

# Definição e Aplicação de MOOCs e do Modelo *Flipped Classroom* como Apoio ao Ensino de Computação

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# Contexto



Columbia



Tecnologias Digitais



Metodologias de Ensino

# 21st Century Student Outcomes and Support Systems

Adapt to Change

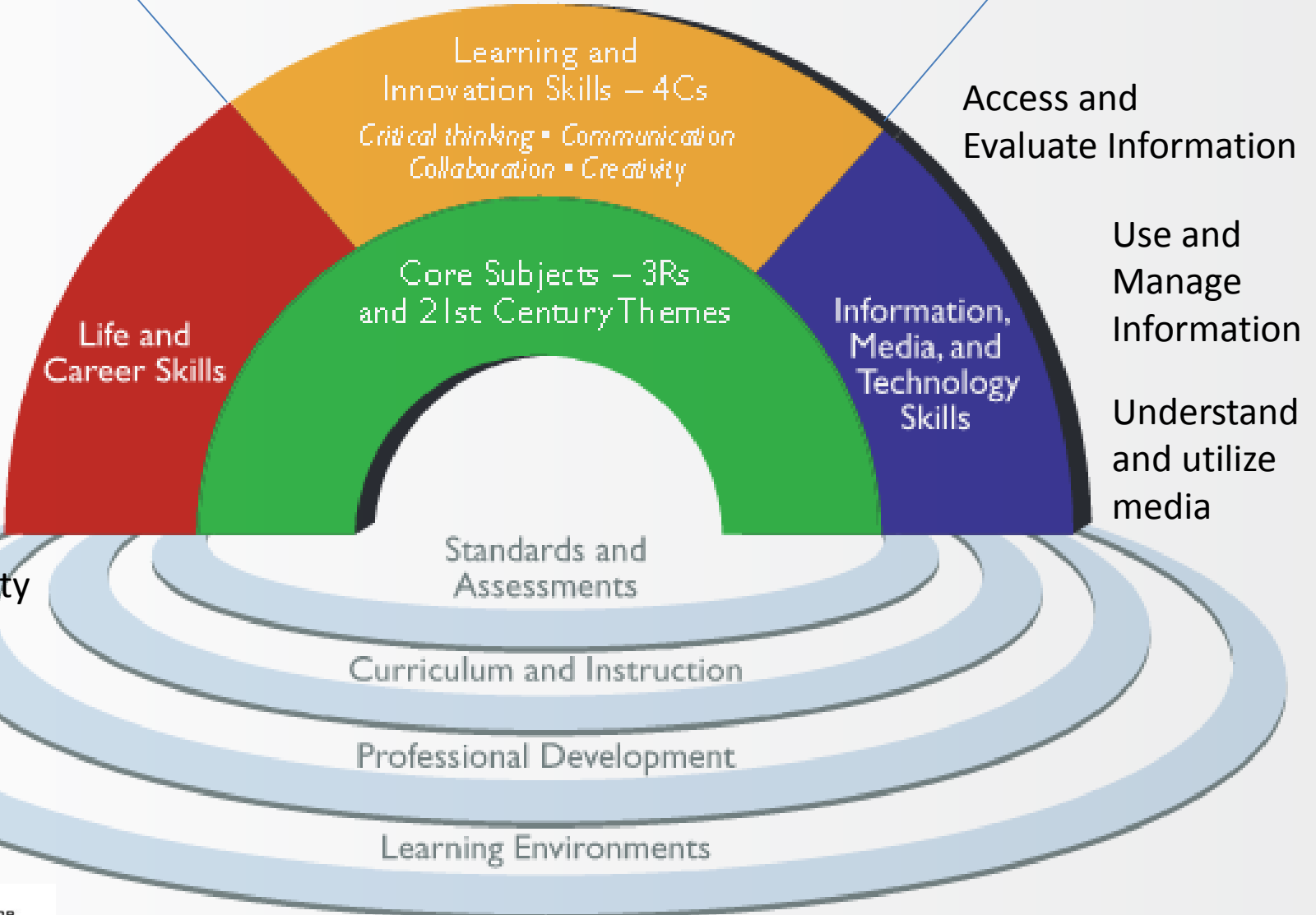
Be Flexible

Initiative

Be Self-directed Learners

Leadership

Responsibility



Life and Career Skills

Learning and Innovation Skills – 4Cs  
*Critical thinking • Communication  
Collaboration • Creativity*

