



CADGME 2018

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FLIPPED CLASSROOMS AND MOODLE: DIGITAL TECHNOLOGIES TO SUPPORT TEACHING AND LEARNING MATHEMATICS

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Calculus and Blended Learning



PreCalculus was a pilot project of Universidade Presbiteriana Mackenzie, result of a postdoctoral research held at PUC-SP, which aimed to stimulate the development of the student through a different methodology (Blended Learning)



Goal

Get innovative actions and using the Virtual Environment Moodle, promoting the improvement in the process of teaching and learning of Mathematics in higher education.



Methodology

Bibliographical Research

- Use of AVA
- Calculus I
- Blended Learning

Research field

- Virtual Environment Moodle
- Flipped Classroom format





Calculus

- It is important to the history of Mathematics at the University;
- There's a great disapproval by (first) students;
- High degree of abstraction;
- Does not facilitate content memorization;
- Requires of the student mathematical knowledge and prior concepts;
- It is not always done properly in primary and secondary education.

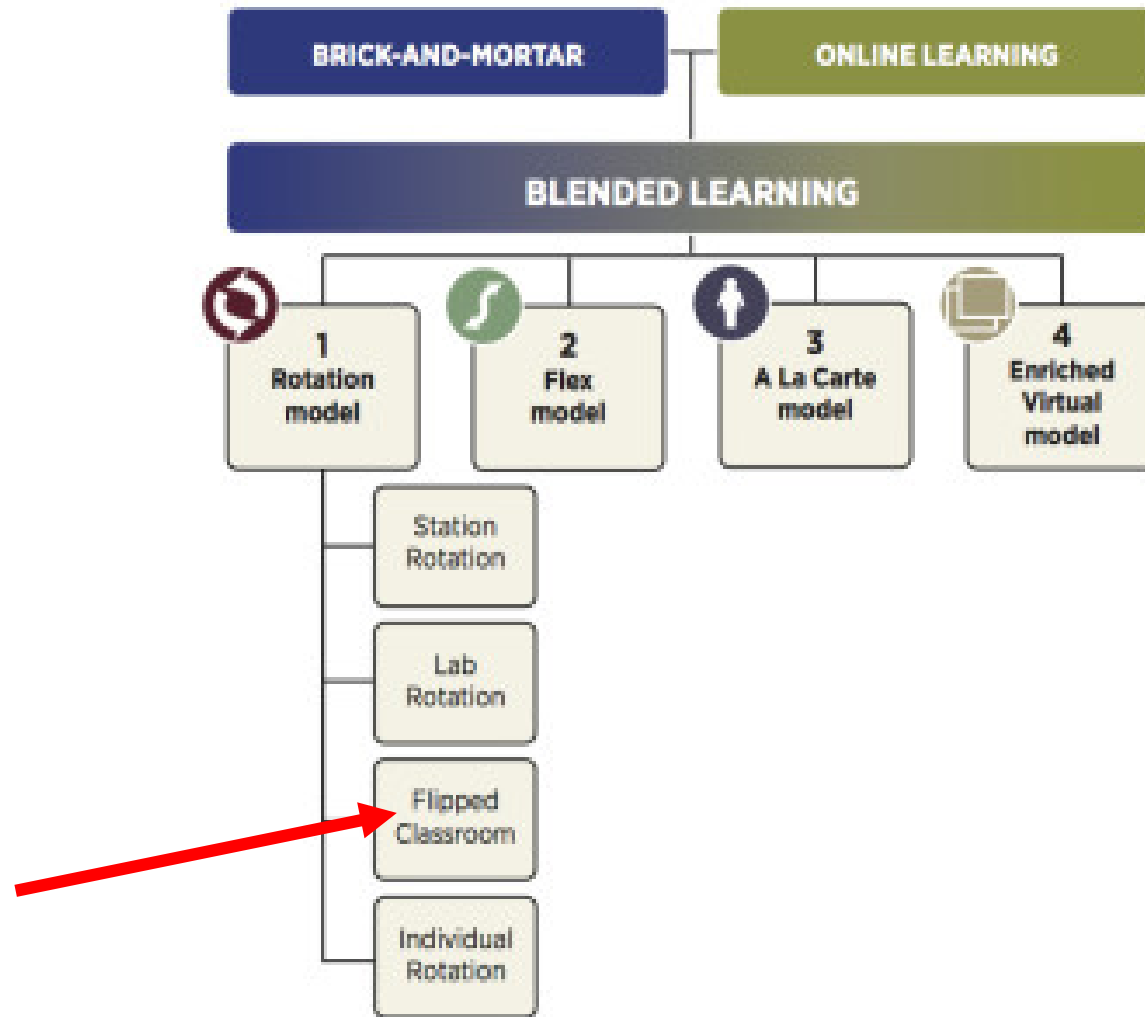


Blended Learning

Horn & Staker:

"Any formal educational program in which a student learns, at least in part, through online education, with some element of student control over time, the place, the way and/or the rhythm".

Blended Learning Rotation Models





Searcheds



- Students who entered the University in 1st sem/2017;
