What is the value created by distance education through digital platforms during the pandemic in the perception of users?

Marcelo Okano[1+]
Samira Antunes[2]
Marcelo Eloy[3]
Celi Langhi[4]

[1,2]*Production Engineering, Paulista University, Brazil.*
[1]*Email: Marcelo.okano@unip.br*
[2]*Email: samira.antunes@aluno.unip.br*
[1,3,4]*State Center of Technological Education Paula Souza, Brazil.*
[3]*Email: marceloeloyfernandes@gmail.com*
[4]*Email: celi@infolearning.com.br*

(+ Corresponding author)

ABSTRACT

The years 2020 and 2021 were not easy for the world's population, as the COVID-19 pandemic compromised all countries and created restrictions never imagined by people and highlighted the use of digital technologies. One of the areas that has evolved a lot is Distance Learning with the help of digital platforms, therefore, this article aims to verify how distance learning with the use of digital platforms has created value from the perspective of users during the COVID-19 pandemic. In this research, it was decided to use the qualitative and quantitative methodological procedure through a questionnaire with eleven questions and to analyze the data obtained in the field research, the concept of value was used based on the definitions of Priem (2007). The survey data were collected from April 4 to 21, 2021, using Google forms and the sample obtained 286 observations and eleven variables. From the proposed study, it is clear that the objective of this research was achieved, based on the analysis of the four categories presented in the results and analysis section, we were able to prove that distance education through digital platforms generates value that is perceived by the respondents.

Contribution/Originality: This article stands out for promoting the discussion of the concept of value creation in the use of distance education through digital platforms in an atypical period such as the pandemic.

1. INTRODUCTION

The years 2020 and 2021 were not easy for the majority of the world's population, as the COVID-19 pandemic compromised all countries and created restrictions never imagined by people, such as quarantines, lockdowns, social isolation and sanitary barriers.

For several months, people were forbidden to leave their homes and presently socialize with others. Companies had to adapt to the new reality and remote work supported by new digital technologies were the main tools for companies to continue their work.

All face-to-face classes were canceled and teaching organizations had to adhere to distance education (DE) on a mandatory basis to maintain the minimum of their academic activities, according to Martins (2020) in early 2020, one of the effects of the COVID pandemic -19 broke down all the legal barriers that separate the educational system into face-to-face or distance education.

Distance education (DE) is a method of teaching and learning that alters all of the aforementioned components, including face-to-face teaching methods, which have increasingly adopted a blended approach, necessitating a more flexible requirement for presence in physical space (Moran, 2015).

The new information and communication technologies (ICTs) contribute to the advancement and popularization of distance learning, especially digital platforms, and accelerate its use by educational institutions. The characteristics of distance learning are remarkable, such as quantity, scalability, serving students at the same time, scope and being cheaper.

The objective of this research was to verify whether distance learning, through digital platforms during the Covid-19 pandemic, creates value from the perspective of users.

This article contains this introductory topic, in the second topic the theoretical foundation is developed with the subjects' distance education, value creation and digital platforms, in the third topic there is the methodology, then the analyzes and results and in the last topic the conclusion.

2. THEORETICAL FOUNDATION

2.1. Distance Education (DE)

Fiori and Goi (2021) describe in Brazil that Distance Education (DE) is governed by the National Education Law (Law no. 9.334/1996) and is regulated by Decree no. 5622/2005, with standardization defined in Ministerial Order no. 4,361, of 2004.

Gomes (2013) says that DE has been a political ally of past governments, which has utilized it as a cost-effective method of expanding access in order to overcome the latent educational gap in various regions of the country. The discourse surrounding the democratization of education has sometimes turned it into a fetish that is almost magical in its ability to solve educational problems. Recently, distance education has also had a significant role in the expansion of private higher education, as it was used to increase the number of students by a large margin while lowering costs and maximizing profits.

Moran (2002) describes Distance Education as "instructional delivery that involves teachers and students who are not typically located together, but can be connected via technology, primarily the internet, such as social media."

Belloni (2002) explains that distance education is the part of the educational innovation process that includes new information and communication technologies. This is what we understand by distance education here.

With schools mandated to teach online, digital platforms have become more prevalent, since face-to-face teaching is currently not possible due to the ongoing global pandemic (Moura & Gomes, 2020).

Distance learning is increasingly intricate, as it expands into new areas, having different approaches, having a rapid evolution to networks, technological mobility, and the scope of digital communication systems. The attributes of this bulk model are Quantity, scalability, service to people simultaneously, international and national scope, interesting product for the majority, well-dimensioned and popular, low cost, strong capture and marketing efforts (Moran, 2015).

Online education has experienced significant changes in recent times, its evolution and composition have been coupled with the changes in societies themselves, the effects of which are profound and widespread (Rivera-Vargas, Anderson, & Cano, 2021). These alterations increased during 2020 with the pandemic and its effects (Rivera-Vargas et al., 2021).

2.2. Value Creation

Value creation does not have an ontological basis definition and to start defining the value creation process, it is important to first define what value is. Value has been studied from multiple perspectives and fields, including marketing, human resources and entrepreneurship, economics, sociology and psychology, and it becomes a concept

that can be constructed and perceived differently by different actors (for example, customer and supplier) (Grönroos & Voima, 2013).

Grönroos and Voima (2013) believe that it is impossible to describe the nature of value without conflicting ideas as a base, but in the field of strategic management, 'value' has been defined in various ways, such as "what buyers are willing to pay for what the company offers him, that is, each individual establishes the value of the product or service acquired as a function of the benefit added by this product or service" or "properties of products or services that provide utility" (Ramirez, 1999) or "value is associated with experiences; products and services facilitate individual experiences and experiences measured by the community" (Prahalad & Ramaswamy, 2004) or "value is created by a vertical chain of participants as a whole" (Brandenburger & Stuart, 1996).