Core Subjects – 3Rs  
and 21st Century Themes

Information, Media, and Technology Skills

Standards and Assessments

Curriculum and Instruction

Professional Development

Learning Environments

Access and Evaluate Information

Use and Manage Information

Understand and utilize media



PARTNERSHIP FOR 21ST CENTURY SKILLS

<http://www.p21.org/>

# Contexto

- **Tec. Digitais:** *Massive Open Online Courses (MOOC)*
- **Met.Ensino:** *Flipped Classroom Teaching Model (FC)*



## The Traditional Classroom

Teacher's Role: Sage on the Stage



## The Flipped Classroom

Teacher's Role: Guide on the Side



<http://www.flippedlearning.org/>

**Passive subject** of their own learning.

Students have **homework**

Students have **lectures in classroom**

**Active subject** of their own learning

Receive **short explanations** that should be studied **before each class**  
(video/podcast/website/book)

**Available anywhere: at home, at work, bus, ...**

**In the Classroom:** take **active** and **collaborative** activities with the support of the teacher

# Problema(s)

- MOOCs atuais: *one-size-fits-all* learning model.
- Replicam a Sala de aula tradicional
  - xMOOCs → Behaviorismo
  - (Tendência: Construtivista, Sociointeracionista)
- Evasão.
- A grande quantidade de informações geradas a partir da interação dos usuários com os MOOCs

# A Nossa Proposta

- Para alcançar a personalização do ensino em um MOOC, nós postulamos que a literatura sobre:
  - *Flipped Classroom*
    - *pre-class, warm-up, master learning ?*
  - *Personalização/Adaptação/Customização*
    - *Personal Learning Environments (PLE) ?*
    - *Mass Customization (MC)*

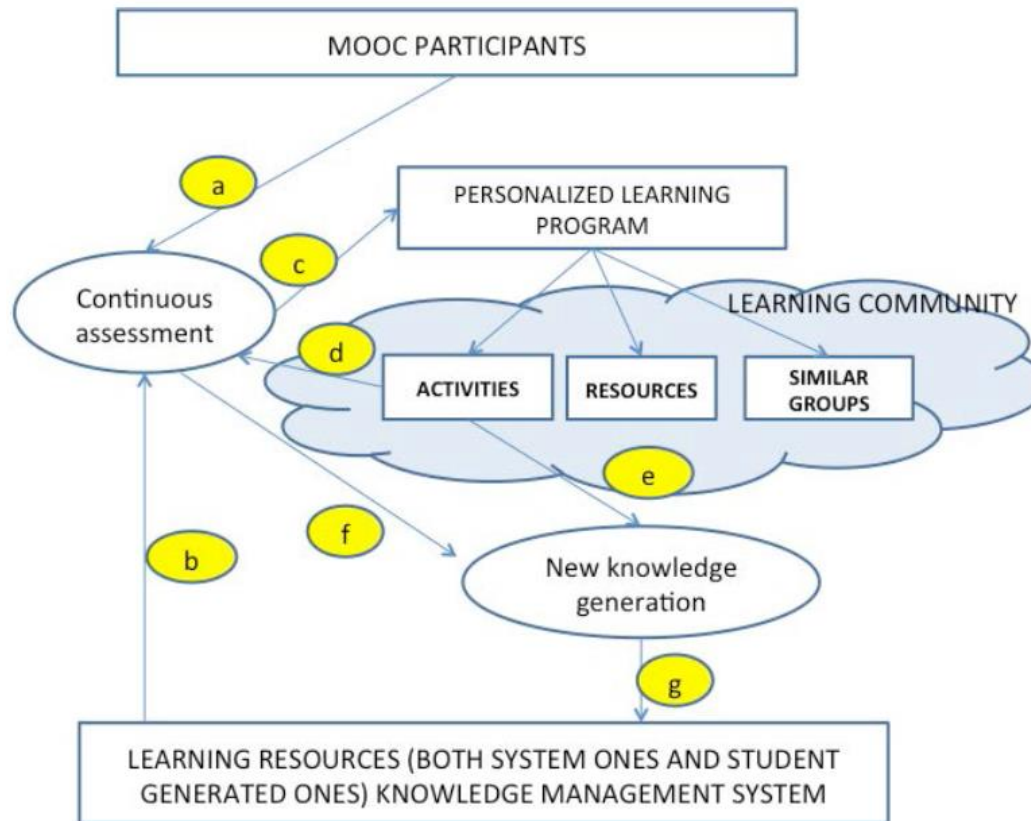
pode nos ajudar a obter *insights* importantes.

