A Proposal so That Teachers Can Work with Techniques of Active Methodologies since the Approach of the Teaching Plan

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Abstract: This study presents a differentiated approach to the Teaching Plan (PE) that can be used in any higher education institution (HEI). The study concentrated on two institutions located in the state of Rio Grande do Sul - Brazil and had as main justification the dissatisfaction of the students in face of the passive presentations of the teaching plans made by the teachers. Knowing that the traditional forms of detailing the Teaching Plan do not meet the expectations of students, the authors of this study proposed something based on active methodologies. Thus, it seeks to awaken the student's interest in this process and especially to make this moment more pleasurable for both the student and the teacher. In the activity proposed in this article, the student becomes the protagonist of the explanation of this very important document in the learning process, he actively participates in the creation of a conceptual map created with the collaboration of his colleagues and mediated by the teacher. In order to make this possible, the present study sought to explore technologies that provide interactivity in presential or remote classrooms. Thus, through the Coggle tool it was possible to make classes more attractive based on the teaching plan. Then, after a few months of carrying out the activity, students answered a questionnaire to validate their degree of satisfaction with this proposal. The result was analysed in a qualitative way and obtained more than 90% of satisfaction on the part of the interviewees. As a conclusion of the study, it is possible to state that the proposed activity made the process of explaining the teaching plan more enjoyable and active for the student.

1 INTRODUCTION

It is necessary for the student to experience the online experience in a pleasant, collaborative way and to engage in this model. Thinking about it, the first date can also be active. Presenting the Teaching Plan (PE) of a discipline is extremely necessary, but it is generally not pleasant. Many students learn in a traditional teaching model that does not lead them to question why the procedures are presented. Thus, they end up being indifferent to the whole system that a Teaching Institution (IE) considers so that the knowledge reaches the student in the classroom.

At the beginning of each semester, particularly in private on-campus higher education (the target of this research), the first class has a low attendance rate, which is believed that the classes are not attractive. There are countless reports justifying this by the students. However, a baseline is perceived in the following report that supports this argument, where it stands out: "There will be nothing important and no

activity to deliver", in turn they do not participate in the first class. So, it is important that, with the help of active methodologies and technologies, innovative education makes it possible to transform classes into more vivid and meaningful learning experiences for students of digital culture at all times. (BACICH and MORAN, 2018). In addition, methods and tools are sought to make classes more meaningful for students. This introduces the concept of meaningful learning. Rogers (2001, p. 01) conceptualizes it as follows:

> "By meaningful learning I mean learning that is more than an accumulation of facts. It is a learning process that causes a change, whether in the individual's behaviour, in the future orientation he chooses or in his attitudes and personality. It is a penetrating learning, which is not limited to an increase in knowledge, but which deeply penetrates all parts of its existence".

David Ausubel defines that in order to have meaningful learning; there must be an interaction between new information and a specific knowledge structure. Ausubel considers the facilitating element in the individual's cognitive structure to be one of the

pillars that support significant learning, in the activity proposed in this study it is possible to identify all these characteristics (MOREIRA, 2021).

Engagement on the part of the student and the teacher is the central gear of all the processes that make the learning active and meaningful. For Gandin: "A planning process requires, when the good of all is sought, that participation happens at every moment, in every action." (GANDIN, 1993). Therefore, it is very difficult to have a positive return from something applied in a passive way. Passively, many teachers leave their teaching plans in their Virtual Learning Environment (VLE) and do not even detail it with the student. This ends up causing a disruption in the teaching process. Therefore, changes are necessary and this article will present a successful practice for the most significant approach to the Teaching Plan.

The focus of the proposed activity is on detailing the Teaching Plan actively so that the student can understand and contribute by asking about future improvements. Corroborating this, we seek to answer the following problem situation: How to present the teaching plan to students in a meaningful way?

As specific objectives, for that it will be necessary:

1. Bring interactivity in the presentation of the teaching plan;
2. Evidence that an active approach applied to an exhibition process can make the student understand better the teaching plan of a discipline;
3. Use tools based on the principle of active methodology and technologies so that the student works collaboratively;
4. Create an activity that the student works with what is in the discipline's teaching plan;
5. Analyse qualitatively if students understand the teaching plan.

In the next sections, development, methodology, analysis of results and final considerations will be discussed. In addition to these items, the bibliographic references that served as a theoretical basis for this study are also presented.

