

International Journal of Human Sciences Research

PROBLEMS AND POSSIBLE SOLUTIONS FOR HIGHER EDUCATION POST PANDEMIC

Edgar da Matta Duarte Fattori

Department of Production Engineering,
Polytechnic School of USP

Sao Paulo – Sao Paulo

<http://lattes.cnpq.br/6562272010728664>

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



Abstract: During the COVID-19 pandemic and with the consequent need to adapt a large portion of the country's universities to remote teaching methods, higher education gained some prominence in discussions about education. One of the points that came to be questioned was: after two years of major changes within the main universities in the country, how could a return to face-to-face teaching be carried out in order to optimize teaching in the post-pandemic period. With a view to seeking possible answers to this question, the present work searched the literature for problems in the educational process in literature references, in addition to seeking educational techniques that aimed to mitigate these problems. In order to verify the students' perception of the problems found in the literature, an evaluation was also carried out on the students' perception of teaching-learning techniques applied in a mandatory subject for fifth-year production engineering students: Operations management in services, offered at USP under the acronym PRO3534. In view of this research and these factors, the centralization of education in the figure of the teacher, the lack of adaptation to the student's reality and the disincentive to learning among students were validated as problem factors, which when mitigated by means of teaching techniques, in the case of the research the GV/GO (Verbalization Group/Oralization Group), alter the students' perception about the disciplines and the university as a whole.

Keywords: Higher education; post pandemic; problems; solutions.

INTRODUCTION

For several years, studies have been discussing the need for innovation in the classroom in face-to-face teaching at universities (CHRISTENSEN, 2009), including in the field of Engineering. On the one hand, this need stems from the

advances made possible by the application of Information and Communication Technology (ICT) in education, thanks to which students have access to a wide range of didactic materials in journal databases, books, video lessons. On the other hand, it stems from the most recent changes in the behavior and cultural background of higher-level students when taking face-to-face courses. This need has become more urgent due to the whole range of new problems and solutions that have arisen as a result of education adapting to the social distancing generated by the COVID-19 pandemic.

These works and studies in education have in common the foundation of the proposed actions, which, for the most part, are based on the taxonomy of Bloom et. al. (1964) that deals with the domain levels of knowledge: the cognitive, the affective and the psychomotor.

The National Council of Education (CNE) has made changes to the curriculum guidelines for engineering degrees in the country, with the aim of making courses more attractive (PALHARES, 2018). The proposal is that the career has a greater number of practical activities, more flexible organization, interdisciplinary and focused on innovation. Teaching needs to be based more on skills than on specific content, making the engineer more flexible and having a more entrepreneurial attitude. These are some of the characteristics and aspects evaluated in the most diverse university courses around the world and in the most diverse solutions found by Universities to overcome the challenges posed by the COVID-19 pandemic.

The great differential of the approach proposed here is to study and evaluate these issues mentioned with a view to the reality of the student at the Public University in Brazil, thus considering the challenges of

this student of cultural background until then little studied and explored by research in Brazil (IVENICKI 2020). The main focus of the study is on Engineering courses at the Polytechnic School of USP, however, for comparison purposes, practices in equivalent courses at other universities will also be examined.

The objective of this study is to evaluate the forms of learning that have already been applied and developed around the world, especially the technique known as GV/GO, which was explored in a practical way in the discipline of Operations and Service Management of the fifth year of the course of Production Engineering at USP. This evaluation will be based on the students' perception of its effectiveness. With this analysis, it is possible to explore the possible evolutions and resources that can change the reality of higher education in Brazil, considering the limits of what the school regulations allow.

To achieve this objective, we will try to report aspects considered in the discipline's organization, describe its realization and the changes that occurred in its application and identify the factors that most marked the students' experience. This way, it is intended to make a contribution to identifying critical success factors in post-pandemic higher education (CHEAWJINDAKARN et. al., 2012). The comparative analysis between what was planned by the teacher and what was perceived as relevant by the students seeks to highlight important and critical factors in the success of these new forms of learning. Finally, the success factors and criticisms will be reported and future development possibilities will be pointed out, such as the deployment of other teaching-learning techniques of the same nature.

METHODOLOGY

The project's methodology initially consisted of a search for study sources that confirmed the hypothesis raised through discussions between advisee and advisor that the pandemic profoundly affected higher education in Brazil. During this research, conclusive data were found from SEMESP (Secretary of specialized modalities in education) showing how the pandemic affected the permanence and completion of Brazilian higher education students.