Bowman and Ambrosini (2000) focused on customers and distinguished the concept of value into: (i) use value; (ii) exchange value; and (iii) perceived value.

The idea of "value" is similar to the idea of "use value" (Bowman & Ambrosini, 2000; Lepak, Smith, & Taylor, 2007), that is, it implies that the way users perceive the specific qualities of a new job, task, product or service will satisfy your needs, such as the speed or quality of performance on a new task or the benefits that a new product or service offers to its recipients.

On the other hand, the difference between use value and exchange value is the monetary value paid by the user to the producer for the value of the product or service (Bowman & Ambrosini, 2000; Lepak et al., 2007).

Once the concept of value is understood, value creation follows, a central concept in the field of strategic management that has received significant attention at the micro (individual and collective) and macro (organization and society) levels (Lepak et al., 2007; Priem, 2007).

There is no single universal process for creating value, as stakeholders such as products, services, intended users, stakeholders and their perceptions vary greatly depending on the context (for example, the values they have are different if we compare a business entity to a for-profit non-profit organization or, even within the for-profit, voluntary association and foundation (Hinna & Monteduro, 2017) have different values).

Value creation can occur at different levels of consciousness, where becoming "better" or "worse" can occur in different ways (imagined, perceived or evaluated before, during or after) in the experiential process of use (Grönroos & Voima, 2013).

In the service economy, the definition of value and the value creation process have a notable shift from a product-centric perspective to a personalized view centered on the consumer experience (Prahalad & Ramaswamy, 2004).

In this paper, value-based strategy theory was employed to understand business model value creation (Brandenburger & Stuart, 1996).

The process of analyzing value creation based on the chosen approach (Brandenburger & Stuart, 1996) (Figure 1) allows a comprehensive analysis of the concept of value, as value is not limited to the profit of the focal company, but also includes companies in the chain, their suppliers and customers. Brandenburger and Stuart (1996) expanded the definition of "Value Creation" to "Appropriate Value".

The "created value" is calculated by taking the opportunity cost of the customer into consideration and the amount they are willing to pay for the product or service. The "appropriated" value or "captured" value is derived from price and cost, those that are derived from the company's accomplishments. The prerequisites for creating and acquiring value are different for buyers, companies and suppliers in different business environments.
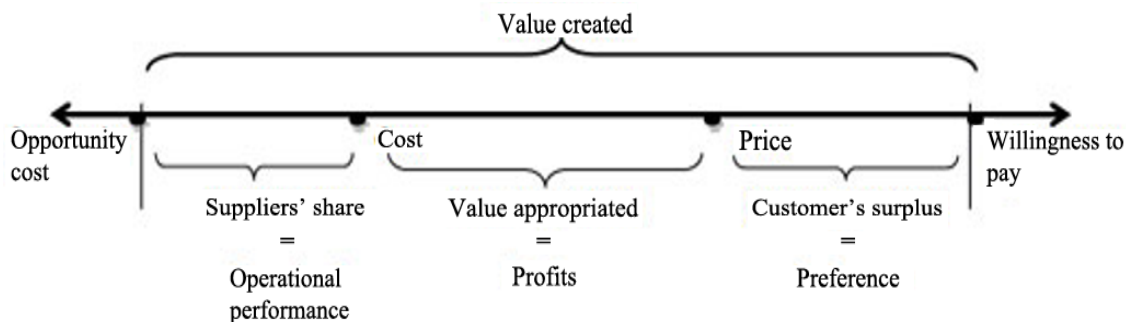
Figure 1. Value created x appropriated value.

Source: Brandenburger and Stuart (1996).

Priem (2007) defines value creation as the addition or increase in consumer enjoyment of the consumption experience (eg, the value of using a product). Value is created when the consumer: a) will be willing to pay more for a new benefit; b) will be willing to pay more for something perceived as better; c) will choose to receive a previously available benefit at a lower cost, which causes a greater volume of goods to be purchased.

2.3. Digital Platforms

The digital platforms are not new, digital technologies have increased the scope of their reach, facilitating the simple integration of systems based on common standards (Teece & Linden, 2017). As a result, previously separated products can now be integrated into new business models (Teece & Linden, 2017).

Digital platforms can capture the value created by the interaction between external entities such as consumers and producers, with the objective of providing a participatory and open infrastructure for the interaction between two different user groups (Parker, Van Alstyne, & Choudary, 2016).

This type of platform is based on principles and service architecture and aims to create a set of services that can be brought together to create applications and workflows (Lehong, Howard, Gaughan, & Logan, 2016).

Another characteristic is that digital platforms vary in purpose and complexity, from connecting our private lives to connecting our customers, friends and business partners. The digital platform analyzes the integration between the real and digital world and the potential of digital transformation to achieve the goals of a multistakeholder organization (Bonollo & Poopuu, 2019).

The digital technologies that enabled DE progress were established through the development of VLE (Virtual Learning Environment), a software environment developed on the Internet that uses technological resources to create educational environments that allow different types of interaction between students and teachers geographically separated (Fiori & Goi, 2021) and the use of this kind of digital platforms in a pandemic was evident.

In education, we have new ways of retrieving and accessing information (digital libraries, open educational resources, scholarly repositories), new ways of communicating (Skype, online social networks), and even new ways of teaching (distance education, Blended Learning, and Massive Open Online Courses (MOOCs) Another learning opportunity is digital education platforms, which can even enable a new form of interaction (Moura & Gomes, 2020).