# Objetivo Principal

- Investigar a aplicação de conceitos e princípios do modelo *Flipped Classroom* no projeto, desenvolvimento e disponibilização de MOOCs.
  - Adicionalmente, utilizar a informação produzida e armazenada nos MOOCs para promover sua própria adaptação e personalização.



# Abordagens



Ausência de rigor científico.

Avaliações “fracas”.

A methodology proposal for developing Adaptive cMOOC [3]

# Abordagens

- NovoED
  - Student-centered Online Learning Environment
  - Collaboration and Teamwork



## Amin Saberi

Amin Saberi is co-founder of NovoEd. He is also a professor at Stanford University where he developed an earlier version of the platform used to offer Stanford courses to hundreds of thousands of students. His research focuses on the intersection of computer and social sciences and he is co-director of Social Algorithms Lab. As of January 1, 2013, he has taken a leave of absence to pursue NovoEd full time.



## Farnaz Ronaghi

Farnaz Ronaghi is co-founder and Director of Engineering at NovoEd. She designed and developed the Venture Lab platform at Stanford University while a PhD student. She is passionate about making education, as a basic human right, more accessible and meaningful through collaboration and experiential learning. As of January 1, 2013, she has taken a leave of absence from work on her PhD thesis on the creation of social incentives in online learning to pursue NovoEd full time.

Stanford University

NovoED Home Courses Partners About Sign In Sign Up

NovoEd is the social learning environment for online courses.

NovoEd partners with leading education institutions and corporations to offer collaborative, experiential online courses.

Learners Join courses

Educators Engage learners

Corporations Cultivate talent

# Abordagens

- Can You Flip an Online Class?
  - Barbara Honeycutt
  - North Carolina State University



Honeycutt, B. & Garrett, J. (September 2013). **The flipped approach to a learner-centered class.** (whitepaper). Magna Publications.

Honeycutt, B. & Glova, S. (2013). **101 Ways to Flip Your Online Class.** Flip It Consulting & Reify Media. Raleigh, NC.

# Resultados Esperados

- Definição de um conjunto de requisitos/abordagem de personalização para MOOCs.
- Projeto, desenvolvimento e disponibilização de um MOOC personalizado (na área de Ciência da Computação).
- Contribuir para a utilização efetiva de MOOCs personalizados em cenários reais de ensino e aprendizagem.

# Metodologia

- **Revisão Sistemática:** pra descobrir lacunas e conhecer melhor a área.
- **Pesquisa Ação como abordagem principal**
  - Flipped Classroom
  - MOOCs
  - Integração/Personalização/  
Adaptação/Customização
  - Experimentos em Computação.



# Resultados já obtidos

- Experimentos e *Flipped Classroom*
  - *Tools for the Flipped Classroom Model: an Experiment in Teacher Education*
    - *Frontiers in Education (FIE), Madri.*
  - *Testing Flipped Classroom and Problem-Based Learning in a CS1 Course*
    - *Em processo de submissão.*

# Resultados já obtidos

- Uma revisão sistemática sobre MOOCs
  - *Construção e Uso de MOOCs: Uma Revisão Sistemática*
    - SBIE, Congresso Brasileiro de Informática na Educação (CBIE), Dourados.
- Experimentos e MOOCs
  - *Avaliação dos MOOCs Coursera e edX a partir da Condução de Estudos Experimentais*
    - *Em processo de submissão.*