2 DEVELOPMENT

Proposing something different to present the teaching plan is not an easy task, as it is the time to understand the discipline. This becomes more challenging when seeking to bring interactivity to this process. For this, it is necessary to understand that currently interactivity, in most cases, occurs with group activities and with the use of some technology. The relevance of an activity performed in the classroom is linked to how much it arouses the student's curiosity and interest. Therefore, the use of intuitive technologies and tools is paramount.

In view of the various tools available on the web to support teachers in their classes, a freeware application for mind mapping on the web, known as COGGLE, stands out. With it, the student can perform the activity collaboratively, as the app allows more than one user to edit the file in real time, working like Google Docs. (COGGLE, 2020). Moreover, using the Microsoft Teams environment, students are able to discuss and perform online activities. With the help of Moodle, Virtual Learning Environment (VLE), the student has access to documents, guidelines and videos related to the activity.

As defined by Almeida and Valente (2011), it is not enough to put the student in front of the electronic interaction device, it is necessary to have the mediation of the teacher, who is responsible for assisting in defining the project's theme, clarifying the doubts that will arise, dialogue stimulating students and guiding them in the moments when difficulties arise. However, at no time should the academic protagonist be taken away. Then, to analyse the result, with each new insertion in the mind map, the teacher opens a moment for discussion among all students in the class.

The student researches, reflects and analyses possible situations for decision making with the teacher as his facilitator (Berbel, 2011). Thus, active education happens when the student interacts with the activity and through Information and Communication Technologies (ICTs) proposed by the teacher in the proposed activity. (Rêgo and Garcia, 2020).

The methodology strategy used as the basis for this study was the Inverted Classroom (SAI), but it is possible to show that the characteristics of another strategy: Project Based Learning (ABProj), which are present in the proposed activity. SAI aims at dynamic, interactive and creative learning. In the proposal of this article, the student receives the activity that requires a study prior to its execution. After conducting the study, the groups discuss each other and carry out the main activity, which is the creation of the collaborative mind map. Soon the student actively participates in the discussions and practices. At ABProj, the project is authentic based on a question, challenge or motivating problem. The student will only be challenged if he understands the meaning of the proposed challenge. Therefore, for this study the role of the facilitator is of paramount

importance. In addition, Project-Based Learning involves teaching academic content and technical skills in ongoing projects and collaborative work, describes Borges and Alencar, 2014. The following skills are described as acquired skills: self-assessment, engagement, teamwork, decision-making, time management, among others. Therefore, it is possible to affirm that the article used a hybrid solution without the strategies presented, because both the characteristics of SAI, as well as ABProj are present in it (Rêgo and Garcia, 2020).

To **create an activity that the student works with what is in the discipline's teaching plan**, it is necessary to be detailed and let the student passively have the first contact with the document, in this first moment it is named pre-class. Therefore, that traditional approach to the teaching plan is in the past and the student participates more in this moment.

In order to understand the second objective of this study: **highlight that an active approach applied to an expository process can make the student understand better the teaching plan of a discipline**, it is necessary to detail the proposal of the activity performed. First, the students formed groups of four members, being able to use the groups resource offered by Teams for faster communication or WhatsApp. After this definition, guidelines are given for the use of the Coggle tool and then the teaching plan already available in the AVA is presented so that the student becomes familiar with the concepts and methods presented in this document through the mediator. So, the activity is divided into two parts: the construction of a first mental map of the plan, taking into account the items contained in it, such as: assessments, skills and classes; and a second mind map that focuses on the syllabus of the discipline. Students will create these maps in a collaborative way with the group's colleagues and, after finishing, share them with the rest of the class. Then the activity of a group is chosen and all other groups change the file as discussed among its members and mediated by the teacher.

Given the objective: **using tools based on the principle of active methodology and technologies for the student to work collaboratively**, the Coggle tool was used because, among all those researched and tested, it presented itself as the one that could best meet the entire proposal of activity fully and efficiently and clearly. To validate this tool, a study was carried out in a smaller class that delighted the students.

Section 2.1 presents the application of the approach.