- Courses that have the discipline Calculus I (or equivalent) in the first stage of the course;
- Diagnostic evaluation for 560 students exploring the mathematical concepts important to the Differential and Integral Calculus;
- Invitation to these students with 0 to 2 notes (up to 4) in diagnostic evaluation.
- Entry 141 students



Methodology

- Student has contact with the content (videos and exercises) in the Virtual learning environment (Moodle);
- Meetings in the model “flipped classroom”;
- Face-to-face meeting for the active learning: questions, discussions and exercises (the student practice ...);
- Students with difficulties has the support of the teacher. The others follow with more diversified exercises;
- If they have questions after the face-to-face meeting: breaking monitors;

Methodology

PRE-MEETING ACTIVITIES:

- Watch the video lesson in the Virtual environment Moodle
- Reading the e-book ("PreCalculus" Sheldon Axler available on Virtual Library)
- Exercises

FACE-TO-FACE MEETING:

- Discuss and provide guidance on the content of the video lesson;
- Discuss the main difficulties in exercises;
- New exercises.

POST MEETING ACTIVITIES:

- List of exercises and tests;
- Challenges;
- Proposal for a collaborative work;

Station "breaking monitors".



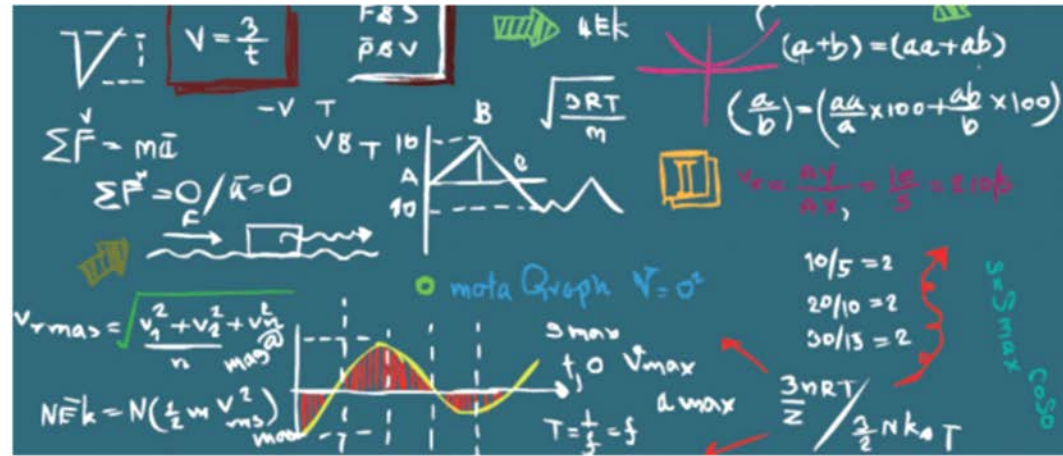
The methodology in practice



- Student assumes the responsibility of study;
- The classroom as a learning space;
- Allows: individual rhythm, flexibility, autonomy/leadership;
- Works the students' difficulties: Teaching customization.