Given this scenario, the initial objective of the project was to seek and gather in the literature problem-generating situations and solutions to the problem in higher education in the pandemic and post - pandemic. However, through a keyword search in sources of scientific articles such as Scopus, no satisfactory results were found for carrying out the research directed at the moment of the pandemic and its posterity until the moment of the research, largely due to the short time elapsed between the pandemic and the timing of this research.

Therefore, the objective was slightly changed and a research was carried out in reference sources of education as a whole and in reference sources of higher education, in order to distinguish factors and behaviors that could adapt to the situation and possible educational methods that would maximize the behaviors. benefits and minimize the harmful ones in higher education.

After carrying out this research and obtaining results, in order to validate the result of this research in a more practical way, this methodology was applied in a class of the Service Operations Management discipline, offered at USP under the acronym PRO3534 and later the dynamics were indirectly evaluated through a questionnaire formulated by advisee and advisor via google form. The form was sent to the students to

be answered voluntarily after the end of the course, in order to leave no doubt about the lack of relationship between the evaluation of the technique and the student's use of the course.

CHALLENGES OF HIGHER EDUCATION POST PANDEMIC

Since the re-democratization of Brazil, in the late 1980s, and the promulgation of a new constitution, which has as one of the main pillars the education and personal development of each of its inhabitants through the state (Art. 205 CF), Brazil began to witness a series of measures and public policies aimed at expanding access to higher education that ended up changing the reality of Universities in Brazil. This expansion can be seen as a breakthrough, given that these new policies have allowed access to this type of institution by a historically marginalized portion of the population (Silva et. al. 2018).

This expansion became more evident after the enactment of the policy of quotas in federal institutes and universities in mid-2012 (Law No. historically marginalized groups. Universities, however, did not adopt effective measures to adapt to the new public.

In addition, in recent years, with the advancement of information technology and the structural increase in the access of a large portion of the population to these means, the technology applied to higher education has also become an issue discussed in the country. Although promising, virtual learning methods came to be seen as a panacea by educational policies (IVENICKI, 2020), despite not being conceptually structured and having natural barriers in an unequal country like Brazil.

This concern was reiterated in public higher education with the COVID-19 pandemic that forced the closure of Universities and the consequent adoption of

remote classes in part of universities. At that point, the vision of digital tools as a solution underwent a reality check. The lack of access to digital technologies proved to be one of the reasons for a number of public universities to partially or fully postpone the 2020 academic year (IVENICKI, 2021). Brazilian news consistently pointed out, during 2020, that the majority of students in Brazil did not have access to digital education. Even at universities with greater public recognition, such as USP, a series of measures were necessary through the administration, such as the delivery of internet *modems* to students and movements for computer donations to make online teaching possible during the COVID pandemic. -19.

It is also important to highlight the non-adaptation of previously face-to-face classes to digital media as a problem in this scenario. Although popularly referring to the virtual classes offered during the pandemic as EaD (Distance Learning), (VASQUEZ, 2021) the concept of Distance Learning encompasses classes made specifically for virtual platforms, with a series of interactions and specific dynamics to enhance this type of learning. learning, something that was not even partially covered in a large number of universities that adhered to remote classes. The form of education adopted by public universities that opted for remote teaching would be better defined as ADE (Emergency Home Activities), which consists only of the transition from the classroom format offered in person to the virtual platform, which generally creates a problem of motivation and interest from students.

The combination between the delay in returning to classes, the difficult access and adaptation to the technologies necessary for accompanying virtual classes, the non-adherence to the teaching tools necessary for effective classes on virtual platforms and

the incomplete adaptation of the university to its new public more diverse, ended up accentuating the higher education dropout rates, registering a 3.3% increase in the dropout rate in the public higher education network, changing from 18.4% to 21.7% and also registering a drop of approximately 8% in the number of graduates of face-to-face courses at public universities, which increased from 396 thousand in 2019 to 366 thousand in 2020. (SEMESP, 2022).

