

Active Methodologies in Education: remote/flexible teaching and the flipped classroom for students with disabilities

Metodologias Ativas na Educação: o ensino remoto/flexível e a sala de aula invertida para estudantes com deficiência

Metodologías Activas en la Educación: la enseñanza remota/flexible y la aula invertida para estudiantes con discapacidades

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Maikom Joaquim Barbosa Ecard da Silva

ORCID: <https://orcid.org/0000-0002-8540-5220>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: maikom.ecard@ifes.edu.br

Hermelinda Peixoto Pereira Martins

ORCID: <https://orcid.org/0000-0001-6650-3274>
Instituto Federal de Educação, Ciência e Tecnologia do Paraná, Brazil
E-mail: hermelindamartins@gmail.com

João Paulo Martins Barcelos

ORCID: <https://orcid.org/0000-0003-2727-0580>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: joaopmb@ifes.edu.br

Renato César Oliveira Junior

ORCID: <https://orcid.org/0000-0003-3531-3552>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: renato.oliveira@ifes.edu.br

Vanessa de Medeiros Figueiredo Tavares

ORCID: <https://orcid.org/0000-0002-3221-3217>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: vanessa.figueiredo@ifes.edu.br

Elizabeth Premoli Azevedo

ORCID: <https://orcid.org/0000-0002-2007-589X>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: elizabeth@ifes.edu.br

Raíza Teixeira Griffó Vasconcelos

ORCID: <https://orcid.org/0000-0002-7575-4056>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: raizagriffo@gmail.com

Silvana Reis dos Anjos

ORCID: <https://orcid.org/0000-0002-2278-6783>
Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo, Brazil
E-mail: silvana.anjos@ifes.edu.br

Lafayette Menezes de A. L. Rios

ORCID: <https://orcid.org/0000-0002-0810-8660>
Instituto Federal de Educação, Ciência e Tecnologia da Bahia, Brazil
E-mail: lafayette.rios@ifba.edu.br

Marcos Lourenço da Silva Zanotelli

ORCID: <https://orcid.org/0000-0002-7818-6621>
Prefeitura Municipal de Guarapari/ES, Brazil
E-mail: mlsilva30@yahoo.com.br

Abstract

This article is the result of a bibliographic research on active methodologies, especially blended teaching and flipped classrooms for students with disabilities. These methodologies have stood out for better correlating technology and the breadth of the scope of learning, both in the school space and outside it. The rotation model allied to the Inverted Classroom sub-model are more suitable for the reality of students with disabilities, which, in turn, demand different educational requirements and efficient approaches, as discussed in this article. For this, the choice was made by a qualitative research, through bibliographic investigations, of an exploratory nature, in which different publications on the theme Inverted Classroom in the learning of students with disabilities were discussed. Among the results, we identified that the learning of these students achieves better results articulated with the Inverted Classroom, and their

knowledge is acquired in a way that their limitation in teaching activities is circumvented by the personalization of teaching. This study promotes the constant debate towards the development of efficient pedagogical practices that are adequate to the demands of the ever-changing students, using technological resources to arouse interest and facilitate learning.

Keywords: Active methodologies; Inclusion; Teaching-learning; Teaching; Flipped classroom.

Resumo

Este artigo é resultante de uma pesquisa bibliográfica sobre as metodologias ativas, sobretudo o ensino híbrido e sala de aula invertida para alunos com necessidades específicas. Essas metodologias têm se destacado por melhor correlacionar tecnologia e amplitude do alcance da aprendizagem, tanto no espaço escolar como fora dele. O modelo de rotação aliado ao submodelo Sala de Aula Invertida se mostram mais adequados a realidade dos alunos com deficiência que, por sua vez, exigem diferentes exigências educacionais e eficientes abordagens conforme objeto de discussão deste artigo. Para isso, a escolha foi feita por uma pesquisa qualitativa, por meio de investigações bibliográfica, de caráter exploratório, na qual foram discutidas diferentes publicações sobre o tema Sala de Aula Invertida na aprendizagem de alunos com deficiência. Dentre os resultados, identificamos que a aprendizagem destes alunos alcança melhores resultados articulada com a Sala de Aula Invertida, sendo seu conhecimento adquirido de maneira que, sua limitação nas atividades de ensino é contornada pela personalização do ensino. Este estudo promove o debate constante rumo ao desenvolvimento de práticas pedagógicas eficientes e adequadas às demandas dos alunos sempre em transformação, utilizando os recursos tecnológicos para despertar o interesse e facilitar a aprendizagem.

