

# **M-LEARNING CHALLENGES IN TEACHING CROSSCUTTING THEMES IN THE EDUCATION OF YOUNG PEOPLE AND ADULTS**

Marcos Andrei Ota and Carlos Fernando de Araujo Jr  
*Cruzeiro do Sul University, Brazil*

## **ABSTRACT**

The challenges faced in using new technologies in the classroom are numerous, but contributions generated with their resolution can proportionately provide original and efficient teaching practices more in tune to students' eager learning needs. This article presents some strategies developed to help teachers in transversal themes classes using m-learning. The use of mobile devices and the choice of applications in teaching revealed important data, indicating that the expansion and intensification of the use of these devices in the classroom is possible. In Young and Adult Education, the situation emerges as an opportunity to make up for lost time and space in the restitution of studies, as well as furthering advancement in teaching, itself. Competent m-learning practice rises to situations that reach beyond the concept of technological resources. They imbue teaching with intrinsic characteristics that facilitate and motivate teaching and learning situations to the benefit of all participants. As result, we present several strategies for help teachers in transversal themes classes using m-learning. Therefore, these contributions allow the application in other fields of knowledge.

## **KEYWORDS**

M-learning. Young and Adult Education. Transversal themes

## **1. INTRODUCTION**

We live in a world that incites contemplation of technological and scientific growth and its impact on educational environments. Considering that even though we now have access to resources that we never imagined possible before, the dilemma remains the same: What can be done to improve education? As an initial response, we suggest reflection as a starting point. Education should not fear change (DEMO 2001). The fact that mankind has not benefitted from the advent of technological progress to advance the educational context intrigues us to research the real-time need for innovation in finding solutions to paradigms evidenced in this area.

Given this perspective, students enrolled in the Youth and Adult Education Program (EJA); see an opportunity at school for increased social mobility and motivation (BOCK, 2008; BUROCHOVITCH et al, 2010) to resume interrupted studies. Oliveira (2002) considers that individuals enrolled in adult education suffer a trajectory of academic exclusion. Students often manifest this in failure and evasion (motivational aspects, family issues, displacement) and consider this a result of an inadequate school system when one considers that the current model does not promote a welcoming and efficient working environment to provide meaningful learning situations (AUSUBEL, 1968; SANTOS, 2008; MOREIRA, 2006) that stimulate student interest in pursuing study.

We see new strategies for teaching in an increasingly "technologized" world as constructive and necessarily practical, not just for the sake of adopting the use of technological devices in the classroom, but also as a challenge in placing these students in today's entrepreneurship and business world, reiterating full exercise of their citizenship.

With the evolution of mobile technologies and the inherent possibilities of interaction, mobile learning (m-learning) enables connections that make teaching non-linear and collaborative, encouraging new ways of producing content shared in time and space (TAPSCOTT, 2009 ). The relevance of this study is justified by the many benefits that m-learning (ML) usage can create in school environments (BARBOSA et al, 2011;

ARAÚJO and SILVEIRA, 2014) and, in extension, to promote learning strategies which are non-formal and ubiquitous (HWANG & WU, 2014; SANTAELLA, 2010; CASTELLS, 1999).

In this context, this study aims to present proposals to aid educators in the teaching of crosscutting themes with the utilization of mobile devices. We will take crosscutting themes as its starting point and more specifically, discussions based on the topic: Sustainability, involving 27 students in the 1st year of adult education - high school.

This choice is not restricted to this issue, as we will demonstrate use of strategies that can be adopted in other areas of knowledge. Another important element is justified by the theme choice, because they are traditionally treated in public education in a very superficial way away from the reality of students. Therefore, the proper use of mobile resources can extend the possibilities of teaching and learning even in situations which the contents do not generate motivation to make learning more meaningful.

To that end, we organized this article as follows: Introduction, as represented by this section. Intentionally, this next section brings some literature contributions to help in understanding the reality of Brazilian EJA students and then Section 2 discusses the possibilities of use and motivational aspects and opportunities that ML can create for students and teachers of adult education. Section 3 describes implementation steps of the activity and some strategies in using these applications in the classroom. Section 4 presents an analysis of the results, and finally we present the conclusion and future projects.