Pré-Cálculo



Clique para entrar neste curso

Clique para entrar neste curso

Modeling of Virtual Environment Moodle

Environmental structure (Initial screen)



Universidade Presbiteriana
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oodle

Alunos ▾ Professores ▾ Tutoriais ▾ Contato Sobre o CEDaD

Buscar cursos

Página inicial > Minhas Disciplinas/Cursos > precalc

Ativar edição

Apresentação

Horários, Local e Turmas (INSCRIÇÃO AQUI !!)

Aula 1 - Potenciação

Aula 2 - Produtos Notáveis e Fatoração

Aula 3 - Funções e Representações Gráficas

Aula 4 - Funções

Aula 5 - Trigonometria

Aula 6 - Transformações Trigonométricas

Aula 7 - Matrizes e Determinantes

Aula 8 - Sistemas Lineares

Aula 9 - Exercícios

Aula 10 - Avaliação

Material Adicional

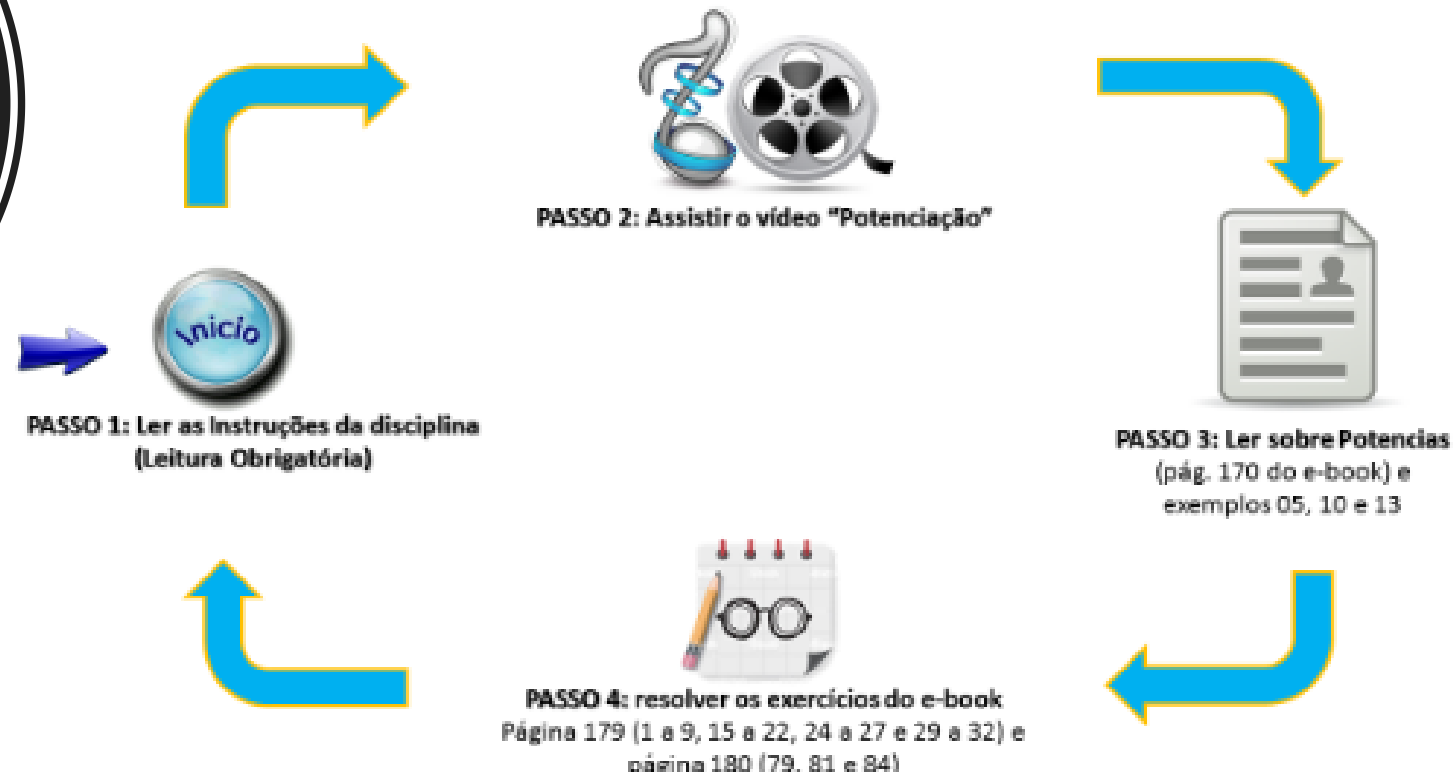
UNIVERSIDADE PRESBITERIANA MACKENZIE

Aula 1 - Potenciação

"A potenciação é uma operação que surge a partir da multiplicação de fatores iguais como uma alternativa para simplificar a notação".

Learning Track (First Week)