This way, public higher education is currently facing major adaptation challenges after the most serious moment of the pandemic and the consequent release of the return to face-to-face classes. The challenges begin with taking advantage of and improving forms of virtual learning, which were explored and evolved in several universities in the country during the most critical years of the pandemic (2020-2021), going through the continuation of adapting the university as an institution to a public more diversified that has come to occupy the faculty in recent years and come to the urgent need to mitigate the factors that generate the growing dropout rate, such as policies to facilitate access to technologies necessary for monitoring classes and new teaching methods and other resources.

THE SEARCH FOR INNOVATIVE METHODS AND RESOURCES AS A SOLUTION

In this scenario, in which a drop in student engagement at public universities is increasingly being seen, as illustrated by the growth in dropout numbers and the reduction in the number of students graduated per year at these institutions, the need for a series of changes in the way higher education is viewed.

The necessary changes involve reformulating the student's relationship with the university, which dialogues with

the point advocated by Silva (2018) and defined by Charlot and Trowler (2010), that integration and engagement with the educational space depend mainly on three factors: the affective, linked to motivation and willingness to learn, the cognitive, linked to the intellectual mobilization put into practice in the learning process, and the behavioral, linked to observable demonstrations of engagement, such as participation in classes and discussions. These three keys to student integration into the university have become even more critical with the access of a public historically excluded from the public university space, presenting itself as an additional challenge for public higher education. This situation can be understood from the point of view defended by Paulo Freire (2020), who criticizes the way education is organized in our culture. He uses a metaphor calling attention to the so-called "banking education", a situation in which the teacher is the holder of all knowledge, treated in this scenario as something static and predetermined, and passes this knowledge on to the group of students, minimizing the students' power of creation and consequently of adapting that situation to their own reality.

This point of view is reiterated by Masetto (2020), who sees the problem of this form of teaching that basically occurs through contact between teacher and student. He understands that professors address students individually and expect to be contacted individually as well, as a remnant of the traditional model in which the professor is the holder of knowledge, and the student's function is only to learn from him, avoiding and diminishing the learning of one student with another.

This form of teaching minimizes the learning resulting from the interaction between students, in order to cause a loss in the three factors mentioned above: the

cognitive, the affective and the behavioral. Still according to Masetto (2020), research shows that strategies that encourage group integration facilitate learning, and there are still testimonies on how learning is privileged in group situations, with a broader development in this context, which encompasses not only the professional field, but also the human, in addition to discouraging individualism.

Thus, there is a need to seek didactic strategies from the perspective of the key points of student engagement with the university, in order to correct and compensate for the defects mentioned above.

By analyzing the three points seen by experts as problematic in education, we were able to relate the improvement in student engagement at the university to relatively simple changes. For example: the relationship between a reduction in the number of purely expository classes and those held by the professor dialogues directly with the question raised by Paulo Freire and would be expected to collaborate with the improvement of the student's affective relationship with the university, as it is placing the student in more central position in the learning process and, consequently, giving greater autonomy, which usually generates motivation. The points raised by Masetto dialogue with the affective and cognitive issue, for all the role that the interaction between students plays in their motivation in relation to the university and for the series of learnings that the relationship between students with their most diverse experiences and exchanges of learning about them is able to generate. This way, the union of these factors would also tend to generate a change in the behavioral issue, after all, more motivated students and integrated with the institution and colleagues would attend and participate more in the activities proposed by the course and disciplines.

In addition, another point also raised by Paulo Freire (2020), as fundamental to the success of learning processes, is the dialogue between these processes and didactic means and the reality of students.

In the current scenario, in which 66.1% of students in the public higher education network are between 18-24 years old, and that around 94% of young people in this age group have access to the internet, according to a survey by ICT households, digital media of learning appear as a tool that is already widely used and with a lot of potential to increase the association between learning and the student's reality, a factor that is even more intensified and highlighted by the advances in digital education tools generated by social isolation due to the COVID-19 pandemic and consequent adaptation of classes at various universities around Brazil and the world to virtual classes.

In this context of diffusion of digital educational media, these media still present themselves as a possible solution to some other problems for this new public that attends the university. For example, in large cities such as the city of São Paulo, the average daily time spent on public transport is approximately 2 hours a day, according to research by São Paulo network. In this context where limited urban mobility ends up reducing the quality of life of students, the combination of days with face-to-face activities and days with virtual activities appears as a possibility of improving the quality of life of students, who would earn up to 6 hours a week, in a scenario of 3 virtual weekly days. This time gained could be dedicated to studies, extracurricular activities or rest, which would contribute to better academic development. It is worth mentioning that, in this context, there would be an additional challenge of providing access to technology for students who do not have access to the

necessary technological means, however, recently, during the COVID-19 pandemic, we have already had examples of success in this regard within public universities, such as the “Escola Politécnica” in USP, which successfully managed to organize a computer distribution program for students who did not have access, thus demonstrating the tangibility of this kind of policy.

