS)

According to the socio-technical perspective; LMS are the places where the online part of the blended courses take place; it is to say that they support the process of teaching and learning, they must, therefore, be considered when evaluating course quality [21]. Sanders-Smith, Smith-Bonahue & Soutullo [25] suggest that the key traits of a successful LMS are ease of access and user-friendliness points out the need to be perceived as

facilitating student’s learning.

LMS can be deployed as black-box closed systems or integrated with the Internet and social media, however it is still common to say “new technologies”, the fact is they have decades of track and evolution and nowadays, the term Web 2.0 designates the transition from static, HTML-based content, to dynamic, advanced, websites that provide a platform for virtual interpersonal and social networking and interaction. An effective blended learning model will have to be open-minded in its approach and not overlook these options. Traditional LMS focused on course curricula and other student-centered options must be kept in mind when designing opening learning [26], updated LMS are open and consider that learning can’t happen in Internet nowadays ignoring the use of social media [27], which they are natural in the day by day of students. Finally, the purpose of creating ‘*Personal Learning Environments*’ (PLE), [28], that make possible social interaction.

A further aspect which is gaining research relevance in LMS is the role of learning analytics in the development of student-centered teaching approaches. Such tools enable instructors to follow each individual student’s progress and to meet their needs much more accurately [29] opening the door to improve the quality perception of students.

Relacionando los conceptos de social presence y teaching presence con el modelo pedagógico blended instaurado: la comunicación prevista, además de considerar la parte presencial de los programas, en la parte online se desarrolla a partir de un contacto regular síncrono en forma de sesiones todos los lunes, miércoles y viernes, a esto se le suma los requerimientos de contacto derivados de la necesidad de satisfacer trabajos que a veces son individuales y otras veces en grupo, y por último en la comunicación también constante asíncrona. Durante las sesiones síncronas, alumnos y profesorado con las webcams interaccionan en tiempo real en las diferentes actividades de aprendizaje previstas.

### 2.5. Student Support Services

The last variable that has been identified as important in published research when evaluating student satisfaction is “support services” – i.e. other services, secondary to the main teaching-learning process [21]. In our research setting, for example, students had a tech support service, a library and a program coordinator at their disposal. These services must be considered as far as their interaction with the students conditioned their educational experience and they impact in terms of perception of quality.

## 3. Research Questions

This research aims to face the following questions:

*RQ1. How many editions of a blended program are needed to get the maximum level of students’*

*satisfaction?*

According to the state of the art, it seems clear that blended methodologies foster higher levels of satisfaction; however, there is a gap in the literature when it comes to studying the evolution of this satisfaction over time.

*RQ2. How does the curriculum, professor, students, support services and LMS in a blended program evolve on a longitudinal base?*

Another perceived gap in the literature involves addressing how these main factors contributing to the student's satisfaction evolve over different editions from a longitudinal point of view, which will allow us to understand the rating curve.

*RQ3. How does the satisfaction with the curriculum evolve after three editions of the blended program compared with the F2F modality?*

As far as it is not expected to have curriculum redesigns, it is to say that it is going to be stable factor over the studied period of time, it is not clear how it is going to be its evolution.

*RQ4. How does the satisfaction with the professor evolve after three editions of the blended modality compared with the F2F modality?*

The pedagogical model situates faculty as the key quality factor to enhance students' learning. Also, the reviewed literature declares the concept of "teaching presence" [21] as one of the most important factors when it comes to establishing satisfaction.

*RQ5. How does the satisfaction with the peer students evolve after three editions of the blended modality compared with the F2F modality?*

With faculty, students are the other part of the couple; the pedagogical model aims to generate "social learning", therefore, getting to know this factor will make it possible to know whether we are achieving or not this essential component of the model.

*RQ6. How does the satisfaction with the support services evolve after three editions of the blended modality compared with the F2F modality?*

Beyond the teaching and learning process, mainly driven by faculty, how do the different modalities perceive the rest of the support services? Are there differences in how this factor contributes to students' satisfaction?

*RQ7. How does the satisfaction with the LMS evolve after three editions of the blended modality compared with the F2F modality?*

In the blended modality, the LMS is the place where the

teaching and learning process takes place, while in f2f programs it is conceived to be a resource to improve learning, which happens in regular traditional classrooms. This different role suggests different opinions about how it contributes to satisfaction.

## 4. Materials and Methods

February 2015 marked the beginning of the new, blended learning, Master's programs at EAE Business School, in Barcelona (Spain). These programs all included classroom-based and online components. A specific course design was developed, including a two-week intensive, face-to-face class period, halfway through the program. The online component includes a one-hour live webinar every Monday, Wednesday and Friday and asynchronous online work using an LMS.

This project has a global perspective, and this is reflected in the academic curriculum and in the international faculty and students. Teaching takes place in Spanish, and students are mostly from Spanish-speaking Latin American countries and from Spain.

This context has enabled us to analyze this teaching approach and determine what elements have enhanced or hindered the students' experience and affected their degree of satisfaction, and students' perception of the relative importance of the most essential factors [7]. In a student-centered approach to teaching, discovering students' values and perceptions is essential. What relative weight do online and offline variables have from their point of view? Given that students enrolled in these programs are different; do they value different aspects of the teaching process differently from students enrolled in conventional, classroom-based, programs? Are we providing quality training from the first edition? What is the improvement rate within a blended modality?