2.1 Application of the Approach

This section presents the execution of the activity. After the division of the groups, the students debate about the Teaching Plan and in a collaborative way, they will build the mental map mediated by the teacher according to the illustration presented in Figure 1.
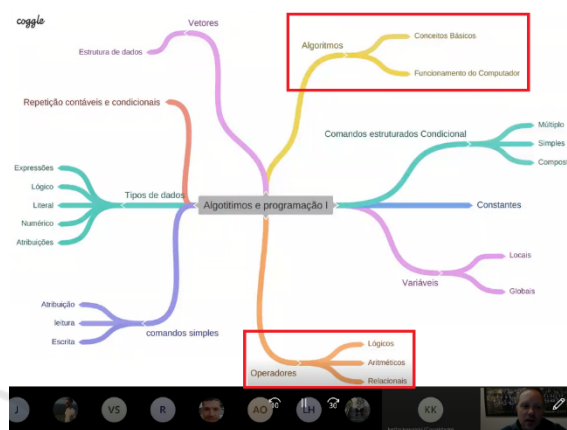

Figure 1: Result being discussed online.

For the final presentation, the teacher adds all students in the class to the chosen mind map. It is selected through the online presentations of each group. In the final mind map, each of the added students can make the desired changes; they are discussed and validated by the mediator.

Figure 1 illustrates the discussion of the result obtained in a collaborative way and the students changing the mental map in real time. All students are assessed individually taking into account attributes such as class participation and group involvement.

Another important factor to be reported is that the students had no greater difficulties because the activity was being applied online. Therefore, it is possible to affirm that the activity will not be restricted only to this moment of pandemic, but also in online and face-to-face subjects after this period of challenges that we are going through, improving even more a characteristic teaching process. In section 2.2 is the methodology used in the development of this research.

2.2 Methodology

For Prodanov and Freitas (2013), the methodological part is the phase, whose methods and processes are defined in which they will be approached over a problem and how the problem that was raised will be solved.

Then some works were studied for the creation of the questionnaire. Moreover, it was observed that for Parasuraman (1991), a questionnaire is just a set of questions designed to generate the data necessary to achieve the objectives of a research. And corroborating this, according to Demo (2011), it is possible to have a much larger number of questions, however he defines that it is important not to make the research boring to the participants, the more objective and simplified its assembly, the better the result. Thus, we tried not to leave the questionnaire tiring for the student.

Thus, this element of data collection perfectly meets one of the objectives of this article. Twelve questions were asked, as the researcher believes that he will have a better clarity in the answers given by the students. It is considered a possible forgetfulness on the part of the student since the questionnaire is applied 9 weeks after the activity. The questionnaire had a period of three weeks for students to answer it. It is composed of 12 questions essential to the proposal of this study, three of which are essays. In the next section, the questions and the analysis made on them are presented.

2.3 Analysis and Discussion of Results

It is important to mention that this whole scenario was created and validated with the application in a single class, so that the necessary corrections were made and later applied in several classes with different student profiles.

A qualitative analysis was made to try to understand if the approach was significant for the student; a questionnaire was made on Google Forms and applied to students from two different HEIs in Brazil. In one of them, a university centre, the activity was carried out in two different units: one in the capital of the state of Rio Grande do Sul (RS) and the other in the metropolitan region of the same state. The other institution of higher education chosen was a college also located in the metropolitan region of RS. The subjects in which the study was carried out were IT Management, Algorithms and Programming - NH, Algorithms and Programming - POA and IT Quality and Auditing. This is the target audience of this study.

For this study, there was a population of 120 students, with a sample of 38 respondents who answered the questionnaire. This represents a percentage of 32%, considered good compared to other research carried out in the institutions. However, it is evident that the student does not like to answer questionnaires, whatever they may be. Therefore, it is interesting that the interviewer leaves

a longer time for students to respond, but also make time available for them to be more secure for the student. In applying this questionnaire, two techniques were used: three weeks to answer and one time before classes with guidance from the teacher.

This study also sought to show whether the most different student profiles liked the proposed activity. Then, Table 1 presents the result for the following question: What course are you enrolled in? There were 38 respondents.

Table 1: Courses covered in the research.