Palavras-chave: Ensino-aprendizagem; Inclusão; Metodologias ativas; Ensino; Sala de Aula Invertida.

Resumen

Este artículo es el resultado de una investigación bibliográfica sobre metodologías activas, en especial la enseñanza semipresencial y las aulas invertidas para alumnos con necesidades específicas. Esas metodologías se han destacado por correlacionar mejor la tecnología y la amplitud del alcance de los aprendizajes, tanto en el espacio escolar como fuera de él. El modelo de rotación aliado al submodelo de Aula Invertida es más adecuados a la realidad de los estudiantes con discapacidad, que, a su vez, demandan diferentes requerimientos educativos y enfoques eficientes, como se discute en este artículo. Para ello, se optó por una investigación cualitativa, a través de investigaciones bibliográficas, de carácter exploratorio, en las que se discutieron diferentes publicaciones sobre el tema Aula Invertida en el aprendizaje de alumnos con discapacidad. Entre los resultados, identificamos que el aprendizaje de estos estudiantes logra mejores resultados articulados con el Aula Invertida, y sus conocimientos se adquieren de manera que su limitación en las actividades docentes es sorteada por la personalización de la enseñanza. Este estudio promueve el debate constante hacia el desarrollo de prácticas pedagógicas eficientes y adecuadas a las demandas de los siempre cambiantes estudiantes, utilizando recursos tecnológicos para despertar el interés y facilitar el aprendizaje.

Palabras clave: Enseñanza-aprendizaje; Inclusión; Metodologías activas; Enseñanza; Aula Invertida.

1. Introduction

Promoting active methodologies that provide dynamic learning for students with disabilities must be a constant search for all those dedicated to education. In this context, new discussions have been growing in order to identify the true meaning of the school space and, thinking about students with disabilities, which tools can reduce the negative effect that their limitation causes on their learning.

Considering the fundamental right to education as unrestricted and compulsory, as advocated in article 6 of the Federal Constitution, allied to art. 23 that delegates the competence to the Union, States and Municipalities to provide, among others, education, science and technology, demonstrating the urgency in the offer and conditions of isonomic permanence to education. In this vein, Resolution No. 04 of October 2, 2009, by establishing the guidelines and bases for Special Education, defines the target audience of specialized educational services. They include disabilities, high abilities and global disorders. Due to the breadth and peculiarity of each specific need, the efficiency of the teaching proposal and guarantee of the fundamental and universal right to education is linked to the potential and uniqueness of each person. In this way, it is necessary to value the pedagogical practice that optimizes and intensifies the teaching-learning process.

In the active methodology proposal, blended learning has stood out for better correlating technology and learning scope, both in the school space and outside it (Christensen et al., 2013). The Information and Communication Technology tools - ICTs promote a significant improvement in the quality of teaching, multiply the possibilities of research and encourage

student participation. Thus, in this teaching model, the teacher is no longer the great transmitter of content, but a mediator of discoveries, encouraging and guiding students to develop their autonomy and an active posture (Rodrigues, 2017).

In this active methodology, the incentive to an active posture and the search for autonomy on the part of the students, with the proper guidance from the teachers, is given by different models of hybrid teaching, namely: a) rotation model; b) flex model; c) à la carte model; d) enriched virtual model (Costa, 2020).

Through the flexibility of hybrid teaching, it is possible to discuss some teaching models adapted for students with disabilities. As already mentioned, the rotation model, with the Inverted Classroom sub-model, presents itself as the mechanism that best suits the Brazilian reality (Trevelin et al., 2013), therefore, its discussion is the objective of this article, in view of the importance and need for debate on the subject.