Trilha de Aprendizagem

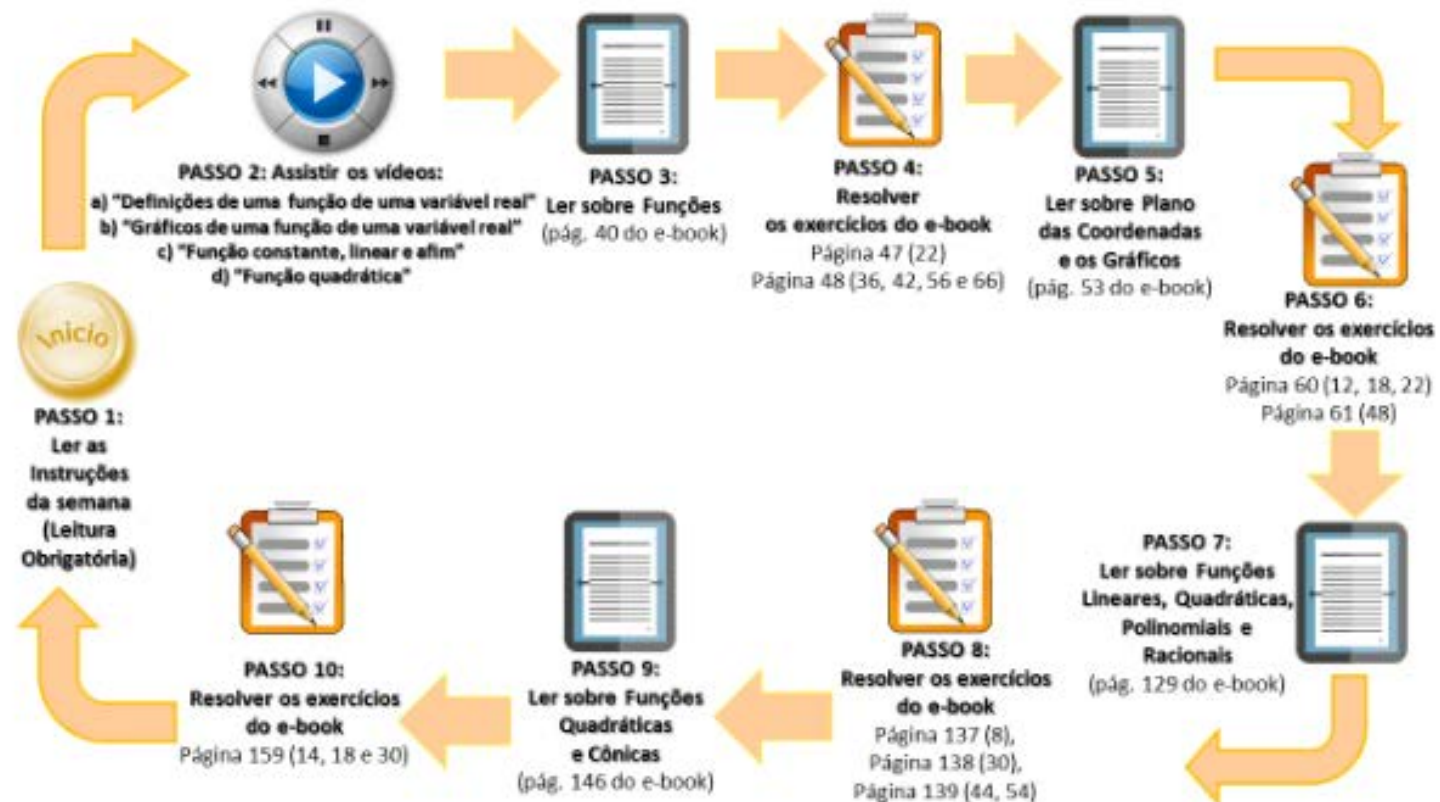


Aula 3 - Funções e Representações Gráficas

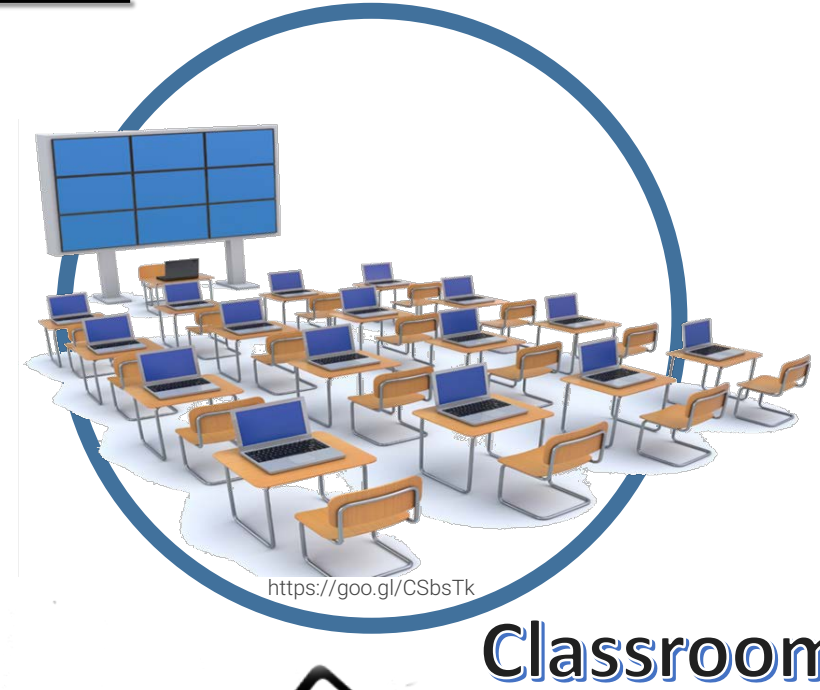
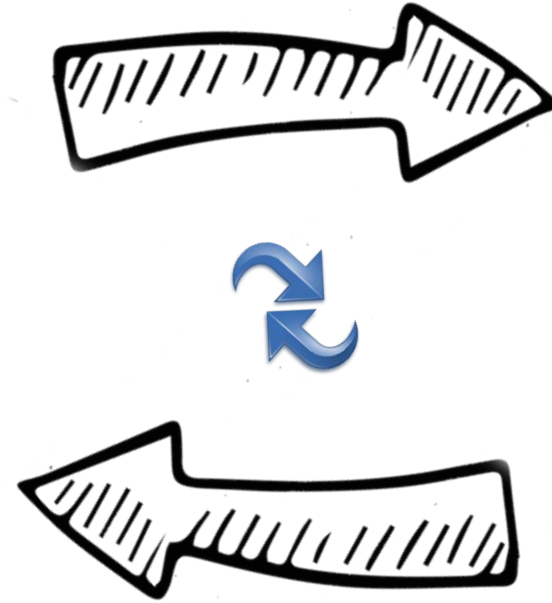
"Uma grande vantagem da representação gráfica está na sua capacidade de facilitar a compreensão de fenômenos estudados."