## **2. M-LEARNING CHALLENGES IN THE EDUCATION OF YOUNG PEOPLE AND ADULTS**

UNESCO (2015) in the publication: Education for Global Citizenship: preparing students for the challenges of the twenty-first century – the text elucidates ideas that contribute to reflection on changes in educational practices and the need to resolve global issues.

Society hopes that education will facilitate international cooperation and promote social transformation in innovative ways toward a humanity that is more equitable, pacific, global, tolerant, inclusive, secure and sustainable. In an increasingly interconnected and interdependent world, a transformative pedagogy is fundamental; one which enables students to work out persistent questions that encompass all humanity, related to sustainable development and peace [...] (UNESCO, 2015, p.7)

In this context, the topics pointed out in this document advocate studies that explore and test innovative and transformative educational practices and new technologies in school environments linked to this reality, especially those that enable mobility and mobile learning; conceiving ideas that guide student learning in dealing with the challenges of this century.

In an attempt to conceptualize m-learning, Barbosa et al (2011) identified several distinct practices related to this concept: portable e-learning, learning in the classroom supported by mobile wireless technologies, mobile training, inclusion and diversity. The authors add that the key feature of this educational revolution is the mobility of learners who may be physically distant from formal and informal learning spaces such as the classroom and each other.

Therefore, one can perceive five specific characteristics of mobile device use in education: portability, social interaction, sensitivity to context, connectivity and individuality.

This scenario favors the growth of academic projects related to m-learning in promoting access to education and disadvantaged social groups. (BARBOSA et al, 2011). Accordingly, according to Hwang *et al* (2015) the application software or supplementary materials for extension courses and discussion can help students acquire extensive knowledge of the course content and connect the knowledge to real-world contexts, on the other hand, teachers need to focus on the relationships between the learning content, additional learning sources or application software, and the real-world contexts,

Tapscott (2009) points out that a society provides elements for rethinking education and relationships that drive the individual to seek knowledge. We may consider that communicative obstacles are now fewer for students from the 'digital generation' with their modern technological possibilities at hand, when compared

to students of the EJA educational modality. This is because EJA students were born at a time when computers were not commonplace. Tablets and Smartphone Internet with 3G / 4G are examples of devices only recently available and introduced into the everyday lives of new learners.

We circumspectly identify challenging possibilities in EJA students, indicating a motivation toward learning and navigation toward social mobility and intrinsic inclusion in society, while reversing the unfortunate past of academic exclusion. M-learning then emerges as a starting point in consolidating this new future, as these newfound educational practices increasingly facilitate settings for essential learning that go beyond the school, taking place at any place and time in their daily routine.

## 2.1 From Transversality to Mobility

Santos and Weber (2013) consider mobility in the educational context as pedagogical practices that promote immersion in contemporary culture, transformed by a new understanding of space and time, promoting new ways of living and moving in society.

The proposal of classes involving crosscutting themes may include practices derived from mobile learning in an attempt to bolster student learning in assimilating concepts, theories, practices and even motivational factors, so that they may experience the entirety of citizenship and participation in society. In this sense, crosscutting themes are a starting point for meaningful learning, fitting in the syllabus as stimulus to academic advancement (KAMURA, 2009).

In line with the above, it is noted that students of the EJA modality can benefit from learning contexts provided by m-learning in enhancing the study of crosscutting themes in and out of school environments. In other words:

Transversality, dynamic and fluid, perfectly permeates the proposal of teaching competency. A graduate student nestled in the competency model is an individual prepared to satisfactorily and globally deal with the most diverse situations presented to him in his professional life and in society. (CARNEIRO et al, 2002, p.16).

Thus, mobile learning enables a connection between crosscutting themes, students and teachers. Araujo Jr. and Silveira (2014) reaffirm this assumption, considering that m-learning in the educational environment fits into the study of mobile device use for adapting study content and in learning how to use applications, as well as in using collaborative strategies for the cogency of aspects inherent to teaching and learning.

## 2.2 From Motivation to Meaningful Learning

Learning motivation at school stands out as a separate field of interest and research for many scholars who believe that learning motivation is one of the principal factors that favors the outcome of student learning acquisition, much sought by educators.