Another kind of platform, such as a distance education platform, provides a new pedagogical channel where teachers can provide information to students regardless of the method used to access the platform (Idoga, Oluwajana, & Adeshola, 2022).

There are several types of educational platforms that integrate different tools based on the purpose of their activity, according to Table 1.

Table 1. Main platform tools.

	Goal	Tools
Communication	Animate and supervise learning activities; communicate in synchronous and asynchronous mode; ensure follow-up pedagogical information about current classes.	Messaging, chat, forums;
Collaboration	Conduct group activities; allow collective productions	Blog, file sharing, wiki, …
Concession	Create pedagogical and multimedia resources	Interactive classes, content pages, quiz, links, video and audio, tests, glossaries, indexes, …
Planning	Identify meeting or group work dates; fix calendars and dates for activities; manage the schedule	Calendar, shared agenda, …
Management	Proceed with registrations; form groups; customize the classroom space; follow the activities posted online	Online tests, links, short codes, …

Source: Moura and Gomes (2020).

3. METHODOLOGY

In this research, it was decided to use the qualitative and quantitative methodological procedure to analyze the data obtained in the field research. The investigation involved verifying the value derived from distance learning via digital platforms based on Priem (2007) definitions presented in theoretical foundation.

Brandenburger and Stuart (1996) theorized that the "value" of a product or service is derived from the opportunity cost and the customer's willingness to pay for it, depending on the external conditions of the business. The "appropriated" value or "captured" value is derived from price and cost, which are based on the company's performance.

Based on these authors, we created the following categories opportunity cost, cost, price and willingness to pay and Table 2 presents the variables according to the categories.

Table 2. Categories and variables.

Category	Variable	Item
Opportunity cost	Internet services	Quality of internet services
	Cell services	Quality of cell phone services
	Access	Platform access
Cost	Cost	Cost
Price	Adaptation	Adaptation to the new process
	Learning	Acquired learning
	teachers	Interaction with teachers
	Colleagues	Interaction with colleagues
Willingness to pay	Resources	audiovisual resources
	Reading	Reading materials
	Time	Organization of time to study

The opportunity cost category has the concept of "value", in the sense of "use value" (Bowman & Ambrosini, 2000; Lepak et al., 2007). In this category, the items are Quality of internet services, Quality of cell phone services and Platform access.

The cost category means the monetary value paid by the user to the producer for the use value of the product or service (Bowman & Ambrosini, 2000; Lepak et al., 2007). The item is cost.

The price category will be analyzed according to the value in use or how much the consumer will be willing to pay for a new benefit (Priem, 2007). The items in the category are Adaptation to the new process, Acquired learning, Interaction with teachers and Interaction with colleagues.

The willingness to pay category is related to the willingness to pay more for the perceived value (Priem, 2007). Items in this category are audiovisual resources, reading materials and organization of study time.

The research instrument used was a questionnaire with closed questions based on the items in Table 2, the standard question was "Indicate your satisfaction with the new learning environment with a digital platform during the pandemic in relation to [item in Table 2]". The responses were closed on a five-level scale: 1 Not applicable, 2 Dissatisfied, 3 Little Satisfied, 4 Satisfied and 5 Very satisfied.

Survey data were collected from April 4 to April 21, 2021, through google forms, eleven questions were prepared. Our sample has 286 observations and eleven variables.

3.1. Descriptive Statistics

Table 3 shows the descriptive statistics for each variable. In the first column, we see that all variables have averages greater than three, that is, respondents are satisfied with the items represented by the variables Internet services, Cellular services, Access, Cost, Adaptation, Learning, Teachers, Colleagues, Resources, Reading and Time in relation to DE. Teachers and access stand out, which are the most significant for respondents. At the other end, the cost variable has the lowest average.

Table 3. Descriptive statistics.

Variable	Average	Median	Standard deviation	Max.	Min.
Internet services	3.29	3.00	1.11	5.00	1.00
Cell services	3.10	3.00	1.23	5.00	1.00
Access	3.68	4.00	1.16	5.00	1.00
Cost	3.09	3.00	1.36	5.00	1.00
Adaptation	3.42	4.00	1.10	5.00	1.00
Learning	3.37	4.00	1.10	5.00	1.00
Teachers	3.70	4.00	1.10	5.00	1.00
Colleagues	3.26	3.00	1.15	5.00	1.00
Resources	3.53	4.00	1.17	5.00	1.00
Reading	3.57	4.00	1.17	5.00	1.00
Time	3.29	3.00	1.11	5.00	1.00

4. RESULTS AND ANALYSIS

The questionnaire responses were analyzed according to the categories and variables described in the methodology. The "opportunity cost" category brings together the items that the customer will be willing to pay for a new benefit (Priem, 2007). The three items in this category are:

The first item is to verify the level of satisfaction of the respondents in relation to the question "quality of Internet services," since due to the pandemic and social isolation, the Internet was the main channel of communication with the outside world. Figure 2 shows the respondents' responses, 79% of respondents are at least satisfied with internet services (30.5%), satisfied (37.7%) and very satisfied (10.8%).
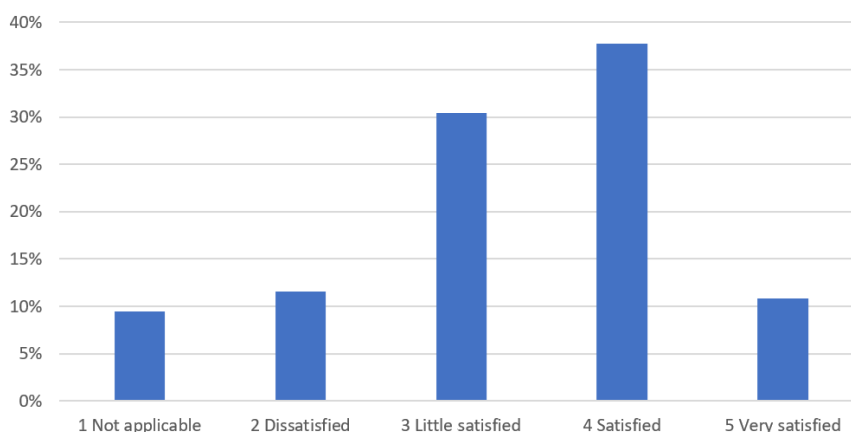

Figure 2. Variable internet services.