Learning Track (Week 3)

Trilha de Aprendizagem

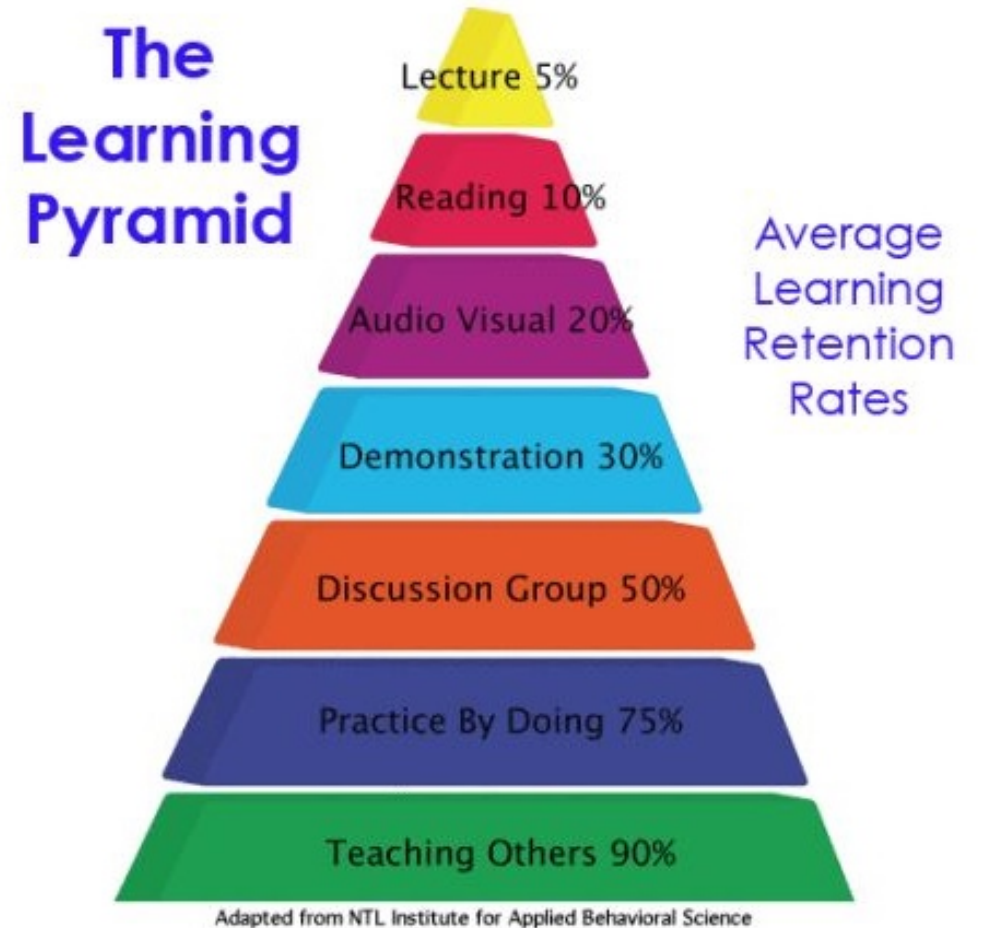


Flipped Classroom Model



"Monitors" station

- Station intended for students with doubts or difficulties;
- Monitors with great performance and prepared to meet;
- Individualized attendance;
- More efficient dialogue;
- Physical space and conditions that allow to discuss, divide, teach...





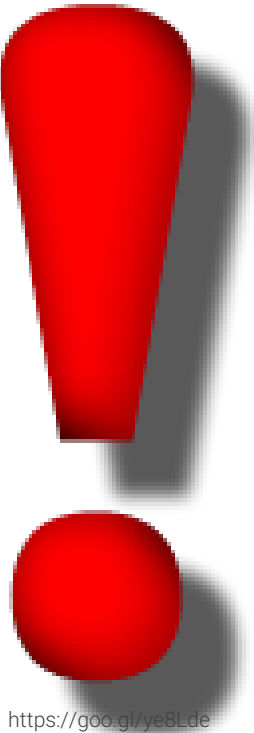
Final considerations

- Students believe it is positive to use the Flipped Classroom with the support of the Virtual environment of teaching and learning. This binomial privileges access to information and the organization of Studies;
- The students used this systematic (tracks/video/e-book) with other disciplines;
- We could see that the student assumes the responsibility of studying;
- At the present moment, when students and teachers are together, the said space integrates applications of the content learned in the video, reflections and discussions on the concepts;
- After the application of the final evaluation, the students presented improvement in their performance in relation to the initial diagnostic test. Students who participated actively (not missed at any meeting) were approved in Calculus I.