GV/GO AS A LEARNING TECHNIQUE AND ITS APPLICATION

In the scenario where there is an understanding that some of the inefficiencies of the teaching process within public higher education go through the hyper-centralization of the learning process in the figure of the teacher, an undervaluation of interactions and exchanges of experience between students and a lack of adaptation to the student’s reality, it is necessary to search for teaching-learning methods that mitigate these effects.

One of the teaching methods that presents itself as a possible solution to these problems in this context is the method known as GV/GO (Verbalization Group and Oralization Group). The GV/GO method consists of dividing students into groups. The first group of students, called the verbalization group (GV), would be responsible for discussing a predetermined theme; the second group, called the observation group (GO), would be responsible for making a critical analysis of the verbalization made by the first group.

The GV/GO contributes to facing the problem of centralization of the teaching-learning process in the figure of the teacher, insofar as it offers a learning process focused on the student, who is primarily responsible for understanding the content. This method also helps to face the discouragement of interaction between the students themselves and the lack of adaptation to the student’s reality, by proposing that students discuss

with each other and exchange perceptions without close supervision of the teacher. This type of communication allows for freer communication and a more genuine and non-judgmental exchange of experiences, favoring the integration of students with *backgrounds* different from those who traditionally attended university.

With a view to confirming the understanding of techniques of greater interactivity among students as a possible factor for improvement in public higher education, an adaptation of the method was carried out and a subsequent survey of students’ opinions about this approach was carried out.

ADAPTATION OF GV/GO

The GV/GO method, to be tested in the context of a mandatory 5th year subject in the production engineering course at USP, needed to undergo some adaptations, in order to make sense for the context of classes on Phygital themes and Omnichannel in the Service Operations Management discipline.

The application proceeded as follows:

- 1) First, students were divided into groups that had access to the same texts and asked to read the texts within a week’s time.
- 2) After that, in the context of the class, the students were separated into groups that had read different texts, so that they could discuss and deepen their understanding of the topic.
- 3) Then, the students were placed back in groups of students who had read the same texts as them, but who had done the discussion with students who had read different texts.
- 4) At that moment, some groups of students were asked to make an oral

presentation of what was understood about the topic and some students to make a critical analysis of the information presented.

5) Finally, students who had done the critical analysis were asked to summarize on paper and expose in writing on an A4 sheet the main points of correction or improvement to be made in each presentation. Ideally, these points must be presented orally, but due to the time constraints of the classes, students were asked to read the material exposed on paper on the wall later.

RESEARCH METHODOLOGY

In order to impartially evaluate the students' perception of the method, at the end of the course, an anonymous and voluntary survey was given to the students, carried out using the Google forms software. The survey was made available to students via e-disciplines and the optional and anonymous nature of the survey was highlighted throughout the process, in order to avoid changes in student responses for fear of the answers given interfering in some way with the results and grades of the survey. discipline.

In addition, during the research, the GV/GO theme is not addressed directly, in order to obtain more general perceptions of students about the learning outcomes, not just about the method itself.

RESULTS OF APPLICATION OF GV/GO

The research was applied to a group of about 70 students in a mandatory discipline of the fifth year of the production engineering course at the Polytechnic School of USP, that is: the subject was necessary to obtain the diploma. The questionnaire was applied to

all students enrolled in the course and was answered by 35 students, approximately 50% of enrolled students. It is important to emphasize that this is a non-probabilistic sample, whose responses were obtained through the voluntary participation of students, without any conditionality or additional incentive linked to the survey response.

The assessment involved *screening questions* to determine the profile of students responding to the survey. Among the 35 students who responded, 34 students (97.1%) responded that they were regularly enrolled in the production engineering course, 33 students (94.2%) responded that they had attended at least 70% of the discipline's classes (minimum attendance required for approval of the student in the regular disciplines of the University of São Paulo). In addition, 32 students (91.3%) spent up to 4 hours a week on course activities, and of these, 13 students (37.1%) spent between 2 hours and 4 hours a week on course activities. In other words, based on the average profile of the students, it is possible to conclude that the vast majority of respondents met the expectations of the discipline.