### 4.1. Procedure

As this was a new portfolio of blended programs, it was considered essential to determine the evolution of each one of the main satisfaction factors studied, ranking variables by importance and benchmarking them against the traditional, classroom-based programs that these blended learning Master's programs were based on. At the end of each academic edition, a student satisfaction survey was administered. Participation was voluntary and took place after students had received their marks.

The groups involved were the 2016, 2017 and 2018 editions of the blended program and their equivalents in the f2f modality. The programs studied were the Master in Project Management and the Master in Supply Chain 2016, adding in 2017 and 2018 the Master in Corporate Communication and Master in Marketing to the School's portfolio.

The compared modalities present the same characteristics but the different modality itself: programs and their internal structure, contents, artefacts such as syllabus, templates, guides, faculty, learning activities, bibliography, LMS, etc. The only difference would then be the learning modality: blended vs. f2f. We sought to answer the questions: Which is the level of quality perceived by students blended and f2f? How do the main satisfaction factors evolve on these two types of students?

Regarding the research instrument, surveys are widely used in research as they enable us to obtain and process data in a timely and efficient manner [30]. All participants were given the same instructions and the same administration procedure was used. A wide array of questions was covered and technology facilitated reaching a large number of participants. The "Survey Project" platform was used to host questionnaires. Students were informed of this survey through the LMS (Blackboard).

This ease of access to students explains the fact that the studied sample is, in fact, the entire graduating class, which gave our analysis the greatest possible confidence. The conventional f2f classroom-based groups were also active users of the LMS as it was used to distribute at least documentation and hand in assignments.

In the year 2016, 63 students answered the survey; in 2017 it was answered by 107 and finally in 2018 we had 111 respondents; this means a total 281 answers that integrates the sample of the blended students. On the other hand, and regarding the f2f modality, in the year 2016, 58 students completed the survey, in 2017 the number was 377, and in 2018, the respondents were 301; the f2f sample is composed by 736 students. Essential factors in achieving such high rates of participation were: (1) the fact that the survey was placed as the first option on students' LMS page when they logged in; (2) the fact that they were repeatedly informed of the fact that their participation and opinions were considered very important and that it involved just a quick and easy-to-complete questionnaire.

This procedure was designed to guarantee anonymity and data protection and participants were informed of this in the survey instructions. The data summary report was generated automatically, removing any chance to trace answers back to specific individuals.

This enabled us to connect expressed student satisfaction with each studied factor, linking them to our original question: How the different factors are perceived in student satisfaction in each of the two studied learning modes? And from a longitudinal perspective?

Finally, the same survey was used for conventional, classroom-based programs, in order to make possible the

comparison and it also included the most important quality factors in this research: curriculum, professor, students, support services and LMS.

#### 4.2. Instrument

The survey questionnaire was the instrument that this institution had been using for over ten years. This choice was made in order to enable benchmarking against a history of traditional, brick-and-mortar, classroom teaching, which is essential for this research. Given this long history and ample data based on this instrument, there was no need to engage in further validation. All items were reviewed to evaluate their adequacy for a blended learning setting and no major issues were discovered.

Its format is brief enough to ensure students can complete it in approximately ten minutes, which has proven to be an acceptable duration in this setting, and uses a technological platform that these students are familiar with. The wording was also very appropriate to this well-defined and well-known group of participants, who, after a full academic year, share a vocabulary, precluding comprehension difficulties or misunderstandings. This degree of confidence also meant that there was no need for control items. There were two open-ended questions that allowed students to provide broad qualitative input.

Item wording has been carefully crafted to be clear and easy to understand for the new blended master's students. Feedback has confirmed that there were no ambiguous questions. All questions were brief, expressed in positive terms and avoided leading or prompting wording, ensuring that each question involved one single, clear, logical sequence.

It is a Likert scale ranging from 0-5, where 0 means no satisfaction and 5 is total satisfaction. The items are the following ones:

- What is your overall assessment of the professor?
- What is your overall assessment of the curriculum?
- What is your overall assessment of the LMS?
- What is your overall assessment of the support services?
- What is your general satisfaction with the master?

#### 4.3. Statistical Analysis

The Kolmogórov-Smirnov test was applied in order to check the normality of the distribution, considering two independent samples, one for the blended modality and the other for the f2f modality, results are reported in table 1.

**Table 1.** Test of Kolmogórov-Smirnov for two independent samples.

| Statistics <sup>a</sup>      |          |            |           |          |                  |       |               |
|------------------------------|----------|------------|-----------|----------|------------------|-------|---------------|
|                              |          | Curriculum | Professor | Students | Support services | LMS   | GSatisfaction |
| Máximas diferencias extremas | Absolut  | 0,201      | 0,170     | 0,334    | 0,055            | 0,189 | 0,298         |
|                              | Positive | 0,201      | 0,170     | 0,334    | 0,055            | 0,189 | 0,298         |
|                              | Negative | 0,000      | 0,000     | 0,000    | -0,031           | 0,000 | 0,000         |
| Z of Kolmogorov-Smirnov      |          | 2,873      | 2,427     | 4,760    | 0,786            | 2,701 | 4,252         |
| Sig. )                       |          | 0,000      | 0,000     | 0,000    | 0,568            | 0,000 | 0,000         |