Course	Percentage
Systems analysis and development	34,2%
Computer Networks	13,2%
IT Management	7,9%
Civil Engineering	28,9%
Mechanical Engineering	7,9%
Electrical Engineering	5,3%
Mechatronics	2,6%

It is possible to show that students from the most diverse courses answered the questionnaire. This is very important for this research, as the target audience is not restricted. The courses of analysis and system development with 34.2% of the answers and civil engineering with 28.9% were the courses that prevailed totalling more than 60% of the answers. In addition to these, there were also computer network courses with 13.2%, IT management with 7.9%, mechanical engineering with 7.9%, electrical engineering with 5.3% and mechatronics with 2.6%. Questions 2, 3 and 4 also seek to collect more information about the respondent's profile in order to show whether students with different characteristics liked the activity or if a standard profile was preponderant.

The second question: **In which semester are you in the course?** It is presented in Table 2. She sought to understand in which semesters the students who answered the survey were. This information is important because it is possible to define if the application of the activity is restricted to one semester or can be applied in all. So the following results were obtained: 44.7% were in the 1st or 2nd semester, 36.8% were in the 3rd or 4th semester, 10.4% were in the 5th or 6th semester, 5.3 were in the 7th or 8th and only 2.6% were after the 8th semester of college. Even with respondents in all semesters, the younger students predominated. This becomes very relevant when starting from the fact that if the student likes the activity already at the beginning of his course, it will not be a problem throughout him.

Table 2: Semester in which the student is in the course.

Semesters	Percentage
1st or 2nd	44,7%
3rd or 4th	36,8%
5th or 6th	10,5%
7th or 8th	5,3%
9th or more.	2,6%

The third question addressed was: **Which of the subjects do you study that presented the teaching plan with a practical activity?** This question sought to validate the previous question, as of the four subjects chosen; two were from the first semester and two from the final semesters. It is important to note that the most common subjects, which are in the first semesters, have a larger number of students, which corroborates the high rate of respondents between the first and the fourth semesters. Table 3 describes the subjects covered in this research and their percentages.

Table 3: Research subjects.

Algorithms and programming I - NH (Top).	28.9%
Algorithms and programming I - POA (Top)	36.9%
IT quality and audit (Final)	15.8%
IT Management (Final)	18.4%

The fourth question, on the other hand, sought information from the geographic region of those who were answering the questionnaire. It should be noted that the target audience was from both the capital and the metropolitan region. In this context, it is known that in the state of Rio Grande do Sul the profile of students differs, so that it was evident that the activity can be applied in both regions without problems, it was necessary to collect this information. This was done through the fourth question detailed in Table 4.

Table 4: Research regions.

Porto Alegre (capital)	31.6%
Novo Hamburgo (Metropolitan Region)	68.4%

Based on the percentages, it is possible to contact the diversity of the target audience and that in both regions it would be possible to apply the proposed approach of the education plan.

After detailing and understanding the target audience and the universe of this research, it is important to validate whether it was satisfactory for the student. The next questions seek to clarify this.

Question five sought information on student satisfaction and other possible collaborative tools. The question was: **Did you like to use the Coggle tool to build mental / conceptual maps related to the discipline's teaching plan?** It is shown in Table 5.

Table 5: Satisfaction with the tool.

Yes.	92.1%
Yes, but I use another one.	2.6%
No.	5.3%

The question showed a high level of satisfaction with 92.1% of the interviews approving the Coggle tool for the execution of the collaborative activity. Only 5.3% of respondents did not like to use the collaborative tool in the creation of the teaching plan. Analysing this result, it is possible to infer that these students would probably be indifferent to the execution of the activity, as they would also have been in the traditional approach of the teaching plan. Therefore, it is evident that the choice of the Coggle tool was assertive.

In this question, only one of the respondents checked the option: **yes, but used another one.** So only he answered question 5.1 (dissertation) that complemented 5. Question 5.1 was **if you answered "yes, but I use another tool". What are the most relevant features of the tool used?** The interviewee stated **"CmapTools. It is a free and very intuitive tool."**

The tool mentioned by the student had already been researched by the authors, who at the time of analysing the tools did not consider it more intuitive than Coggle. Even so, it was not discarded for this reason. The main reason for not using the "CmapTools" tool was because it was not collaborative. After receiving the data from this research, the authors consulted the tool's website and found that it still does not meet the necessary criteria for the activity proposed in this study, so it is not yet an option.