Encouraging student participation in pedagogical activities with the maximum use of the teaching-learning process is a challenge that always comes up against ingrained and outdated processes that distance the student's daily reality from the content exposed in the classroom. The flipped classroom proposes precisely to promote the student's investigative and self-guided capacity, instigate their curiosity and develop commitment and responsibility to, only with the guidance of the teacher, develop their potential and problem-solving skills with available tools. In this way, cyclically in the face of the challenges of Education, teachers, students and the entire academic community will head towards the transposition of frequent, contemporary and imminent obstacles in learning.

This time, a bibliographic analysis of scientific research that deals with processes of inclusion of people with with disabilities was proposed to make teaching-learning more efficient, promoting, in fact, equal access and permanence in education. The objective is, therefore, to verify the dominant position in scientific research on unrestricted and isonomic education for people with with disabilities, as well as to promote debate and reflection by the academic-scientific community on increasingly efficient processes in combating the curtailment of the right to justified education by the fallacy of limitations arising from the disabilities of the student.

2. Methodology

This work was carried out through a qualitative research, using a literature review, where different publications on the theme inverted classroom in the learning of disabled children were discussed (Marconi & Lakatos, 2017).

In this perspective, an active search was carried out for current publications on Google Scholar and other references to better discuss the topic, relating works and research to better discuss Blended Teaching and the Inverted Room and Classroom for students with disabilities.

3. Results and Discussion

Based on the keywords "Teaching-learning, Inclusion, Active Methodologies, Inverted Classroom", the literature review consisted of a Google Scholar search on an efficient mechanism to promote the inclusion of students with with disabilities, promoting, above all, inclusion and success of the teaching-learning process. The research, in turn, resulted in more than six thousand results that were selected according to the convenience with the theme addressed in this study, as shown in Table 1. Initially, it can be seen that research on the subject in question is swarming in the national academic scenario, demonstrating the need and importance of discussing improvements in teaching-learning processes.

Table 1 - Related Scientific Works.

Theme	Type	Author	Target Audience	Objetives	Results
Active Methodology	Book Chapter	Moran (2015)	Academic Community	Discuss changes in education based on the use of active methodologies.	It is possible to maintain the “classroom” if the educational project is innovative, - curriculum, competent management, active methodologies, attractive physical and digital environments - if the school has teachers who are very well prepared to know how to guide students and where they feel protagonists of rich and stimulating learning.
Hybrid Teaching	Article	Santos et al. (2017)	High School Students	Discuss the technological resources and learning methodology used in the planning and execution processes of classes	It was identified that the proposal brought by Hybrid Teaching, in which we "mix" active learning methodologies with educational technologies, tends to generate good results for student learning, as it considerably increases the quality of student study, and the level of discussion in classroom.
Flipped classroom	Article	Beserra, Quaglio e Falandes (2018)	Academic Community	Discuss the contemporary scenario of the teaching-learning process based on the changes brought about by new technologies.	At the end of the reflection, it is observed how concepts and practices of hybrid teaching and the inverted classroom are directly aligned with the technical possibilities of digital TV and multiple screens, so integrated into the daily lives of individuals.
Hybrid Teaching and Inclusive Education	Article	Dultra (2019)	Deaf Students	To present the contributions of blended learning to the teaching and learning process of students, especially deaf students.	The study concludes that hybrid teaching presents a diversity of methods to be applied in the inclusive teaching of the deaf, allowing, through a transdisciplinary approach, a good reflection on the contemporary context in education, as long as it is used properly, with due planning, combining with several technological resources, but for its implementation it is necessary that a school cultural re-elaboration occurs, mainly to the traditional teaching method that is still rooted in our culture.

Source: Own authorship (2022).