a. Aggrupation variable: groups blended and f2f

**Table 2.** Test of Leneve.

|                  |                                | Levene Statistic | Sig.  |
|------------------|--------------------------------|------------------|-------|
| Curriculum       | Se asumen varianzas iguales    | 26,382           | 0,000 |
|                  | No se asumen varianzas iguales |                  |       |
| Professor        | Se asumen varianzas iguales    | 14,510           | 0,000 |
|                  | No se asumen varianzas iguales |                  |       |
| Students         | Se asumen varianzas iguales    | 80,168           | 0,000 |
|                  | No se asumen varianzas iguales |                  |       |
| Support services | Se asumen varianzas iguales    | 0,359            | 0,549 |
|                  | No se asumen varianzas iguales |                  |       |
| LMS              | Se asumen varianzas iguales    | 30,398           | 0,000 |
|                  | No se asumen varianzas iguales |                  |       |
| GSatisfaction    | Se asumen varianzas iguales    | 54,859           | 0,000 |
|                  | No se asumen varianzas iguales |                  |       |

Secondly, the Levene test was applied looking for the homogeneity of the distributions, results are shown in table 2.

Both normality and homogeneity tests revealed a non-normal distribution; as a consequence of these tests a non-parametric analysis is required and applied. In this line, for the comparisons between modalities and editions, the Mann Whitney's test was selected.

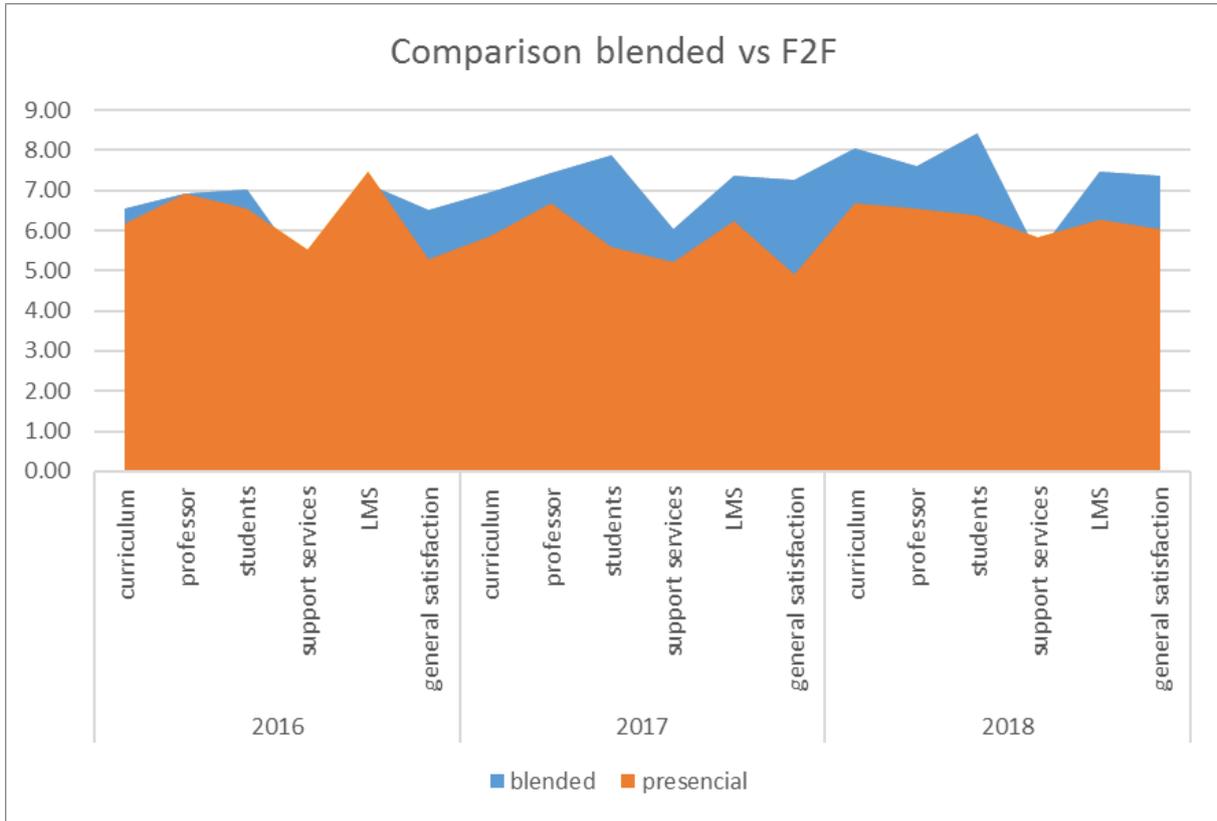
For non-parametric distributions, the Mann Whitney's test is chosen and applied for each blended edition, and it is then cross compared both with their f2f equivalent, and also longitudinally with the different editions of the blended program. Comparing the factors: general satisfaction, professor, students, curriculum, LMS and

support services.

As it is commonly accepted in research, we assume that when p. value has got a significance lower than 0,05 the difference between the distributions is statistically significant, and when p. value is higher than 0,05 it is considered that the two compared groups do not show statistical differences.

#### 4.4. Results

Figure 1 offers a picture of the evolution of the different factors analysed considering both modalities in a longitudinal basis.