Another question was related to the quality of cell phone services, as the main computing device used to access digital platforms was the cell phone. Figure 3 shows the answers of the interviewees, we can see that 71.6% of the interviewees are partially satisfied (26.2%), satisfied (35.6%) or very satisfied (9.7%) with the question.
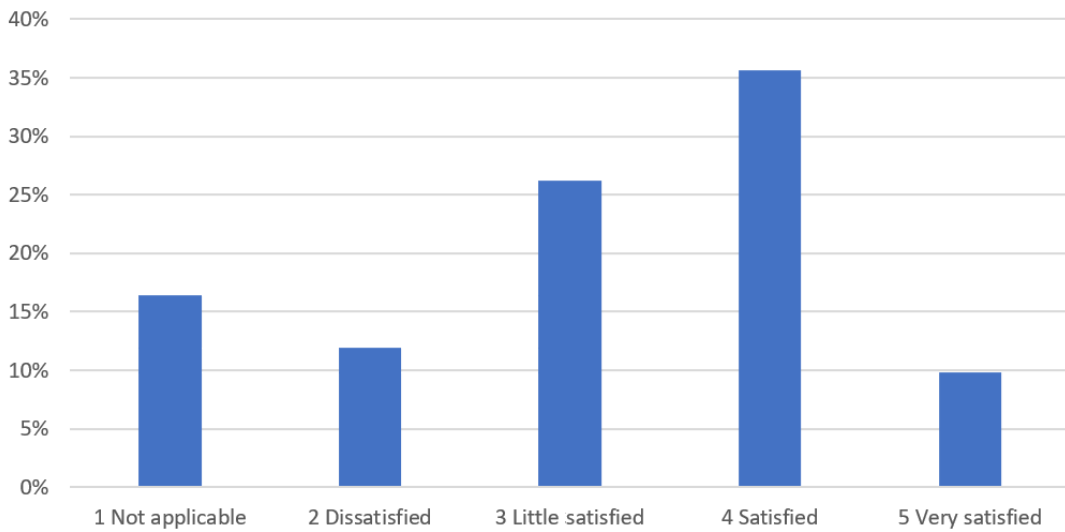

Figure 3. Variable "cell services".

Figure 4 presents the result of the question of how satisfied the respondents are with access to the digital platform. The digital platform and its variations for distance education were the main tools for continuing academic studies and activities during the pandemic. It can be seen that 83.5% of respondents consider that they have quality or are satisfied in accessing the platforms, either slightly satisfied (14.7%), satisfied (45.4%) and very satisfied (23.4%).
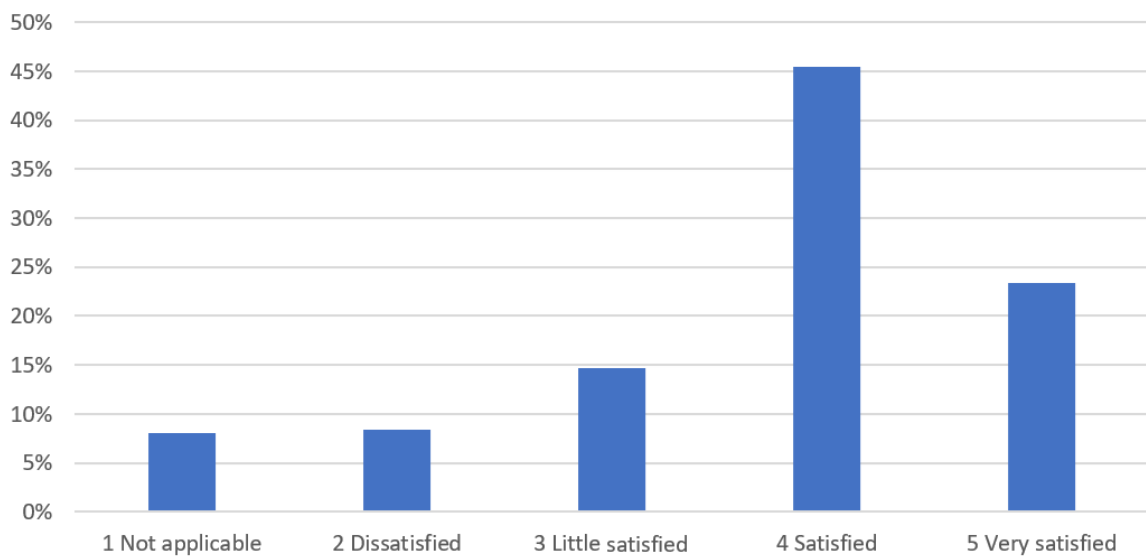
Figure 4. Variable "access".

The three items in this category showed that most respondents consider that they are, at least, not very satisfied, satisfied or very satisfied with the quality of digital platforms for distance learning, thus confirming the statement by Bowman and Ambrosini (2000) and Lepak et al. (2007) that users perceive that the specific qualities of a new job, task, product or service will meet their needs, such as speed or quality of performance in a new task and, consequently, creating use value.