In order to evaluate the effectiveness of the GV/GO method as a learning technique, one of the questions asked was about the students' perception of the relevance of the themes covered in the course. In this context, a probable interference of the application of the GV/GO adapted to the students' perception of relevance is evident. In the five themes worked on in different ways, the average classification of maximum perception of importance (defined in the research as grade 5), was 12 students per theme, that is, approximately 35% of the respondents recognized the five themes as being of importance maximum. However, when evaluating the number of respondents who understood the topics passed through

GV/GO (Phygital and Omnichannel) as topics of utmost importance, the average number of students rose sharply: there were 22.5 students, that is, approximately 65 % of the survey's respondents recognized the topic as being of utmost relevance to the subject's content, as shown in the graph below.

In other words, the results of the research on the perception of relevance of the themes worked on in the discipline suggest that the application of the technique similar to the GV/GO had a direct and positive impact on the students' perception of the relevance of the themes approached through these dynamics.

Furthermore, another way to assess the impact of GV/GO, albeit less directly, is through the discipline's NPS classification. The NPS is a form of customer loyalty and satisfaction assessment developed in 2003 by Fred Reichheld, director of Bain & Company at the time.

The NPS consists of a *feedback assessment* with customers in which they assign a score from 1 to 10 to a product provided by the company. From these scores, customers are divided into promoters, neutrals or detractors. Promoters are customers who evaluate the company with grades 9 or 10, demonstrating satisfaction and who would recommend or encourage staying with the

brand to colleagues, friends and family (OLIVEIRA; SANGUINETO; SANTOS, 2015, p. 8; ALMEIDA, 2014, p. 13). Neutrals are customers whose repurchase and recommendation rate is lower than that of promoters. They can migrate in case of a more attractive offer and stimulate the relationship with the brand or institution only in specific cases (REICHHELD; MARKEY, 2012). Detractors, on the other hand, are people who give a score of 6 or less; their level of satisfaction is low, they are disappointed, tend not to maintain their relationship with the company and encourage their acquaintances, friends and family to do the same (REICHHELD, 2003).

According to QI Market Research, one of the three factors that most influence the choice of educational institution is the recommendation of colleagues or relatives, thus showing the ability of the NPS to bring representative data also for educational institutions and consequently on their dropout rate.

One of the questions asked in the survey fits perfectly with the NPS methodology. At one point in the research, the final assessment of the discipline is asked, taking into account all the activities carried out in it. In this question we obtained 20 grades 9 or

3.5 Relevance of content on Services

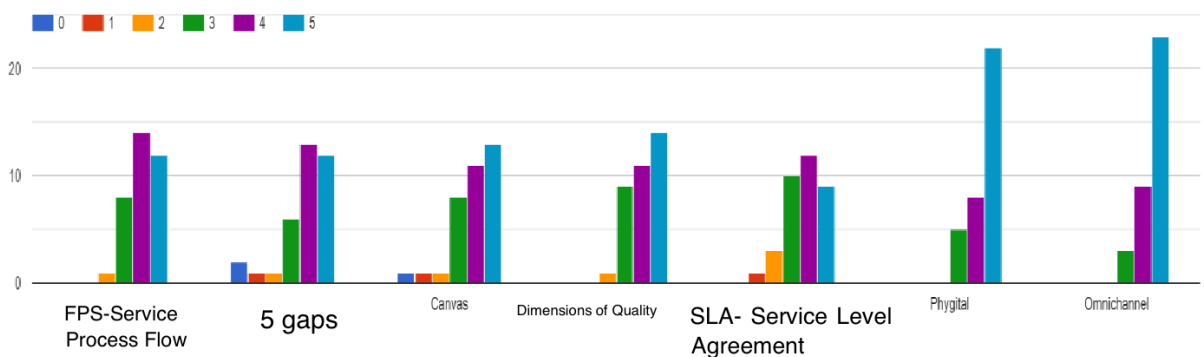


Figure 1: Graph of perceived importance of themes.

10 (57%), 11 grades 7 or 8 (31%) and 4 grades below 6 (12%), thus obtaining 20 promoters, 11 neutrals and 4 detractors.

In this context, the discipline's NPS would be given by the number of promoters (20) subtracted from the number of detractors (4) and divided by the total number of respondents (35), reaching a final NPS of 46 percentage points.