**Figure 1.** Longitudinal average scores in blended vs. f2f

In the first edition, i.e. in 2016, the blended modality presents slightly better results for students, and general satisfaction shows the higher difference between the two groups. In the second edition, the “blue” colour of the blended modality scores higher in all the analysed factors, with the only exception of support services in 2018.

To find out whether these differences are statistically significant, table 3 offers the statistics of the different Mann Whitney test within the cross compared groups. The obtained resulting data provides a way to answer the RQ contained in this research, as it follows.

The Blended Quality Development Curve: A Comparative and Longitudinal Study  
on the Improvement Rate by Using Blended Methodologies in Management Masters

**Table 3.** Mann Whitney's statistics for the crossed groups: blended vs. f2f and different editions of blended itself

|                             |                                   | <i>Curriculum</i> | <i>Professor</i> | <i>Students</i> | <i>Support services</i> | <i>LMS</i> | <i>General satisfaction</i> |
|-----------------------------|-----------------------------------|-------------------|------------------|-----------------|-------------------------|------------|-----------------------------|
| <i>TOTAL blended vs f2f</i> | <i>U de Mann-Whitney</i>          | 74968,500         | 81499,000        | 62368,500       | 101602,000              | 78888,000  | 59999,500                   |
|                             | <i>W de Wilcoxon</i>              | 346184,500        | 352715,000       | 333584,500      | 372818,000              | 350104,000 | 331215,500                  |
|                             | <i>Z</i>                          | -6,887            | -5,306           | -9,875          | -0,434                  | -5,917     | -10,468                     |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,000             | 0,000            | 0,000           | 0,664                   | 0,000      | 0,000                       |
| <i>2016 blended vs f2f</i>  | <i>U de Mann-Whitney</i>          | 1735,500          | 1693,000         | 1712,500        | 1592,000                | 1615,000   | 1344,500                    |
|                             | <i>W de Wilcoxon</i>              | 3446,500          | 3709,000         | 3423,500        | 3608,000                | 3631,000   | 3055,500                    |
|                             | <i>Z</i>                          | -0,482            | -0,710           | -0,600          | -1,227                  | -1,115     | -2,530                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,630             | 0,478            | 0,549           | 0,220                   | 0,265      | 0,011                       |
| <i>2017 blended vs f2f</i>  | <i>U de Mann-Whitney</i>          | 14233,500         | 15647,500        | 10713,500       | 16502,000               | 15420,500  | 9346,000                    |
|                             | <i>W de Wilcoxon</i>              | 85486,500         | 86900,500        | 81966,500       | 87755,000               | 86673,500  | 80599,000                   |
|                             | <i>Z</i>                          | -4,713            | -3,590           | -7,455          | -2,893                  | -3,760     | -8,549                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,000             | 0,000            | 0,000           | 0,004                   | 0,000      | 0,000                       |
| <i>2018 blended vs f2f</i>  | <i>U de Mann-Whitney</i>          | 10429,000         | 11420,500        | 8477,000        | 15523,000               | 11423,500  | 10584,000                   |
|                             | <i>W de Wilcoxon</i>              | 55279,000         | 55673,500        | 51255,000       | 21739,000               | 56874,500  | 56035,000                   |
|                             | <i>Z</i>                          | -5,883            | -4,849           | -7,076          | -1,110                  | -4,979     | -5,788                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,000             | 0,000            | 0,000           | 0,267                   | 0,000      | 0,000                       |
| <i>16-17 blendeds</i>       | <i>U de Mann-Whitney</i>          | 2944,000          | 2782,500         | 2797,000        | 2591,500                | 3324,500   | 2743,000                    |
|                             | <i>W de Wilcoxon</i>              | 4960,000          | 4798,500         | 4813,000        | 4607,500                | 9102,500   | 4759,000                    |
|                             | <i>Z</i>                          | -1,408            | -1,932           | -1,884          | -2,536                  | -0,151     | -2,071                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,159             | 0,053            | 0,060           | 0,011                   | 0,880      | 0,038                       |
| <i>17-18 blendeds</i>       | <i>U de Mann-Whitney</i>          | 3847,500          | 5692,500         | 4701,500        | 5274,000                | 5462,000   | 5825,000                    |
|                             | <i>W de Wilcoxon</i>              | 9625,500          | 11470,500        | 10479,500       | 11490,000               | 11240,000  | 12041,000                   |
|                             | <i>Z</i>                          | -4,588            | -0,541           | -2,314          | -1,439                  | -1,044     | -0,250                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,000             | 0,589            | 0,021           | 0,150                   | 0,297      | 0,803                       |
| <i>16-18 blendeds</i>       | <i>U de Mann-Whitney</i>          | 1940,000          | 2717,500         | 2307,500        | 3133,000                | 3287,000   | 2871,500                    |
|                             | <i>W de Wilcoxon</i>              | 3956,000          | 4733,500         | 4323,500        | 5149,000                | 5303,000   | 4887,500                    |
|                             | <i>Z</i>                          | -4,961            | -2,488           | -3,500          | -1,145                  | -0,668     | -1,994                      |
|                             | <i>Sig. asintótica(bilateral)</i> | 0,000             | 0,013            | 0,000           | 0,252                   | 0,504      | 0,046                       |