In the cost category, there is only one item with the same name and it evaluates the satisfaction of the interviewees in relation to the amount paid to the producer for the use of the product or service (Bowman & Ambrosini, 2000; Lepak et al., 2007). Figure 5 shows that 63.3% of respondents are satisfied with the cost item, with 16.5% being very satisfied, 30.4% satisfied and 16.5% little satisfied.
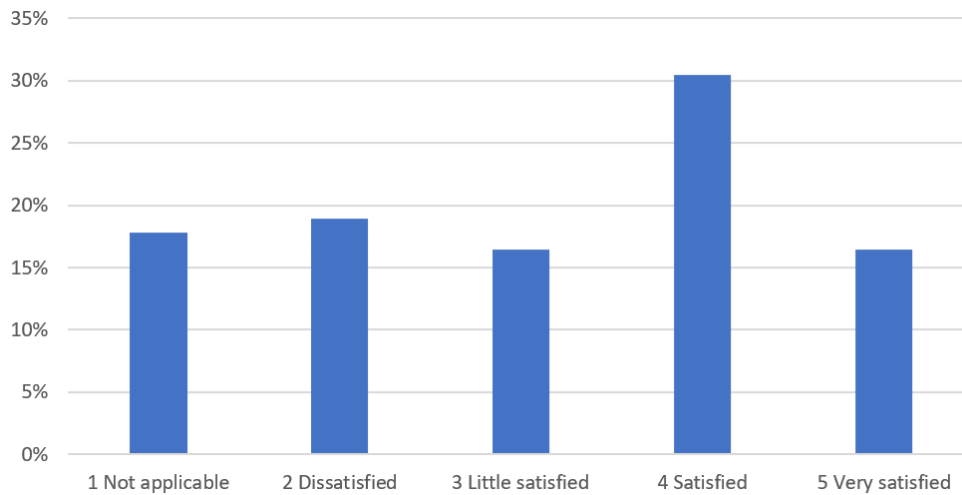

Figure 5. "Cost" variable.

The third category gathers the items that when the value is created, the consumer will be willing to pay for a new benefit that offers essential functionalities of the products.

Respondents were asked if they are satisfied with adapting to new processes with digital platforms. Figure 6 shows the results of the respondents, 63.2% confirmed that they are satisfied with the adaptation to the new processes, 18.8% are dissatisfied with the adaptation and 17.8% considered that this item does not apply.
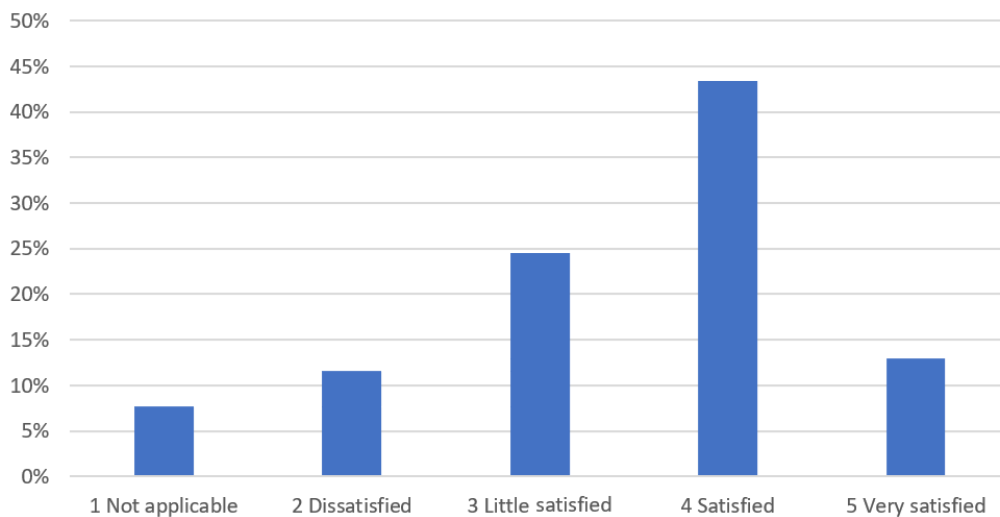
Figure 6. Variable "adaptation".

The discussion about learning with the use of a digital platform is huge, as the entire process was moved from face-to-face to distance learning in a brief time due to the pandemic. Respondents were asked if they are satisfied or dissatisfied with the learning process using the digital platform, most respondents (79.7%) indicated that they are partially or totally satisfied, see Figure 7.
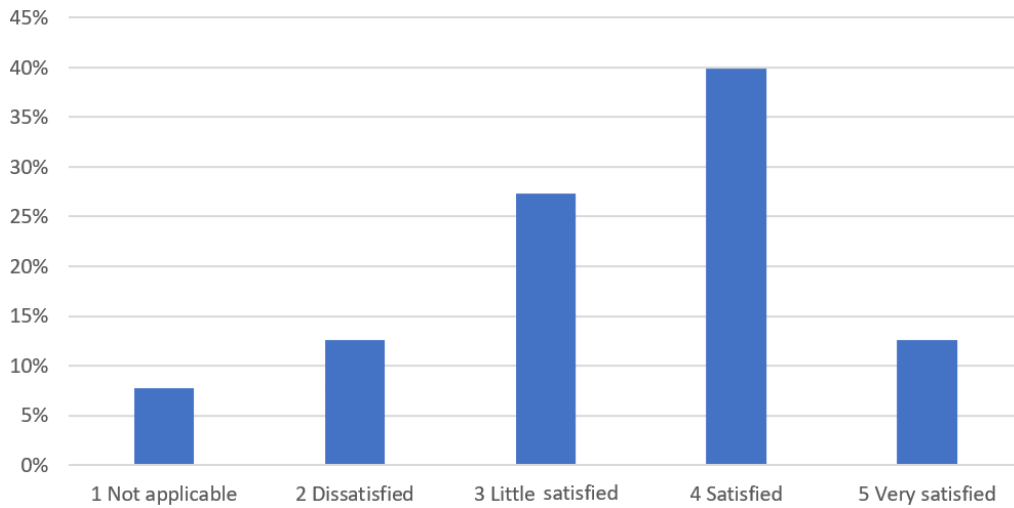
Figure 7. "Learning" variable.