Learning motivation processes are at the center of reflection in educational areas, and its absence is considered the main factor of school failure. (MARCHESI, 2006; NOGARO, 2014)

Boruchovitch et al, (2010) adds that motivation for an activity will be present if the motivational strategy demonstrates this instrumental value, which is shown in several ways. In other words, "a viable motivational goal of teachers in day-to-day schooling is to pursue the advancement and maintenance of motivation in learning activities" (BROPHY, 1999, p.13), i.e., they must provide students with engaging interest and satisfaction in activities.

According to Santos (2008), learning only occurs if four basic conditions are coexistent: motivation, interest, the ability to share experiences and the ability to interact in different contexts. The author further reiterates that once these conditions transpire, meaningful learning becomes possible.

The most important concept in Ausubel's theory is meaningful learning. According to him, meaningful learning is a process by which new information interacts with an important aspect of an individual's cognition (MOREIRA, 2006).

Seeking to leverage new possibilities, m-learning manifests itself as one of several strategies and teaching practices in the transmission of information, especially for contributing to students' motivation in creating teaching proposals and configures as an imposing tool for teaching and learning.

Thus, in the following sections we propose strategies to meet this challenge. Not smugly, but with the intention of opening doors to new contributions and sharing positive academic experiences.

### 3. APPLICATION STEPS

Considering the methodological aspects involved, we initially decided to treat sustainability as a guiding tool in proposing/developing an activity for EJA students. This choice is justified as a strategy to bolster the teaching of crosscutting themes in adult education, providing necessary skills that help prepare participants to recognize and face the challenges that they will encounter as participants in modern society.

We perceived the theme as fertile ground for the exploration of sustainability. This is because the school unit is located on the eastern outskirts of the city of São Paulo, Brazil. There, serious problems related to housing, water shortage and sanitation, among others, are endemic, providing a real-time/life learning context.

We based this study on qualitative and quantitative methods, considering relevant contributions that data yields to education and ensuring a solid interpretation of researched issues. We divided the application activity in three steps.

The first step is a preliminary analysis of the subject, essential to the course of the following stages, taking into account the specifics and weaknesses found in the profiles of students entering the EJA modality. Then, in a broader context, allowing for appropriate advancement proposals focused on apprentice learning that provide greater meaning and motivation.

#### *Characterization of the subject ( Step 1)*

- Class: 1st term - 1st semester (freshman) | Mode - Secondary Education (EJA)
- Participants: 27 students, 80% equipped with smartphones / Android System
- Age group 19 to 47 years
- Weaknesses: Poor reading and interpretation skills, absence of dedication to formal study and apparent difficulty in independent study outside the school.

The object of the second phase was to analyze learning context. Students conducted an activity during Project Classes (refers to Project Learning Support in public schools in São Paulo - Resolution SE 68, 09.27.2013) in the traditional format, given only the printed page content of study. They had no technological resource aid. The learning context required that students read and interpret text, executing two exercises (available for download at: <https://goo.gl/I2AhEf>). The first exercise (word hunting) required that students recognize the main topics covered in the text. For the second exercise (fill-in the gaps), students produced an interpretation about the text content (Sustainability and Social responsibility). This activity took two classes (1h30min.) and students completed it individually.

We developed the third stage as a strategy and activity proposal using mobile devices with free apps support for mobile devices using the Android platform. In this phase, we sought to develop a proposed activity for the teaching of crosscutting themes with the same participants from step 2.

In a previous study, we found approximately 100 applications dealing with the theme of sustainability in the Google Play store. The search results, though significant, were not satisfactory, because EJA students found the content irrelevant and decontextualized. Most of the applications advertised private initiative campaigns, event dissemination or product sales that we identified as tagged with the concept "Sustainable", magazines, books and children's games, difficult to reuse and adapt to the learning context evaluated in the previous step.

In searching for new possibilities, we based the generated content on the same procedure adopted in the previous step. The intention of this refers strictly to teaching strategies that are based on the challenges of m-learning and active, meaningful learning conditions (ARAÚJO and SILVEIRA, 2014; SANTOS, 2008). According to Totti et al (2011, p. 5), m-learning is a reference to a threshold base and allows for the incorporation of other features of mobile devices. Some of these characteristics are the mobility of the

learner, content access at any time and place, user context / location and the ability to merge real and virtual scenarios, as well as providing support to maximize classroom-learning experiences.