Taking into account the educational scope, the 46 NPS points stand out in relation to renowned educational institutions in the world, for example, Harvard Business School, which has an NPS of 41, according to the customer website, specialist in the NPS evaluation of range of economic institutions and activities. The highlight of the NPS score becomes even more relevant when comparing institutions in developing countries, such as Russia, which has one of its main universities, the National Research University, with a score of 30, according to the same customer.

Therefore, the results of the NPS assessment in the subject suggest a possible influence of factors such as greater interaction between students and the decentralization of the teaching role of the teacher as factors

that improve the students' perception of the quality and efficiency of the teaching process. teaching-learning.

CONCLUSION

When analyzing the situation of public higher education in Brazil, we were able to find some critical points for a student not fully adapting to the public university, such as : the hyper-centralization of the teaching-learning process in the figure of the teacher, the disincentive to interaction and exchange of knowledge between students and their colleagues and the non-adaptation of the educational context to the students' reality.

According to the theoretical references, we were able to understand the need to mitigate these factors understood by some of the researched theorists as impeding the student's integration into the university.

When considering the factors seen as a problem, it was identified, among other possible solutions, a teaching method, called GV/GO, with the potential to mitigate some of the main challenges for higher education, especially the centralization of teaching in the figure of the teacher and the consequent lack

3.4)Final evaluation of the discipline, with a team part and an individual part

35 answers

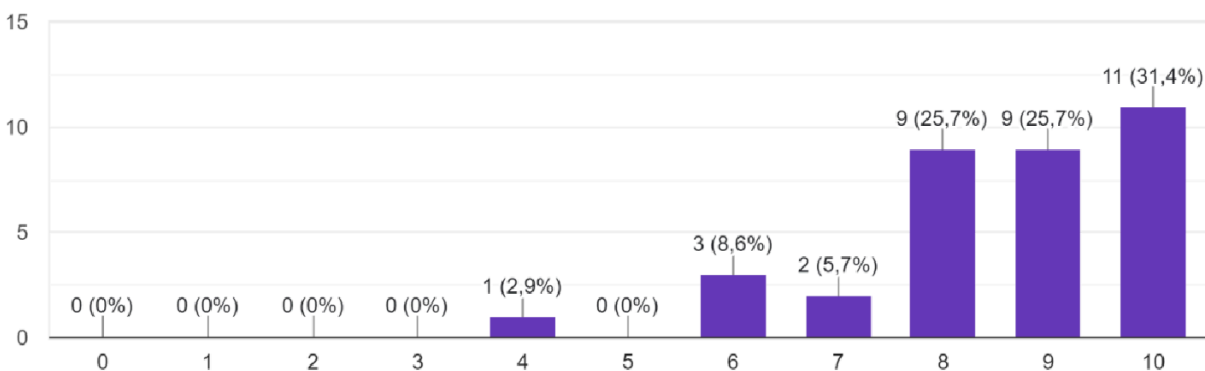


Figure 2: Graph of students' evaluation of the subject.

of integration and exchange of experiences between students that prevent them from also learning from each other.

This understanding was confirmed through field research, on the students' perception of a discipline and the themes that were worked on using the GV/GO technique.

This way, we were able to verify that both theoretically and practically, it is suggested that a classroom context with greater interaction between students and with less centralization of the teaching-learning process on the figure of the teacher has great potential to improve the relationship between student and university as a whole, encompassing not only the relationship between student and institution, but also the relationship between the student and specific disciplines within the institution.

STUDY LIMITATIONS

The first limitation of the study was the selection of only a few reference sources within the literature on education and consequently the treatment of only some of the problem issues in the subject of higher education in the post-pandemic, with several issues not addressed or treated in less depth.

The second limitation of the work was the target audience of the research. Perceptions about the method and, consequently, the problem factors were evaluated only by students of the subject "Operations management in services" of the fifth year of the production engineering course at the Escola Politécnica da USP, that is: perceptions about combat were not evaluated. problem factors in other public higher education courses or institutions in Brazil.

The third limitation is linked to the questions that were asked in the survey and the way in which they were evaluated. The first question analyzed in the research suggests the interference of the method used in the perception of importance, but as the question was not directly linked to the method, there are other factors not researched that may be the true reasons for this answer. In the second question, the comparison between the NPS of a subject and the NPS of educational institutions is also a comparison that may be influenced by other factors about which we do not have data.