# Resultados já obtidos

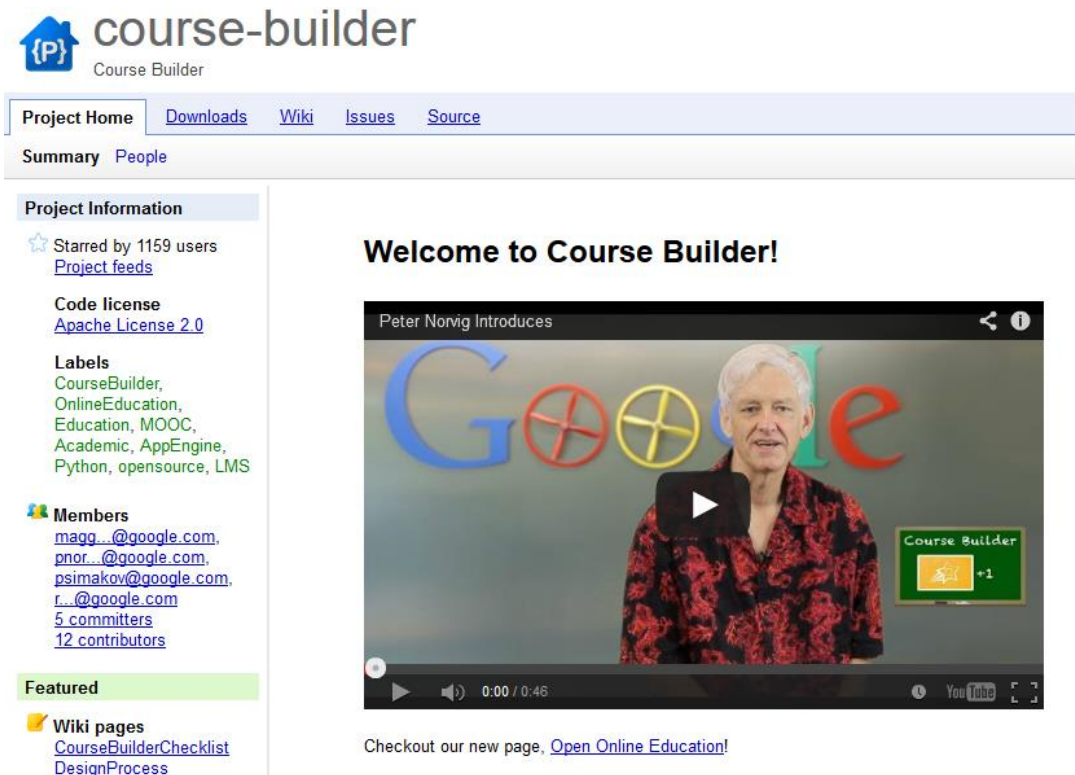
- *Melhorando Experiências Acadêmicas*
  - *A Recommendation System to Support the Students Performance in Programming Contests*
    - *Frontiers in Education (FIE), Madri.*



# Experimental Platform for Online Education at Scale

- Google Course Builder

- <https://code.google.com/p/course-builder/>



The screenshot shows the Google Course Builder project page. At the top, there is a navigation bar with links for "Project Home", "Downloads", "Wiki", "Issues", and "Source". Below this, there are tabs for "Summary" and "People". The main content area is divided into two columns. The left column contains "Project Information" (starring by 1159 users, Apache License 2.0, labels like CourseBuilder, MOOC, etc.), "Members" (listing email addresses and committers), and "Featured" (Wiki pages like CourseBuilderChecklist). The right column features a video titled "Welcome to Course Builder!" by Peter Norvig, showing him in front of a Google logo. Below the video is a link to "Open Online Education!".

# Experimental Platform for Online Education at Scale

- Open edX platform
  - [code.edx.org/](http://code.edx.org/)

The screenshot shows the GitHub repository page for edX. At the top, the GitHub logo is on the left, followed by a search bar and navigation links for Explore, Features, Enterprise, and Blog. On the right, there are buttons for Sign up and Sign in. Below the navigation, the repository name 'edX' is displayed with its logo. A description states: 'Open edX is the open-source code that powers http://www.edx.org'. Contact information includes 'http://code.edx.org' and 'info@edx.org'. A search bar with 'Find a repository...' and a 'Filters' dropdown is present. Two repository cards are visible: 'edx-analytics-dashboard' (Python, 6 stars, 7 forks) and 'edx-platform' (Python, 1,472 stars, 842 forks). A 'People' section on the right shows a grid of 16 profile pictures, with a '73 >' link. A 'Developer Program Member' badge is also visible.