The sixth question was: **Did the activity with mental / conceptual maps, about the teaching plan, make you better understand the discipline's teaching plan?** In it, illustrated in Table 6, it is clear that the teaching plan approach through active methodologies was significant for the student. Thus, it is possible to report that the study achieved its purpose taking into account all the objectives, as 65.8% of the respondents marked the option much better. Less significantly, 28.9% responded a little better and only 5.3% were indifferent to the activity proposed by the study. In addition, it is important to note: it is natural for the student to be indifferent to the activity, as he did not like to use the Coggle tool. This student probably performed the activity only in

order to be assessed. Therefore, the results could be even better.

Deepening the analysis further on the 28.9% of the students who reported a little improvement in the understanding of the teaching plan, it is reported that 50% of the students who marked this alternative were considered concluding their courses, so it is possible to verify that even already well accustomed to the traditional model, they were able to find benefits in the new approach. As for the region of these students who accounted for 28.9%, around 65% were from the interior who culturally do not like changes. Moreover, the fear of change may have helped the student with this profile to respond a little better instead of much better.

Table 6: Question six.

Perception of the student	Percentage
Much better	65,8%
Little better	28,9%
Indifferent	5,3%

In order to collect more data and understand what could be improved, the questionnaire had an essay question to complement the answer to the indifferent option in question 6. This question was numbered 6.1 and requested the following: if you answered indifferently in the question 6, justify your reason. Then it stands out: **"I believe it helps, but it is independent of the tool used to present the content, be it mind maps or a Power Point. It is not the tool itself, but the presentation of the programmatic content that makes the difference"**. In the report, the student's preference for the traditional approach is evident, where he is placed as a liability.

The seventh question has its result represented by Figure 2. It corroborated the idea that the activity was extremely pleasurable for the students, since 92.1% of the respondents would like this approach to the teaching plan in other subjects. This demonstrates that the present study was successful in applying a different form to the traditional one for detailing the teaching plan. Therefore, the approach of the teaching plan using active methodologies for detailing it in front of the student was significant.

Question 7 was: **Would you like the presentation of the teaching plan in the other subjects to be just as active as it was in yours?** For this question, the data shown in Figure 2 were obtained.
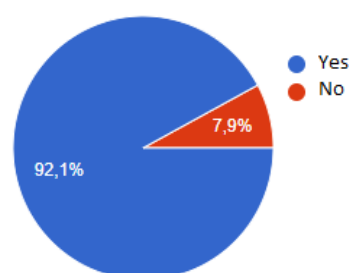

Figure 2: Seventh question.

Question 8 was: **Did the programmatic content of the discipline become clearer after detailing the teaching plan through mental / conceptual maps?** Moreover, the result is shown in Figure 3.
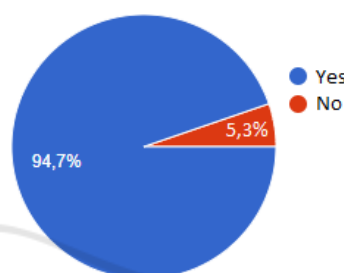

Figure 3: Eighth question.

The greatest relevance in the analysis of question eight, presented by Figure 3, is not in the fact that 94.7% of respondents answered: yes, the syllabus contents of the discipline became clearer after the detailing of the teaching plan through mental maps, but that in Figure 4, it was not possible to obtain the same percentage. The percentage of 89.5% of satisfaction, even though it is high, shows that the teaching plan was not so well understood when approaching assessments, skills and competences. For 10.5% of respondents, this approach was not clearer. In the validation study, the percentage of students who had not found the approach in this item to be clear was 18%, so it was necessary to triple the sample to make sure that the item would not be a problem in the execution of the activity. Soon it was possible to verify that the item is not a problem, but that it deserves special attention. Figure 4 illustrates the results of question 9: **How was the discipline worked on the items: assessments, skills and competence, became clearer after detailing the teaching plan using a collaborative tool?** Below is the result of question 9.
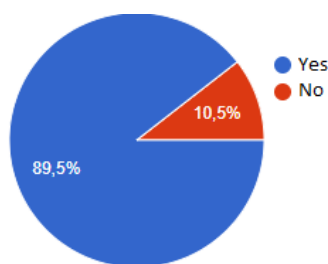
Figure 4: Ninth question.