Problems

- Need to empower teachers and students in the use of Virtual environment;
- Some teacher of the face-to-face meeting did not apply the “Flipped Classroom” model;
- Student attended the present meetings without having accessed AVA, nor at least having watched the video;
- Choice of video. The traditional video contradicts with the methodology of the Flipped Classroom. Search for videos with new speeches (arouse the student's curiosity, correlated examples, work concepts and properties leading the student to knowledge);
- Some students are conditioned to the traditional method.

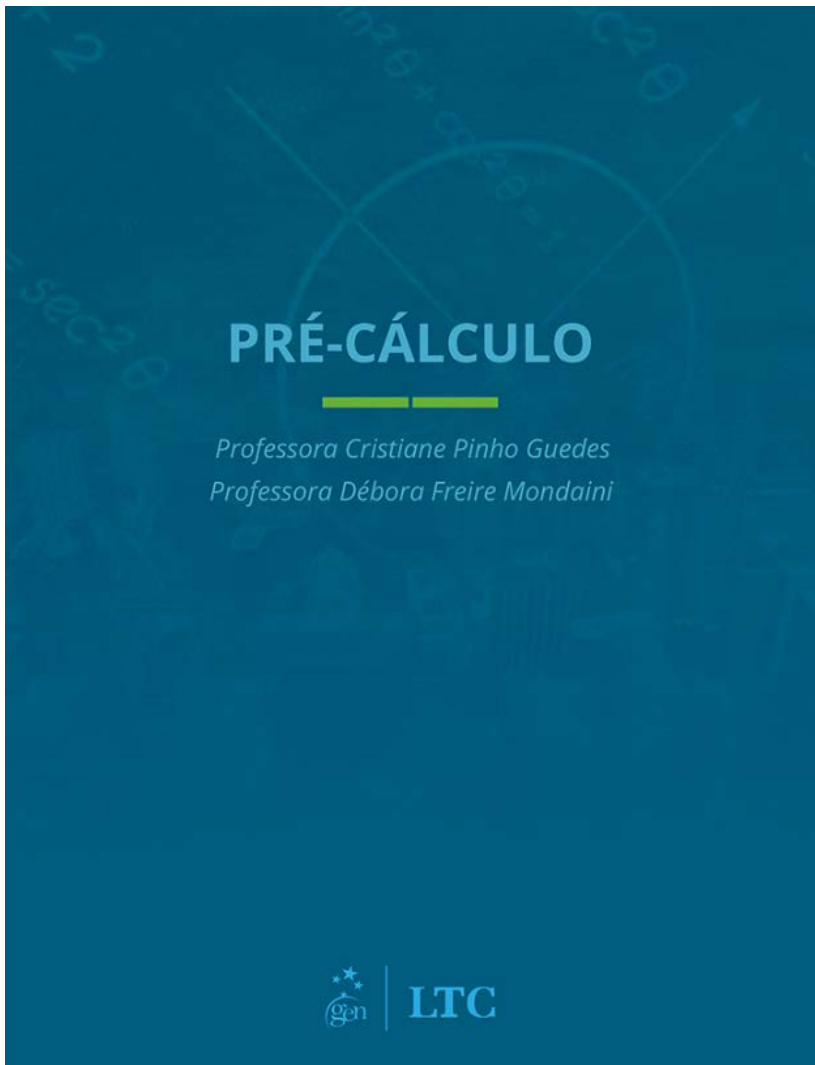


<https://goo.gl/ye8Lde>



References

Videos

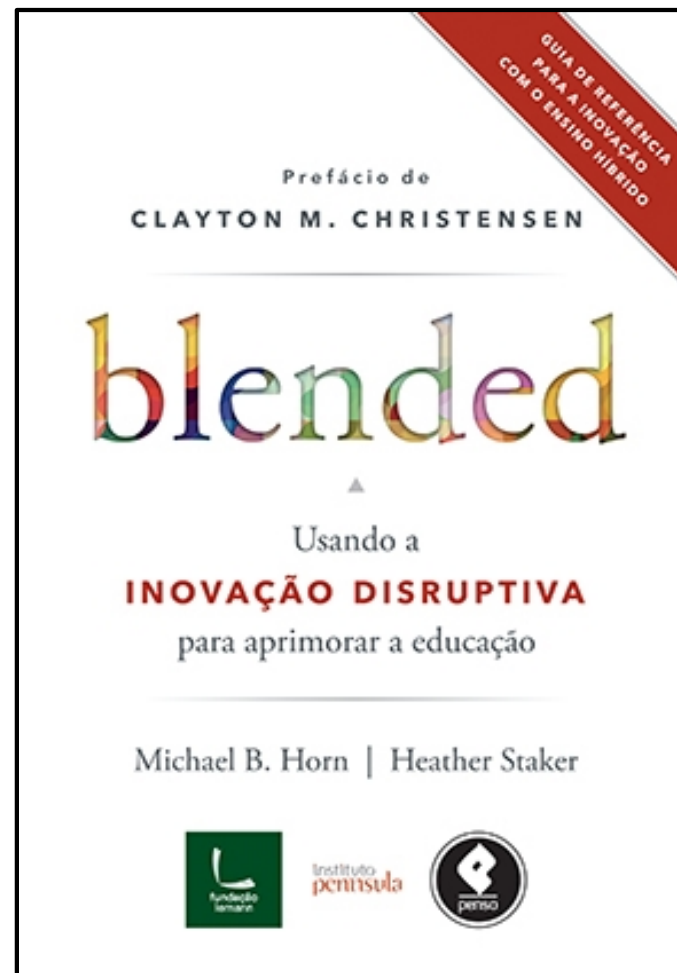
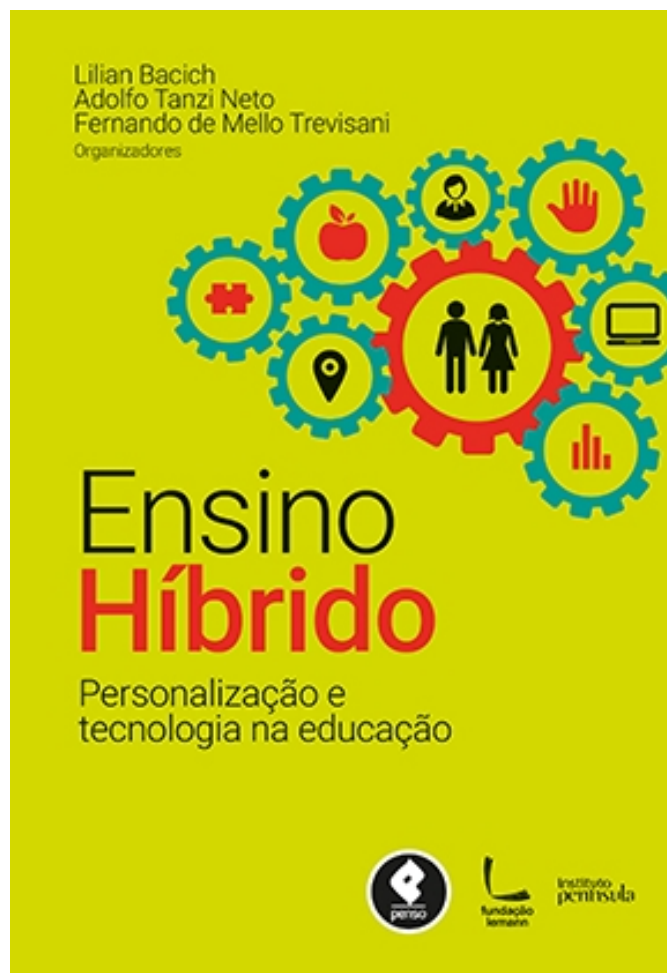


e-Book





References



Thank you!!!

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