**Table 4.** Statistical differences across modalities and editions: Mann Whitney's p value

|                             | <i>Differences between blended and F2F per edition</i> |              |              |              | <i>Differences between different editions of the blended modality</i> |                   |                  |
|-----------------------------|--|--------------|--------------|--------------|---|-------------------|------------------|
|                             | <i>2016-2018 (total)</i>                               | <i>2016</i>  | <i>2017</i>  | <i>2018</i>  | <i>2016vs2017</i>   | <i>2017vs2018</i> | <i>2016-2018</i> |
| <i>Curriculum</i>           | <b>0,000</b>   | 0,630        | <b>0,000</b> | <b>0,000</b> | 0,159   | <b>0,000</b>      | <b>0,000</b>     |
| <i>Professor</i>            | <b>0,000</b>   | 0,478        | <b>0,000</b> | <b>0,000</b> | 0,053   | 0,589             | <b>0,013</b>     |
| <i>Students</i>             | <b>0,000</b>   | 0,549        | <b>0,000</b> | <b>0,000</b> | 0,060   | <b>0,021</b>      | <b>0,000</b>     |
| <i>Support services</i>     | 0,664  | 0,220        | <b>0,004</b> | 0,267        | 0,220   | <b>0,011</b>      | 0,252            |
| <i>LMS</i>                  | <b>0,000</b>   | 0,265        | <b>0,000</b> | <b>0,000</b> | 0,265   | 0,880             | 0,504            |
| <i>General satisfaction</i> | <b>0,000</b>   | <b>0,011</b> | <b>0,000</b> | <b>0,000</b> | <b>0,011</b>  | <b>0,038</b>      | <b>0,046</b>     |

\*p<0.05.

Finally, table 4 shows the p. values of the Mann Whitney test crossing per modality and editions. The obtained resulting data provides a way to answer the RQ contained in this research.

*RQ1. How many editions of a blended program are needed to get the maximum level of students' satisfaction?*

In terms of general satisfaction, with a p.=0,011, the first 2016 blended edition provokes statistically higher significance satisfaction than the f2f, however, several of the main considered factors present differences. In the comparison of the second year (2017) all the analysed factors present a p. value under 0,05 which means statistical differences.

*RQ2. How does the curriculum, professor, students, support services and LMS in a blended program evolve in a longitudinal base?*

Curriculum does not show differences comparing 2016 and 2017 editions, but it does when comparing 2017 and 2018. Regarding professor, there are no differences between 2016-2017 and 2017-2018, 2016 and 2018 need to be compared in order to identify statistically significant differences. In regards to students, 2016-2017 does not show differences, however 2017-2018 does; and this is the trend for support services too. Finally, LMS does not present any differences in the opinion expressed by respondents.

*RQ3. How does the satisfaction with the curriculum evolve after three editions of the blended compared with the F2F modality?*

With a p. value of 0,630 there are no differences in 2016, however, they appear in 2017 with a 0,000, and it is maintained in 2018 with another p value of 0,000.

*RQ4. How does the satisfaction with the professor evolve after three editions of the blended modality compared with the F2F modality?*

Again, there are no differences in 2016 with a p.value of 0,478; however, the comparison changes in 2017 and 2018 with a p value of 0,000 in both cases.

*RQ5. How does the satisfaction with the peer students evolve after three editions of the blended modality compared with the F2F modality?*

And this is valid for students too; p value of 0,549 in 2016 that means no differences, and the comparison changes in 2017 and 2018 with p.=0,000.

*RQ6. How does the satisfaction evolve with the support services after three editions of the blended modality compared with the F2F modality?*

Support services has got a different picture: in 2016, there are no differences with a p.=0,220; there are differences in 2017 with a p.=0,004, and again in 2018 there are no differences with a p.=0,267.

*RQ7. How does the satisfaction with the LMS evolve after three editions of the blended modality compared with the F2F modality?*

There are no differences in 2016 with a p.=0,265, however, in 2017 and 2018 p.=0,000 in both years.

## 5. Discussion

This data expands the body of research that indicates that blended learning students present higher levels of overall satisfaction compared to students enrolled in conventional education programs [14] [31].

When launching blended programs, institutions needs to develop their organic grown into a positive transformation by an iterative loop of continuous quality improvement in each edition [4], from a longitudinal project perspective, this research come up with an original finding about how much time is needed to do the whole quality learning rate, which is according to these results two editions of the program to reach statistically significant differences when comparing with f2f programs.

Keeping in mind the phases that institutions that develop mixed learning programs go through, namely: awareness/exploration, early implementation and mature implementation [32], an explicit course design makes possible shared teaching approaches by all faculty

members, supported by specific training [33] and teamwork will be perceived by all stakeholders as an accelerator for the institution's progress. In the case we have analyzed here, the framework is broad enough to give faculty plenty of leeway to work flexibly and find a balance between personal identity and approach and an institutional teaching strategy.

Furthermore, a clear teaching framework will limit the potentially negative impact of further teacher-related factors such as age or experience [21] and will enable an institution to offer a high-quality experience from the very first edition of a new program in general terms. Higher education institutions have a mandate to offer high quality training from the very first edition and blended learning programs are the only way that many people, given constraints of time and location, can access such an education.

Our statistical analysis has led to results that are fully agree with Diep et al., [7], as the people, faculty and students appear as the primary variable contributing to student satisfaction. Faculty has emerged as the factor with the greatest weight in understanding satisfaction in blended learning settings. However, "teaching presence" [21], has been less fully developed as a construct in published research compared to "social presence" [25], and however the literature still claims to know more about empirical evidences in student's engagement and therefore perception of quality [34].