# Experimental Platform for Online Education at Scale

- openHPI
  - <https://openhpi.de>

The screenshot shows the SourceForge project page for Open HPI. The page includes a navigation bar with 'SOURCEforge', a search box, and links for 'Browse', 'Enterprise', 'Blog', 'Help', 'Jobs', 'Log In', and 'Join'. Below the navigation bar, there are promotional banners for 'Go Parallel' (Translating Multicore Power into Application Performance) and 'Get the Slashdot Newsletters'. The main content area shows the project name 'Open HPI' and a list of download files. A table lists the files with columns for Name, Modified, Size, and Downloads / Week.

Name	Modified	Size	Downloads / Week
<a href="#">Parent folder</a>			
<a href="#">openhpi-3.5.0-win32-amd64.zip</a>	2014-10-09	4.5 MB	2
<a href="#">openhpi-3.5.0-win32-x86.zip</a>	2014-10-09	4.0 MB	2
<a href="#">openhpi-3.5.0.tar.gz</a>	2014-10-09	7.7 MB	17
Totals: 3 Items		16.2 MB	21

# Experimental Platform for Online Education at Scale

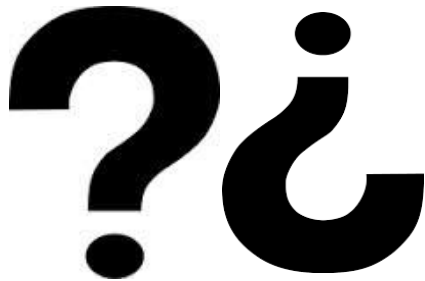
- Open MOOC
  - [openmooc.org](http://openmooc.org)
- Outros
  - <http://www.learndash.com/5-mooc-building-platforms/>

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- [2] Armbruster, Patel, Johnson, & Weiss, 2009; Deslauriers, Schelew, & Wieman, 2011; Saville, Zinn, Neef, Van Norman, & Ferreri, 2006
- [3] Blanco, Á. F., García-Peñalvo, F. J., & Sein-Echaluce, M. (2013, November). A methodology proposal for developing adaptive cMOOC. In *Proceedings of the First International Conference on Technological Ecosystem for Enhancing Multiculturality* (pp. 553-558). ACM.

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- [4] Ng'ambi, D., Jul. **Effective and ineffective uses of emerging technologies: Towards a transformative pedagogical model.** Br J Educ Technol 44 (4), 652–661. URL <http://dx.doi.org/10.1111/bjet.12053>
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- [6] Khan, Salman. **O rockstar da educação: entrevista com Salman Khan.** In.: Exame CEO, Agosto de 2011. Disponível em [http://fundacaolemann.org.br/khanportugues/uploads/exame\\_201108.pdf](http://fundacaolemann.org.br/khanportugues/uploads/exame_201108.pdf). Acesso em 02 mai. 2013

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- [8] Princeton EDGE Lab. **Innovating Education with MOOC/FLIP.** Disponível em: <[http://scenic.princeton.edu/files/MOOC\\_FLIP\\_thoughts.pdf](http://scenic.princeton.edu/files/MOOC_FLIP_thoughts.pdf)> Acesso em: 13 out. 2013.



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- [9] Wood, Michael T. **Opportunities in Online Education-Staying Ahead of the Curve: The Case of the MOOC**. Council of Independent Colleges Presidents' Institute January 6, 2013. 2013. Disponível em: <[http://www.cic.org/News-and-Publications/Multimedia-Library/CICConferencePresentations/2013%20Presidents%20Institute/Concurrent%20Sessions/Recent%20Developments%20in%20Online%20Education\\_%20Wood%20Handout.pdf](http://www.cic.org/News-and-Publications/Multimedia-Library/CICConferencePresentations/2013%20Presidents%20Institute/Concurrent%20Sessions/Recent%20Developments%20in%20Online%20Education_%20Wood%20Handout.pdf)>. Acesso em: 13 out. 2013.

# Referências Informais

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- <http://mooc.org/>
- <https://eliademy.com/>