Two other items that are important and are characteristics of digital platforms are the ways of interacting and communicating with teachers and classmates. Remembering that due to the pandemic and social isolation, people are studying remotely, that is, they do not have face-to-face and in-person interaction with teachers and colleagues. The importance of communication and interaction with teachers is in the teaching-learning process, where the process requires guidance and mentoring from teachers. Users of the digital platform for distance learning were asked about their level of satisfaction regarding interaction with teachers. The answers are in Figure 8, the majority (85.6%) answered that they are completely or partially satisfied.
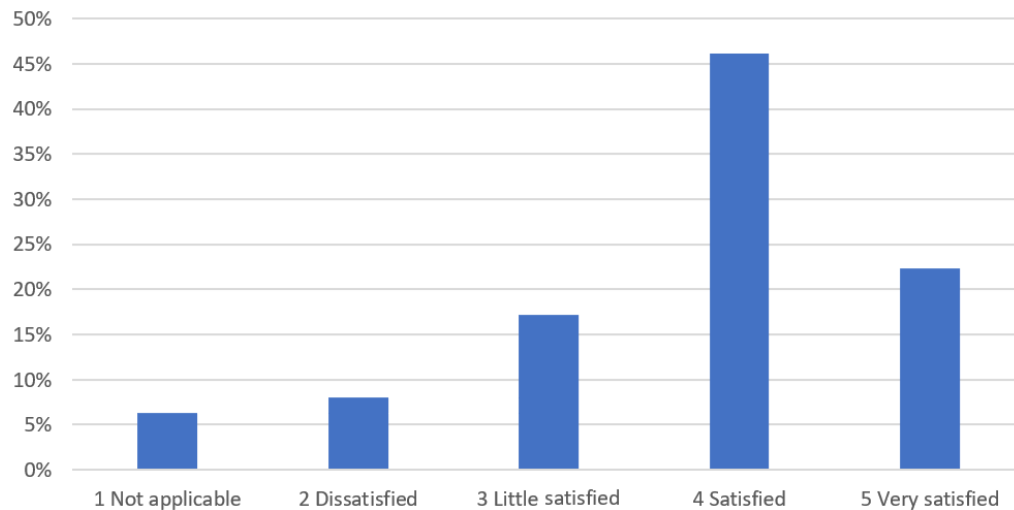
Figure 8. "Teacher" variable.

Regarding the interaction with colleagues, the respondents (75.8%) consider that they are not very satisfied (28%), satisfied (35.7%) and very satisfied (12.2%) in relation to the interaction with colleagues for through the digital platform, see Figure 9.
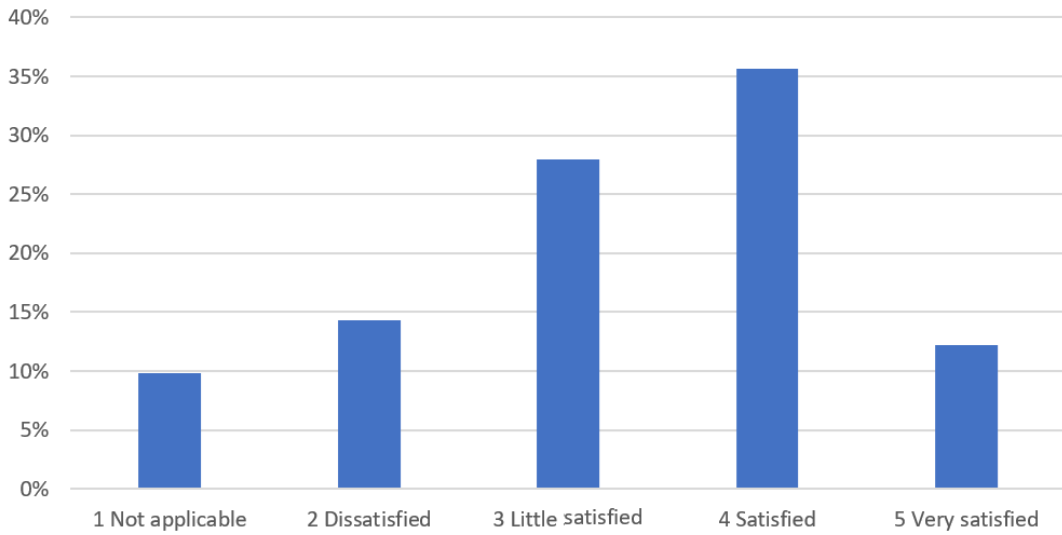
Figure 9. "Colleagues" variable.

The analysis of the questions in the third category "price" showed that most respondents are satisfied with the benefits provided by the digital platform such as adaptation to the process, the teaching-learning process, interaction with teachers and interaction with colleagues, or that is, the category establishes or enhances the consumer's assessment of the benefits of consumption (i.e., use value) by proving value creation.