En el escenario analizado, los profesores que se han lanzado a la modalidad blended han contado con formación y asesoramiento pedagógico constante, de esta manera, todos los elementos constitutivos de la Community of Inquiry: social presence – students, teaching presence – faculty y cognitive load – curriculum presenta una mejora de comparada con la modalidad f2f a partir de la segunda edición, es decir si bien es cierto que la satisfacción general ya significativamente superior en la primera edición, hay que esperar a un segundo año en la curva de aprendizaje del profesorado para conseguir tener un impacto desde la perspectiva constructiva en la Community of Inquiry. Comparando estos elementos consigo mismos hay que esperar un segundo año para identificar una mejora en students y curriculum, y un tercer año para observar una mejora en los tres elementos constitutivos.

Teaching presence has got a high correlation with the student's cognitive load [35], and it happens when faculty is able in the frame of the socio-constructivist paradigm, to design teaching and learning process conducted by questions where everybody contributes, by discussing and reflection, in the frame of a strong learning community [14], specifically a Community of Inquiry [36] [17]. Actually the kind of the interaction between the students is going to shape the experiential quality within the training.

The need to belong and find social support through the

long process of an academic program is relevant to the blended modality too. Social learning [7] permits active approaches to teaching to enable all students to take part in a complex exchange, where everyone teaches and learns. In this sense, students find blended learning settings an exciting challenge, as they engage in effective group work with people from many countries and acquire a global perspective from the very beginning. We believe that the need to belong may be behind these results. Need to belong is related, in published literature, with an increase in participation and engagement in blended learning students. This research has involved adult blended learning students, most of whom have to deal with families and full-time jobs, as well as the ongoing and challenging workload of assessed assignments in these blended learning programs. We therefore believe that although they may name "students" as the factor they enjoy the most – given that these are the classmates they've shared the process with – they are aware that other factors contribute more to the quality and effectiveness of the education they are investing in [21].

These data seem to indicate that an underlying expectation that social presence is an essential learning tool is not, in fact, considered accurate from the year 2007 [37]; we believe that the student variable expresses social support and a feeling of belonging within each person's educational goals [7] [38], and when this prerequisites are in place, the blended modality fits not only to good students, but to a wide range of them; it is the mission of the institution and the faculty to provide with pedagogical models and designs that inspire and encourage participation of any kind of student.

## 6. Conclusions

Our results and the process we describe here can provide clarity on the design and implementation of this type of program and assist managers and faculty tasked with introducing blended or online programs in their institutions, and also permits to be aware of the patience needed to reach the end of the quality curve rate. These results strengthen the grounds that enable us to state that blended learning delivers a higher degree of satisfaction.

The blended learning format with a two-week classroom session in mid-course, webinars every Monday, Wednesday and Friday and asynchronous work leads to comparatively better results than the conventional classroom-based f2f programs. As it appears to be a validated solution on how to address the well-known feeling of isolation that students can suffer in other settings, by providing a continuous interaction that permits social and teaching presence.

The implementation of technology-enabled blended learning programs can succeed if it is done properly. Ultimately, people are at the core and are the purpose of

education; and technology is pointless if it doesn't serve a high-quality student-centered learning process.

Launching blended programs requires at least two editions to fulfill its complete potential when comparing with their equals in f2f, and three editions compared with their own, considering the definition of a clear pedagogical model, teachers' training, and teachers' pedagogical counselling. Between the second and the third edition, according to the data gathered in this research, the results remain similar.

These differences lead us to think that each type of program has a specific internal logic and that higher education institutions that wish to engage in such programs will have to continue researching into this in order to be able to offer the highest educational standards in programs that offer a truly student-centered approach, whatever the format. The information provided in this research attempts to establish a baseline for further development of student-centered teaching approaches and educational program portfolios that truly reflect current needs and maintain the highest educational standards.

## 7. Limitations

It does not use a validated instrument; however, we have checked that students fully understand each item and these items are the general asked ones in the educational institutions.

It is need to delimitate whether the student's characteristics of the two compared modalities contributes to the obtained results. Ultimately, the challenge will determine if differences between students in blended learning or in conventional classroom-based f2f programs are just a result of the different settings with different approaches or if there are other decisive variables, such as age and professional status. This should be the object of future research.

The fact that this research was based on survey data adds some distance between submitted answers and actual phenomena, as we are resorting to indirect observation. Subsequent research should triangulate results with direct observation of that sample or population. From a methodological point of view, a descriptive, correlational study doesn't provide the grounds to prove the existence of causal effects. Future research will be necessary in order to confirm the insights that this research has produced.

This research has worked with data from programs that, for the first time, provided instructors with a higher level of handholding in their teaching efforts. This may have biased results when compared to conventional programs; however, faculties were the same, and they could have transferred these pedagogical learning into the f2f programs as well.