The same students from step 2 had applications pertinent to the activity previously installed on their mobile devices and / or tablets that were granted on loan to students who did not have mobile resources with an Android system, and then received theoretical content on the sustainability issue.

At this stage, the practical class had the same duration as classes of the second stage (2 lessons / 1h30) to complete exercises generated from the applications that are detailed in the next section.

### 3.1 Potential and Limitations of Applications

Faced with the limitations and difficulties in addressing crosscutting themes, and particularly in sustainability through applications, this topic presents the strategies used to prepare the content for step 3, as well as an analysis of the potential and limitations of the applications used. The choice of applications is justified because it made reuse for other class / subject contexts possible, according to the specific profile of the EJA students.

We designed the adopted prototype with socialization and reuse strategies in mind, allowing for content generation planning in other areas of knowledge, from a simple activity to a more complex learning context. Moreover, the contribution of this study can provide digital inclusion opportunities and increase the time and learning spaces / interaction of these students.

#### *I – Application for content sharing*

##### *a) Google Slide*

*Description:* create, import, share and view PowerPoint presentations.

*Learning context:* The student can previously access the content and the teacher can use the resource to introduce the concept.

*Limitation:* Participants must connect for viewing.

##### *b) Lensoo Create*

*Description:* transform any device into a digital whiteboard having the ability to write or type, insert images on a screen and record lectures. The feature also allows you to post and share content (Youtube) and import documents (Google Sheets, Google Slides, PDF).

*Learning context:* The student can previously access and / or review the content explained in the previous class. The teacher can use the feature to create classes based on the inverted classroom methodology (Flipped Classroom) and share the explanation / review / resolution of a given content with students.

*Limitation:* The free version allows you to record only 15 minutes of class and restricts some features (HD recording highlight / emphasize terms and geometric shapes).

#### *II - Application to assess and motivate learning in the classroom*

##### *a) Socrative Student*

*Description:* create, import and evaluate students in real time with teaching issues. The application displays a performance report on the participants. It has a collaborative mode, in which it is possible to divide the participants into groups and challenge them (gamification concept).

*Learning context:* Teachers and students can get the result of the performance in the activity. It is applicable to all areas of knowledge. The data sent in the report enables the educator to review the content / topic and subsidize participants' learning with complementary materials.

*Limitation:* Participants must be logged in to access. It does not work on all versions of Android.

##### *b) MindMup*

*Description:* creates and shares mind maps.

*Learning context:* students can represent content / synthesis of a particular topic through a representation / graphic scheme, facilitating the prioritization of information and amplifying the storage content volume / information - In practical classes, students collaboratively developed a mind map on the theme of Sustainability.

*Limitation:* Participants must connect to create.

In addition to the applications used in items I and II, there are some facilitative tactics used to optimize access and the time necessary for viewing a particular content. With regard to the time limit allotted to each class, technical issues usually take the most time during the application of an activity involving mobile devices. The use of QR-codes, link shorteners, instant messaging (WhatsApp, for example), Bluetooth, blogs and other social networks are presented as good practice exercise for working with previously advanced content sent to students. This avoids the erroneous perception that the immediate use of the resource is presented only as an artifact substitution, since previous preparation practice contributes to active engagement of participants in the task.

#### 4. RESULTS ANALYSIS

In order to recognize the contributions that this study can offer for m-learning usage practices, we organized the step analysis as follows: tools, performance, feedback and guides. As backing support, we based the reasoning on the principles of meaningful and active learning.

- a) *Assessment tools* — the data, represented by the histogram below, shows in distribution prevalence that during the execution of step 2 (Figure 1), there was a low return in the proposed activity (2.5 to 5.0) - 22 students (81%) of a total 27. In Figure 2, we see satisfactory student return concerning the evaluation performed with the Socrative application during the application activity using mobile devices.