The fourth category in this article is "willingness to pay," which brings together items that offer benefits that respondents are willing to pay more for something perceived as better. The first item in this category is audiovisual resources, that is, we question the level of satisfaction that respondents have with audiovisual resources, Figure 10 shows the result of the survey and emphasizes that 82.9% are satisfied with audiovisual resources.
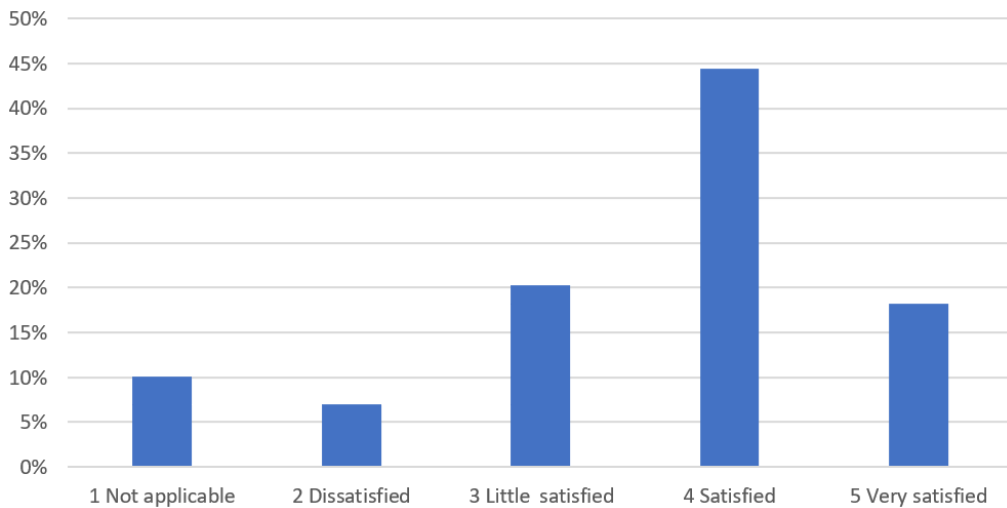
Figure 10. Variable "resources".

Another item in this dimension is the reading materials, that is, the didactic materials that are used to help and contain the subjects of the classes. Figure 11 shows that only 17.4% of respondents are dissatisfied or not applicable, which means that 82.6% of respondents are satisfied with the quality of the reading material.
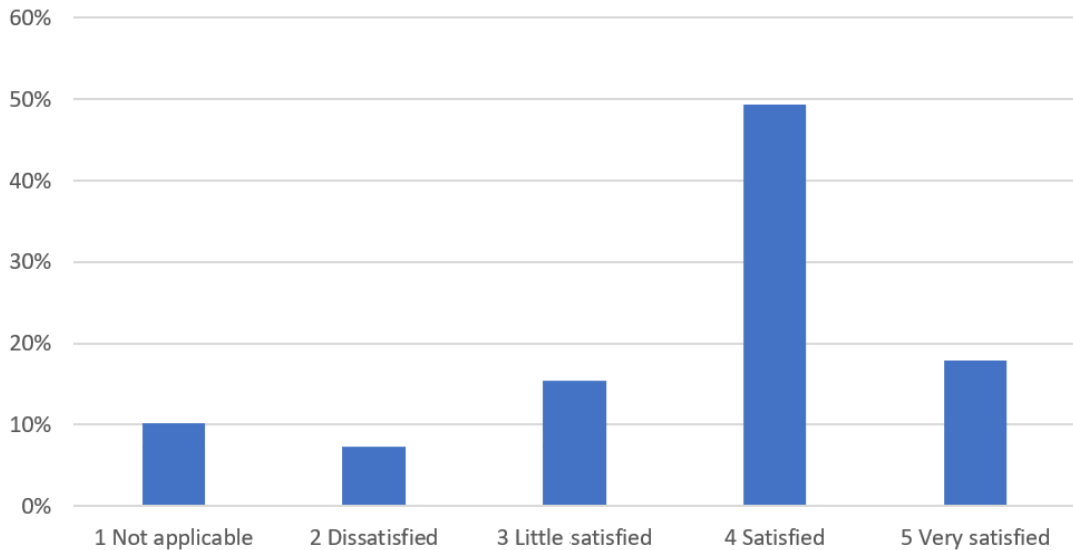
Figure 11. Variable "reading".

The last item refers to the satisfaction of respondents in relation to the organization of time to study that the digital platform offers along with distance learning. Figure 12 shows the survey results, where we can highlight that 78% responded that they are satisfied (little, satisfied and very satisfied) with the organization of time to study.
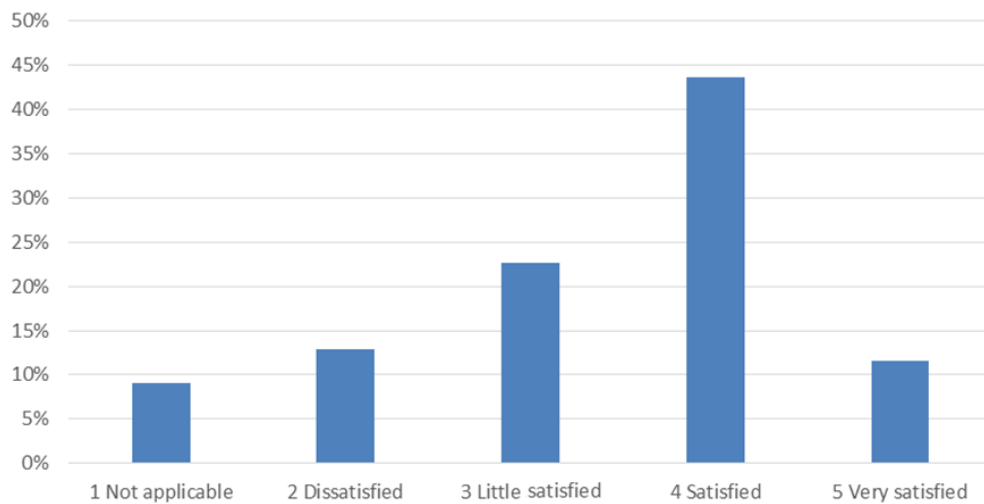

Figure 12. Variable "time".