Among the hybrid teaching proposals, the rotation model, as well as its sub-models, are pointed out as those that best suit different learning modalities (Andrade & Monteiro, 2019). Conceptually, the rotation model is defined by Christensen et al. (2013, p. 3) as:

the one in which, within a course or subject (e.g. mathematics), students alternate between teaching modalities, in a fixed schedule or at the teacher's discretion, with at least one modality being online teaching . Other modalities may include activities such as small group or full class lessons, group work, individual tutoring and written assignments. (Christensen et al., 2013, p. 3)

The rotation model stands out for its use in digital form, as it allows for an even greater adaptation of the learning of students with disabilities, thanks to the virtual environment (Horn & Staker, 2015). There are four types of categories, or sub-models, that can be found in the Rotation model, namely: Rotation by Stations, Laboratory Rotation, Inverted Classroom, and Individual Rotation (Christensen et al., 2013).

The flipped classroom rotation model hybrid teaching was created in the United States in the 2007/2008 school year by two teachers who were dissatisfied with the way their students were unable to bring to everyday reality the theoretical aspects seen in the classroom class. Thus, Jonathan Bergmann and Aaron Sams thought of changing the way they managed the

school routine, adopting a teaching position whereby their presence as a teacher was used only when, individually, a student needed monitoring (Bergmann & Sams, 2016).

In this understanding, school practice consists of an orientation to student learning only when requested. The teacher is not responsible for bringing knowledge to the student. In turn, the student's activity is to actively seek knowledge, without the need for content exposure on the part of the teacher, and it is up to the teacher only to correct the learning when accused (Moran, 2015). The methodological proposal consists of doing in the classroom what, in the traditional model, the student would do at home, such as solving tasks and pointing out doubts, and, therefore, doing at home what would be done at school, studying the content of the subject. The teacher's role is also reformulated in this model, becoming a mediator of the educational process.

According to Moran's (2015) perspective, in the search for knowledge in an active way, it is up to teachers to enable strategies so that students with disabilities can take part and feel included in the teaching-learning process, either through active methodologies, such as blended teaching and the flipped classroom, or by another strategy that inserts the student with a disability in the context of the classroom.

In this context, we can correlate the example with the film "Red as the sky" (Bortone, 2006) which addresses the school routine of visually impaired children at Instituto Cassoni. In the feature film, Professor Don Giulio, through stimuli such as leaves, fruits and sounds, sought to make children with disabilities build their knowledge based on their tactile perception. Mirco, the film's main character, was a very active child, providing the other children, who accompanied him on his adventures, with experiencing the world in a dynamic way, from a Humanist perspective. By arousing the friends' curiosity, it is observed in the film that the other students are also able to learn stimulated by their own curiosity, however, they need a teacher to direct this learning.

This time, the cinematographic work can be used as instructive-training material for teachers who must be prepared to teach with quality and equity to all students, overcoming their limitations, whatever their nature. In addition, the film has a motivational nature for students who learn to see their colleagues as enhancers of knowledge and enhancers of the plurality of skills.

Mendonça et al. (2022, p. 4) consider that "the use of active methodologies should promote a recreation of knowledge with a very daring scope. Educators and students who use such methodologies must be willing to undertake a deep revision of their own conceptions, within a emancipatory praxis".

The Flipped Classroom model is one in which "[...] the rotation occurs between the teacher-supervised practice (or work) at school and the residence or other location outside the school for the application of the content and online lessons" (Christensen et al., 2013, p. 3). In this sense, Santos (2021), Scarpati (2021) and Ferraz (2021) consider that, didactically, this topic can be approached in the following way: a) discussing the importance of technologies in the classroom from the display of videos, as well as as the role of the teacher; b) analyzing the operationalization of technology, as well as the use of the Flipped Classroom as a teaching work strategy; c) conceptualizing Hybrid Teaching and the Flipped Classroom and how to use Active Methodologies today.

Methodologically, the Inverted Classroom model takes place as follows: instructional material (books, magazines, texts, videos, questionnaires, digital and virtual resources, among others) are provided to students before class and contact with the content teacher or determined discipline (Bergmann & Sams, 2016). In this way, in the virtual moment, through an active search for learning, students access the necessary information to form an idea about certain concepts. In turn, in the face-to-face moment, the teacher adopts the posture of a mentor, being available to supervise the practical actions that must be developed (Moran, 2015).