## REFERENCES

- [1] A. Bartolomé. Blended learning. Conceptos básicos. *Revista de Medios Y Educacion*, 23(Pixel-Bit), 7–20, 2004.
- [2] Power, Thomas Michael, and Anthony Morven-Gould. "Head of gold, feet of clay: The online learning paradox." *The International Review of Research in Open and Distributed Learning* 12.2, 19-39, 2011.
- [3] C. Dalsgaard & M. Godsk. Transforming traditional lectures into problem based blended learning: challenges and experiences. *Open Learning: The Journal of Open, Distance and E-Learning*, 22(1), 29–42. <https://doi.org/10.1080/02680510601100143>, 2007.
- [4] P. Moskal, C., Dziuban, & J., Hartman. Blended learning: A dangerous idea? *Internet and Higher Education*. <https://doi.org/10.1016/j.iheduc.2012.12.001>, 2013.
- [5] Cavanagh, T. B. "The blended learning toolkit: Improving student performance and retention." *Educause Review* 34.4, 15, 2011.
- [6] A. Bandura. Social learning theory. *Social Learning Theory*. <https://doi.org/10.1111/j.1460-2466.1978.tb01621.x>, 1971.
- [7] A.N: Diep, C. Zhu, K. Struyven & Y. Blicke. Who or what contributes to student satisfaction in different blended learning modalities? *British Journal of Educational Technology*, 48(2), 473–489. <https://doi.org/10.1111/bjjet.12431>, 2017.
- [8] W. Wu & L. Hwang. The Effectiveness of E-Learning for Blended Courses in Colleges: A Multi-Level Empirical Study. *International Journal of Electronic Business Management*, 8(4), 312–322, 2010.
- [9] Garrison, D. Randy, Terry Anderson, and Walter Archer. "Critical thinking, cognitive presence, and computer conferencing in distance education." *American Journal of distance education* 15.1, 7-23, 2001.
- [10] J. Poon. Use of blended learning to enhance the student learning experience and engagement in property education. *Property Management*, 30(2), 129–156. <https://doi.org/10.1080/02637471211213398>, 2012.
- [11] M. Reiss & D. Steffens. Performance of Blended Learning in University Teaching. *E-Learning and Education*, 1(6). Retrieved from [http://chester.summon.serialsolutions.com/2.0.0/link/0/eLvHCXMw3V05T8MwFLY4BEJCIHKEU\\_LEghKITRo7AwMtoKAygFoOsVQ5bBTRpqVN\\_z9-TpykVSdgYrQVJbY\\_59nv-h5CVsMw9QWZwCh1CbciH1QQy6OOT8waUiikABBCJg\\_3j362qEvT-CZUdWuyr7-APxjJrVA3ARbA2nkVkSqMoGlEo3Ry6Mp5yz0-ka9D Gb1Iga](http://chester.summon.serialsolutions.com/2.0.0/link/0/eLvHCXMw3V05T8MwFLY4BEJCIHKEU_LEghKITRo7AwMtoKAygFoOsVQ5bBTRpqVN_z9-TpykVSdgYrQVJbY_59nv-h5CVsMw9QWZwCh1CbciH1QQy6OOT8waUiikABBCJg_3j362qEvT-CZUdWuyr7-APxjJrVA3ARbA2nkVkSqMoGlEo3Ry6Mp5yz0-ka9D Gb1Iga), 2010.
- [12] J. Poon. Blended Learning: An Institutional Approach for Enhancing Students' Learning Experiences. *Journal of Online Learning & Teaching*, 9(2), 271–289. <https://doi.org/10.1016/j.sbspro.2014.01.992>, 2013.
- [13] S. Smyth, C. Houghton, A. Cooney & D. Casey. Students' experiences of blended learning across a range of postgraduate programmes. *Nurse Education Today*, 32(4), 464–468. <https://doi.org/10.1016/j.nedt.2011.05.014>, 2012.
- [14] R. Owston, D. York, S. Murtha. Student perceptions and achievement in a university blended learning strategic