Analysis of questions in the fourth category showed that respondents are "willing to pay" for something perceived as better or will choose to receive a previously available benefit at a lower unit cost, which results in a larger volume purchased (Priem, 2007) as is the case of distance learning in relation to traditional face-to-face teaching, especially in the case of the pandemic. In the three items Audiovisual resources, Reading materials and Organization of time to study, most respondents are satisfied with the items, which demonstrate that there is value creation.

5. CONCLUSION

From the proposed study, it is clear that the objective of this research was achieved, based on the analysis of the four categories presented in the results and analysis session, we were able to prove that distance education through digital platforms create value that is perceived by the respondents, exploratory analysis was used to purify the data and verify the adequacy of the 11 items to capture the four dimensions.

In this context, the concept of created value can be verified by the level of satisfaction of the interviewees in relation to the questionnaire items and it was also identified in the research, that the interviewees identify the benefits obtained with the digital platforms. On the other hand, the respondents' perception is that the cost is what the interviewees least like, as it has the lowest average of the variables.

As suggestions for future research, we can suggest a deepening or detailing of the quantitative analyzes of the research data or the selection of a theoretical model or framework for the analysis of the data.

REFERENCES

Belloni, M. L. (2002). Essay on distance education in Brazil. *Education & Society, 23*(78), 117-142. https://doi.org/10.1590/S0101-73302002000200008

Bonollo, N., & Poopuu, P. (2019). *The impact of digital platforms on roles and responsibilities in value creation among stakeholders of an ecosystem.* Master's Thesis, Jönköping University.

Bowman, C., & Ambrosini, V. (2000). Value creation versus value capture: Towards a coherent definition of value in strategy. *British Journal of Management, 11*(1), 1-15. https://doi.org/10.1111/1467-8551.00147

Brandenburger, A. M., & Stuart, J. H. W. (1996). Value-based business strategy. *Journal of Economics & Management Strategy, 5*(1), 5-24. https://doi.org/10.1111/j.1430-9134.1996.00005.x

Fiori, R., & Goi, M. E. J. (2021). Literature review in a virtual learning environment in basic education using digital platforms. *Science and Mathematics Teaching Magazine, 12*(3), 1-24.

Gomes, L. F. (2013). Distance learning in Brazil: Prospects and challenges. *Evaluation: Higher Education Evaluation Magazine (Campinas), 18*(1), 13-22.

Grönroos, C., & Voima, P. (2013). Critical service logic: Making sense of value creation and co-creation. *Journal of the Academy of Marketing Science, 41*(2), 133-150. https://doi.org/10.1007/s11747-012-0308-3

Hinna, A., & Monteduro, F. (2017). Boards, governance and value creation in grant-giving foundations. *Journal of Management & Governance, 21*(4), 935-961. https://doi.org/10.1007/s10997-016-9370-4

Idoga, P. E., Oluwajana, D. I., & Adeshola, I. (2022). Educational quality and technological complexity on recognition of enhanced learning platform in developing countries using PLS-SEM in a post COVID era. *Educational Technology Research and Development, 70*(6), 2255-2273. https://doi.org/10.1007/s11423-022-10150-8

Lehong, H., Howard, C., Gaughan, D., & Logan, D. (2016). *Building a digital business technology platform.* Stamford, CT, USA: Gartner.

Lepak, D. P., Smith, K. G., & Taylor, M. S. (2007). Value creation and value capture: A multilevel perspective. *Academy of Management Review, 32*(1), 180-194. https://doi.org/10.5465/amr.2007.23464011

Martins, R. X. (2020). Covid-19 and the end of distance education: An essay. *InRede-Distance Education Magazine, 7*(1), 242-256.

Moran, J. (2015). *Pedagogical innovations in face-to-face and distance higher education. Text adapted from the book new technologies and pedagogical mediation, Papirus, 2103.* Retrieved from http://www2.eca.usp.br/moran/wp-content/uploads/2013/12/inovac%C3%B5es.pdf

Moran, J. M. (2002). *What is distance education.* Retrieved from http://www2.eca.usp.br/moran/wp-content/uploads/2013/12/dist.pdf

Moura, N. L., & Gomes, A. (2020). The "boom" of digital platforms in teaching practices: An E@D experience in higher education. *Practicum Magazine, 5*(1), 106-120.

Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you.* New York, London: WW Norton & Company.

Prahalad, C. K., & Ramaswamy, V. (2004). *The future of competition: Co-creating unique value with customers.* Boston: Harvard Business School Press.

Priem, R. L. (2007). A consumer perspective on value creation. *Academy of Management Review, 32*(1), 219-235. https://doi.org/10.5465/amr.2007.23464055

Ramirez, R. (1999). Value co-production: Intellectual origins and implications for practice and research. *Strategic Management Journal, 20*(1), 49-65. https://doi.org/10.1002/(sici)1097-0266(199901)20:1<49::aid-smj20>3.0.co;2-2

Rivera-Vargas, P., Anderson, T., & Cano, C. A. (2021). Exploring students' learning experience in online education: Analysis and improvement proposals based on the case of a Spanish open learning university. *Educational Technology Research and Development, 69*(6), 3367-3389. https://doi.org/10.1007/s11423-021-10045-0

Teece, D. J., & Linden, G. (2017). Business models, value capture, and the digital enterprise. *Journal of Organization Design, 6*(1), 1-14. https://doi.org/10.1186/s41469-017-0018-x