Finally, question ten. An optional essay question that sought to know the students' opinion on the explanation of the teaching plan in an active way. There were 26 interviewees who decided to contribute to the deepening of this research, some even had very similar opinions, but described differently. Here are some of these contributions:

1. **"Good, simple and clear methodology"**,
2. **"It makes it much easier to understand / understand the content"**,
3. **"Well-organized to better understand every teaching plan."**,
4. **"The didactics proposed are very good."**,
5. **"The use of conceptual / mental maps gives us a clearer and more objective perception about the subject and the teaching plan"**,
6. **"Mind maps help to better understand the discipline in a more summarized and clearer way, totally different than reading articles and much better"**,
7. **"I think this teaching plan method could be practiced in all subjects."**,
8. **"Different from others and visually better"**,
9. **"Some doubts were clarified when doing the activity, as all topics were separated and well defined, making it easy to understand."**,
10. **"[...] more applied students seek to research the content in advance to have more dynamics with the teacher in the classroom when the subject is addressed."**,
11. **"I liked making the mind map, because it is very easy to understand the subjects, I already used the map in chemistry classes and it always helped me a lot."**.

The contributions from number 1 to number 4 make it clear that the students accepted the proposed active methodology. In addition, words with: "clear" and "understanding", define that the study achieved its objective with the application of active methodologies. Today's student wants to be the protagonist of everything that involves his learning,

but in order for his understanding and engagement to be efficient, it is necessary to attract him.

Analysing contributions 5 and 6, it is possible to state that the use of mental / conceptual maps was well chosen for the execution of the activity, as it would be possible to use another way to make the teaching plan approach active. One of the contributions mentioned this; however, unfortunately, it did not suggest an alternative. The interviewee's argument was: "I believe that the help of any tool helps, but it does not necessarily have to be a mental map for the objective to be achieved." However, it is emphasized that the Coggle tool builds mind maps collaboratively and that it is not within the scope of the other proposal, this would affect the use of another tool, which would make the study very comprehensive.

Contributions 7 and 8 show the possibility of use for all subjects of the IES, the student is again asking for teaching to be active in all its processes. Corroborating all the contributions, the number 11 emphasizes that another discipline, which is not part of this study, uses mind maps in its approaches. This is extremely positive and contributes a lot to teaching. Therefore, it is possible to standardize the Coggle tool for using mind maps in Higher Education Institutions.

Contributions 9 and 10 show that the teacher performed well his role as mediator and the student's interest in learning more by preparing in advance for classes, the principle of the classroom inverted.

Through the questionnaire, it was possible to identify a break in the traditional way of teaching; students like to be protagonists of their learning at all times. The activity developed another pleasant moment between the students and the teacher.

In the next chapter, the conclusions obtained through this I am and suggestions for future work will be presented.

3 CONCLUSIONS

The approach proposed in this article sought to solve a very specific problem in teaching. Understanding the teaching plan is of paramount importance for the student, but it is known that he never liked the traditional approach. Therefore, proposing something that was pleasurable, active, engaged the student, helped him to see the teaching plan with different eyes was a very complex, and challenging task. Fortunately, the study was successful and thus leaves a legacy for the education system: it is necessary to do things differently and make sense of all the processes carried out within a classroom. Without the

engagement of the teacher and the student, approaches such as the one carried out in this work do not make sense. Presenting the teaching plan in a passive way or just leaving it in the virtual learning environment does not create a link between the student and the education system and is not meaningful to him.

There are no barriers to change. The study was successful in different institutions of higher education, located in distant regions. Moreover, it had students from different courses, many of whom were not even attending the same semester. Therefore, it was possible to realize that even the interviewees having different characteristics, they accepted the activity very well and did not create obstacles for this approach to be standardized in the IES targeted by the research.

In addition to the benefits already presented and analysed in this article, it is important to reinforce the idea that the student increasingly needs to understand and participate in all the processes that lead to the content that is covered in a classroom. With activities like the one evidenced in this scientific document, the student understands better not only the proposal of the discipline, but also acquires an understanding, even if systemic, of the educational universe.

It is important for the student to remember that at the beginning of the semester the Teaching Plan (PE) is presented and that the skills and competences acquired by the student had already been foreseen. Therefore, the student can see meaning in this process.

The work proved that it is possible to add value to teaching through a break in the traditional model of presenting the teaching plan. This is important so that other procedures related to the education system try to be more active and not mere documents.

For future work purposes, it would be interesting to have an analysis of the teachers' perception regarding the implementation of this approach and that the study had an even larger sample.

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