- initiative. *Internet and Higher Education*, 18, 38–46. <https://doi.org/10.1016/j.iheduc.2012.12.003>, 2013
- [15] A. M. Lau. Formative good, summative bad? – A review of the dichotomy in assessment literature. *Journal of Further and Higher Education*, 40(4), 509–525. <https://doi.org/10.1080/0309877X.2014.984600>, 2016.
- [16] D. H. Lim & M.L. Morris. Learner and instructional factors influencing learning outcomes within a blended learning environment. *Educational Technology and Society*, 12(4), 282–293, 2009.
- [17] S.L. Watson, S. Janakiraman & J. Richardson. A team of instructors' use of social presence, teaching presence, and attitudinal dissonance strategies: An animal behaviour and welfare MOOC. *International Review of Research in Open and Distance Learning*, 18(2), 68–91. <https://doi.org/10.19173/irrodl.v18i2.2663>, 2017.
- [18] R.A. Schuhmann & T.A. Skopek. Blurring the lines: A Blended Learning Model in a Graduate Public Administration Program. *Quarterly Review of Distance Education*, 10(2), 219–232. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=ejh&AN=44895681&site=ehost-live&scope=site>, 2009.
- [19] J. Lee. Design of blended training for transfer into the workplace. *British Journal of Educational Technology*, 41(2), 181–198. <https://doi.org/10.1111/j.1467-8535.2008.00909.x>, 2010.
- [20] M. L. Hung & C. Chou. Students' perceptions of instructors' roles in blended and online learning environments: A comparative study. *Computers and Education*, 81, 315–325. <https://doi.org/10.1016/j.compedu.2014.10.022>, 2015.
- [21] A. Badia, C. Garcia & J. Meneses. Approaches to teaching online: Exploring factors influencing teachers in a fully online university. *British Journal of Educational Technology*, 48(6), 1193–1207. <https://doi.org/10.1111/bjett.12475>, 2017.
- [22] López-Goñi, Irene, and Jesús María Goñi Zabala. *Hacia un currículum guiado por las competencias. Propuesta para la acción*. Vol. 27. Universidad Pública de Navarra/Nafarroako Unibertsitate Publikoa, 2014.
- [23] Rao, K., & Meo, G. *Using universal design for learning to design standards-based lessons*. SAGE Open, 6(4), 1–12, 2016. <https://doi.org/10.1177/2158244016680688>
- [24] Carlsen, A., Holmberg, C., Neghina, C., & Owusu-Boampong, A. *Closing the gap: Opportunities for distance education to benefit adult learners in higher education*. Hamburg, Germany: UNESCO Institute for Lifelong Learning, 2016.
- [25] S. C. Sanders-Smith, T. M. Smith-Bonahue & O. R. Soutullo. Practicing teachers' responses to case method of instruction in an online graduate course. *Teaching and Teacher Education*, 54, 1–11. <https://doi.org/10.1016/j.tate.2015.11.015>, 2016b.
- [26] J. Salinas. Enseñanza flexible y aprendizaje abierto, fundamentos clave de los ples Capítulo 3 los ple en el contexto de las corrientes del aprendizaje abierto. In En L. Castañeda y J. Adell (Eds.), *Entornos Personales de Aprendizaje: Claves para el ecosistema educativo en red* (pp. 53–70). <https://doi.org/10.3145/epi.2012.jul.04>, 2013.
- [27] F. J. Garcia, M. A. Conde, M. Alier & M. J. Casany. Opening Learning Management Systems to Personal Learning Environments. *Journal of Universal Computer Science*, 17(9), 1222–1240. <https://doi.org/10.1016/j.infsof.2008.09.005>, 2011.
- [28] N. Dabbagh & A. Kitsantas. Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *Internet and Higher Education*, 15(1), 3–8. <https://doi.org/10.1016/j.iheduc.2011.06.002>, 2012.
- [29] D. Kim, Y. Park, M. Yoon & I. Jo. Toward evidence-based learning analytics: Using proxy variables to improve asynchronous online discussion environments. *Internet and Higher Education*, 30, 30–43. <https://doi.org/10.1016/j.iheduc.2016.03.002>, 2016.
- [30] J. Casas, J. R. Repullo & J. Donado. La encuesta como técnica de investigación. Elaboración de cuestionarios y tratamiento estadístico de los datos (I). *Atencion Primaria*, 31(8), 527–538. <https://doi.org/10.1157/13047738>, 2003.
- [31] D. Larson & C. Sung. Comparing Student Performance: Online versus Blended versus Face-to-Face. *Journal of Asynchronous Learning Networks*, Pages: 31-42. Retrieved from [http://eric.ed.gov/?id=EJ837556%5Cnhttp://nglc.pbworks.com/w/file/67244155/Comparing Student Performance.pdf](http://eric.ed.gov/?id=EJ837556%5Cnhttp://nglc.pbworks.com/w/file/67244155/Comparing%20Student%20Performance.pdf), 2009.
- [32] C. R. Graham, C. R. Henrie & A.S. Gibbons. Developing models and theory for blended learning research. In *Blended Learning: Research Perspectives, Volume 2* (pp. 13–33). <https://doi.org/10.4324/9781315880310>, 2013.
- [33] Nikolov, R., Lai, K. W., Sendova, E., & Jonker, H. *Distance and flexible learning in the twentyfirst century*. In J. M. Voogt, G. A. Knezek, R. Christensen, & K. Lai (Eds.), *Second handbook of information technology in primary and secondary education* (pp. 1–16). Cham, Switzerland: Springer International Handbooks of Education, 2018. [https://doi.org/10.1007/978-3-319-53803-7\\_45-2](https://doi.org/10.1007/978-3-319-53803-7_45-2)
- [34] H. Zhang, L. Lin, Y. Zhan & Y. Ren. The Impact of Teaching Presence on Online Engagement Behaviors. *Journal of Educational Computing Research*, 54(7), 887–900. <https://doi.org/10.1177/0735633116648171>, 2016.
- [35] K. Kozan. The incremental predictive validity of teaching, cognitive and social presence on cognitive load. *Internet and Higher Education*, 31, 11–19. <https://doi.org/10.1016/j.iheduc.2016.05.003>, 2016
- [36] A. Armellini & M. De Stefani. Social presence in the 21st century: An adjustment to the Community of Inquiry framework. *British Journal of Educational Technology*, 47(6), 1202–1216. <https://doi.org/10.1111/bjett.12302>, 2016.
- [37] L. Rourke & H. Kanuka. Barriers to online critical discourse. *International Journal of Computer-Supported Collaborative Learning*, 2(1), 105–126. <https://doi.org/10.1007/s11412-007-9007-3>, 2007.
- [38] T. M. Steen. Facilitating online learning activities through the discussion board: a first year university students' perspective. *International Journal of Continuing Engineering Education and Life-Long Learning*, 25(1), 77–102. <https://doi.org/10.1504/ijceell.2015.066549>, 2015.