REFERENCES

- ANSI, A, et. Al. **Future of Education Post Covid-19 Pandemic: Reviewing Changes in Learning Environments and Latest Trends** (2020).
- CHEAWJINDAKARN et. al. **Critical success factors for online distance learning education: a review of the literature.** *Creative Education*, v.3, 61-66.(2012)
- ASCE **American Society of Civil Engineers. Civil Engineering body of knowledge for the 21st century.** 2008.
- BATISTA, BEZERRA, BATISTA. **Estímulo intelectual e relações interpessoais no processo de ensino-aprendizagem.** Universidade Potiguar, 2012.
- BLOOM, B.; MESIA; KRATHWOHL **Taxonomy of education objectives.** New York, david McKay(1964)
- CHRISTENSEN; HORN; JOHNSON. **Inovação na sala de aula.** Porto Alegre: Bookman, 2009.
- IVENICKI, A. **Digital Lifelong Learning and Higher Education: multicultural strengths.** 2021

LOPES, R. D. **Análise: é preciso focar mais competências do que conteúdo específico.** O Estado de S. Paulo, 13.06.2018.
LOWMAN. **Dominando as técnicas de ensino.** São Paulo: Atlas, 2004.

MALLMANN, E. M. **Pesquisa-ação educacional : preocupação temática, análise e interpretação crítico reflexiva.** Cadernos de Pesquisa, v. 45, n. 155, p. 76–98, 2015.

MULLER, S. et.al. **Integration of Refugee Students in Higher Education: Insights from Entry Diagnostics in an Online Study Program.**(2020)

PALHARES, I. **Conselho Nacional de Educação quer currículo mais flexível para cursos de engenharia.** O Estado de S. Paulo, 13.06.2018.

SCOTT, C. The futures of learning 1: why must learning content and methods change in the 21st century?. Education research and foresight, sep 13, 2015.

TALBERT, R. **Flipped learning: a guide for higher education faculty.** Sterling: Stylus, 2017.

FREIRE, P. **Pedagogia do oprimido.** Rio de Janeiro: Paz & Terra, 2021.

REICHHELD, F. F; MARKEY, R. **A pergunta definitiva 2.0: como as empresas que implementam o net promoter score prosperam em um mundo voltado aos clientes.** 1. ed. Rio de Janeiro: Elsevier, 2012.

MASETTO, M. **O professor na hora da verdade.** São Paulo: Avercamp, 2007.

MASETTO, M. **Ensino de engenharia, técnicas para otimização das aulas.** São Paulo: Avercamp, 2007.

EDUCATION **Net promoter scores 2022.** Customer Guru. Disponível em: <Education Net Promoter Score 2022 benchmarks | Customer.guru>. Acesso em: 4 de set. de 2022.

TIC DOMICÍLIOS. Cetic. Disponível em: <<https://cetic.br/pesquisa/domicilios/>>. Acesso em: 4 de set. de 2022.

Mapa do Ensino Superior no Brasil 2020. Disponível em: <Mapa do Ensino Superior no Brasil | 2020 – Instituto Semesp>. Acesso: 26 de agos. de 2022.

SILVA, M. et al., **Engajamento entre estudantes do ensino superior nas Ciências da saúde.** Rev. bras. educ. med., Brasília v,42, p. 15-25, 2020

RIBEIRO, M. **A relação professor-estudante na educação superior.** Educ. Anál., Londrina, v.5, p 185-200, 2020.

SILVA, S.; RIBEIRO, L. **Engajamento estudantil na educação superior.** Revista eletrônica Pesquisaeduca, v.12, p. 50-63, 2020

TROWLER, V. **Student engagement literature review,** 2010.

VITÓRIA, C. et al., **Engajamento acadêmico: desafios para a permanência do estudante na educação superior.** Educação (Porto Alegre), v. 41, n.2, p. 262-269, 2018.

Mesmo na pandemia 26% da população paulistana gasta mais de 2 horas no transporte. Rede Nossa São Paulo. Disponível em: <https://www.nossasaopaulo.org.br/2020/10/15/mesmo-na-pandemia-26-da-populacao-paulistana-gasta-mais-de-2-horas-em-deslocamentos>. Acesso: 26 de ago. de 2022.