In this understanding, it is noted that the Inverted Classroom can be defined as “the method that consists of inverting the logic of classes centered on the Traditional teaching model, in which the teacher explains the content and the student performs the proposed activities at home” (Machado et al., 2019, p. 399).

It is noted that, by the Inverted Classroom model, teaching occurs in a hybrid way because the learning process occurs through pedagogical stimuli of different natures, in different places, favored by the active methodology (Valente, 2015).

Through the Flipped Classroom, students with disabilities learn in a way that is more compatible with overcoming their learning limitations. In this way, by bringing the content to be worked on to their reality and seeking to assimilate them through the use of different virtual tools, learning occurs by overcoming the disability that most affects its bearer, thus making the teaching process more efficient more inclusive learning, as it allows knowledge to overcome the different conditions between each student (Andrade & Monteiro, 2019).

With the understanding that blended teaching through the Inverted Classroom allows personalization of learning, Gabrich and Benedito (2017, p. 169) state that:

the Inverted Classroom (...) is an excellent tool for the inclusion of people with disabilities and/or special needs, mainly due to its ability to personalize teaching. As demonstrated, the inversion of classrooms allows the teacher to customize teaching for each student, which contributes to greater inclusion and understanding of classes by students, including those with disabilities and/or special needs. (Gabrich & Benedito, 2017, p. 169)

The main contribution of the Inverted Classroom to the learning of students with disabilities is the fact that, in this type of blended learning, the way in which knowledge acquisition occurs is adjusted to the individual's needs, being dimensioned by the student himself, and thus becoming personalized. This active way of learning makes the teacher an important collaborator with the function of guiding the paths to be followed during the learning process (Bergmann & Sams, 2016).

4. Final Considerations

Through the bibliographic review addressed, it demonstrates that publications are converging on, mainly the reformulation and modernization of pedagogical practices to meet students with disabilities, making them more efficient and attractive. It was possible to perceive the methodological proposal of the Inverted Classroom, provided by hybrid teaching and Information Technology tools, as an excellent mechanism to assist the teaching-learning process of the student with disabilities according to the studies covered in this bibliographic review.

The fact is that everyone should be included in teaching spaces, regardless of their gender, age, ethnicity, socioeconomic status or their disabilities.

Teaching that combines face-to-face and remote activities through Information and Communication Technologies - ICTs brings all the advantages that the two teaching modalities present: flexibility of schedules, study according to the student's personal pace, access to materials whenever necessary and in an easy way and organized, as well as close contact with the guiding professor, close contact with other students to exchange experiences, possibility of research and extension policy based on teaching and breadth of the evaluation system.

In view of the analyzes carried out on blended teaching and inverted classrooms for students with disabilities, we can consider that the learning of students with disabilities is a daily exercise for everyone who is part of the teaching-learning process, with the pedagogical presence of the entire community being essential to reduce distances and establish the presence of students with disabilities in Brazilian public schools.

We understand, therefore, that it is up to the teacher to enable strategies and methodologies that collaborate for the insertion of students, considering that the use of active methodologies, such as the inverted classroom and hybrid teaching, helps in the promotion and development of students, indicating the need to personalize teaching through active methodologies for greater inclusion and understanding of classes for students with disabilities.

This study did not intend, in any way, to exhaust the theme, but to propose a constant and reflective dialogue towards the improvement of education. In this way, it is expected that new and in-depth research will be carried out to keep the theme of Inclusive Education always on the agenda towards improvements to guarantee the universal right to education.

References

- Andrade, D. P. C. M., & Monteiro, M. I. (2019). Educação Híbrida: abordagens práticas no Brasil. *Revista Eletrônica Científica Ensino Interdisciplinar*, 5(14), 250-264.
- Bergmann, J. & Sams, A. (2018). *Sala de aula invertida: Uma metodologia ativa de aprendizagem*. Rio de Janeiro: LTC.
- Beserra, V., Quaglio, A. M., & Falandes, C. G. (2018). Reflexões sobre o ensino híbrido: uso da sala de aula invertida em cenários inovadores com TV Digital e múltiplas telas. *Educação & Linguagem*, 21(1), 5-22.
- Bortone, C. (Produtor/Diretor), Mazzocca, D. (Prdutor). (2006). *Rosso come il cielo* [Filme]. Itália: California Filmes.
- Brasil. Constituição (1988). *Constituição da República Federativa do Brasil*. Brasília, DF: Senado Federal: Centro Gráfico, 1988.
- Brasil. *Diretrizes operacionais para o atendimento educacional especializado na Educação Básica, modalidade Educação Especial*. Brasília: MEC, 2009. Resolução CNE/CEB n.º 4, de 2 de outubro de 2009.
- Christensen, C. M., Horn, M. B., & Staker, H. (2013). *Ensino híbrido: uma inovação disruptiva*. Uma introdução à teoria dos híbridos, 21.
- Costa, G. M. C. (2020). *Metodologias ativas: métodos e práticas para o século XXI*. Editora IGM.
- Dultra, A. A. (2019). *O ensino híbrido: alternativa para a educação inclusiva de surdo*. Research, Society and Development, 8(6), e47861078.
- Ferraz, D. O. In: *Seminário Ensino Híbrido e Sala de Aula Invertida*. Vitória, 04 de nov. 2021.
- Gabrich, F. A.; Benedito, L. M. F. (2017). Sala de aula invertida para o ensino jurídico inclusivo. In: *CONPEDI - Conselho Nacional de Pesquisa e Pós-graduação em Direito*, 157-175.
- Horn, M. B & Staker, H. (2015). *Blended: Usando a inovação disruptiva para aprimorar a educação*. Porto Alegre: Penso.
- Machado, A. P. R. et al. (2021). Sala de aula invertida: uso do Google Classroom em uma disciplina de artes. In: Pavão, A. C. O.; Pavão, S. M. de O. (orgs). *Metodologias ativas na educação especial/inclusiva*. Santa Maria, RS: FACOS-UFSM.
- Marconi, M. A.; Lakatos, E. M. (2017). *Fundamentos de metodologia científica*. São Paulo: Atlas.
- Mendonça, A., Pereira, B. V. A, Ferraz, D. de O., Martins, H. P. P., Sá, H. B. de M., Ribeiro, I. O., Jardim, R. B., Santo, S. C. do E., & Rocha, P. C. da S. (2022). Active methodologies applied to Professional and Technological Education. *Research, Society and Development*, 11(2), e9111225593. <https://doi.org/10.33448/rsd-v11i2.25593>
- Morán, J. (2015). *Mudando a educação com metodologias ativas*. Coleção mídias contemporâneas. Convergências midiáticas, educação e cidadania: aproximações jovens, 2(1), 15-33.
- Rodrigues, E. F. (2017). *Tecnologia, Inovação e Ensino de História: o Ensino Híbrido e suas possibilidades* [PublishedVersion, Niterói]. <https://app.uff.br/riuff/handle/1/4604>
- Santos, A. C., Nicolete, P. C., Mattioli, N., & Da Silva, J. B. (2017). *Ensino Híbrido: Relato de Experiência sobre o uso de AVEA em uma proposta de Sala de Aula Invertida para o Ensino Médio*. RENOUE, 15(2).
- Santos, A. X. S. In: *Seminário Ensino Híbrido e Sala de Aula Invertida*. Vitória, 04 de nov. 2021.
- Scarpatti, E. das V. In: *Seminário Ensino Híbrido e Sala de Aula Invertida*. Vitória, 04 de nov. 2021.
- Trevelin, A. T. C., Pereira, M. A. A., & Oliveira Neto, J. D. de (2013). A utilização da “sala de aula invertida” em cursos superiores de tecnologia: comparação entre o modelo tradicional e o modelo invertido “flipped classroom” adaptado aos estilos de aprendizagem. *Revista de estilos de aprendizagem*, 6(12).
- Valente, J. A. (2015). O ensino híbrido veio para ficar. In: Bacich, L.; Tanzi Neto, A. & Trevisani, F. de M. (orgs.). *Ensino híbrido: personalização e tecnologia na educação*. Porto Alegre: Penso, pp. 21-26.