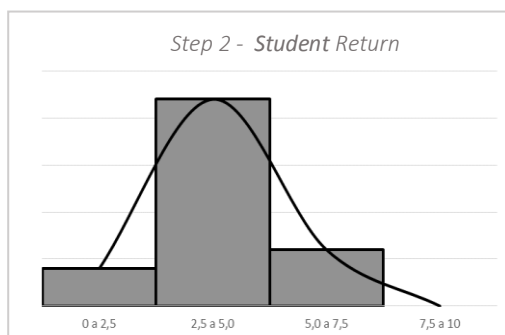


Figure 1. Students' Grades

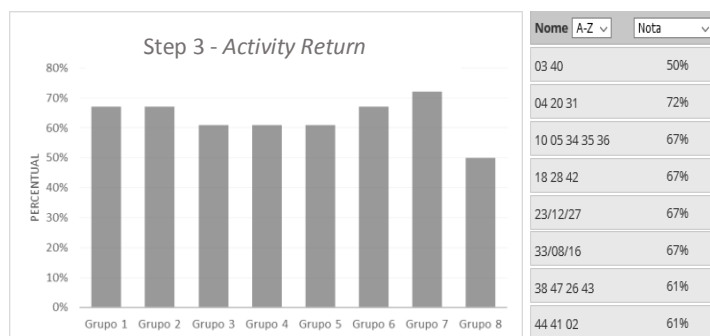


Figure 2. Students' Grades

- b) *Performance Monitoring* — Another potential perceived by adopting the principles of mobile learning is the ability to review concepts and diagnose weaknesses. In Figure 3, we see the need to review a particular aspect of the content: "Sustainability" (the benefits obtained from recycling) that in general, was not assimilated by the group.

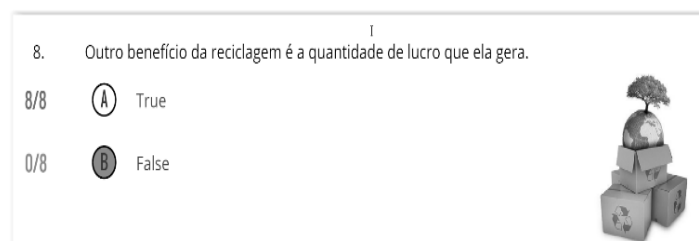


Figure 3. Print Screen - Socrative (exercise with low return)

- c) *Feedback from students about the activity* — In the final moments (step 3), the students received a feedback sheet so that they could express an opinion about their experience of performing activities through mobile devices. As a qualitative approach, student feedback provided important information to evaluate the stages of research.

We randomly chose Nine (9) student records (individual and group) in order to enable the correlation of the objective proposed in this study to the possibilities afforded by mobile learning. Notably, all student feedback discussion has given commentary favorable to the lessons executed with the aid of mobile devices, recognizing the benefits that these devices can provide in processes related to the act of teaching, and consequently guide students in active and meaningful learning.

To Moreira (2006), one of the educator's greatest challenges is to help students assimilate the structure of teaching materials and rearrange their own cognitive structure in the acquisition of new contexts that may in turn generate original concepts and principles. The author also points out that the problem of learning in the classroom is in finding resources that facilitate the capture of the conceptual structure of the content (m-learning, for example) and their integration into the student cognitive structure, making the material meaningful.

Under motivational aspects of learning transversal contents: sustainability, for example, relates directly to the fact that EJA students can put the knowledge acquired during meaningful learning to practice in real-time situations experienced in their everyday living and in active participation in contemporary society. We also observed this in feedback from students:

*[1] For me, lessons using mobile phones and tablets helps me understand more. The activity we did was really cool, testing our knowledge and having fun at the same time. I hope it stays that way.*

*[2] Good, I would like to repeat this experience more times. It is really cool and I learned things too, including today, when I learned the colors that indicate the plastic, glass, paper and metal containers for recycling that I had never paid attention to before.*

*[3] I hope that every lesson we learned we can put into practice.*

*[4] I thought that sustainability was to recycle things, but after I became older, I saw much more than that. I also liked the group activity in making the mental map.*

*[5] To have the class material on my cell phone before class is very good, I studied it on the way to work. I don't have time to study at home because I have to sleep.*

*[6] I thought this class was very productive and interesting. Congratulations on innovation.*

*[7] I found class super interesting because it serves as company testing to get a job.*

*[8] The group felt good, better than just writing without understanding anything. This lesson was good because we learned from our mistakes and it also helped us to think as a team and everyone contributed.*

*[9] I liked the quality of classes and all the steps and I hope we have more of these classes.*

For didactic purposes and application results, we categorized the data as "Learning guides."

*Learning guides* — Figure 4 shows learning guides relating to categorization carried out in the analysis of student opinion (c- *Feedback from students*). Moreover, we observed that student feedback was related to more than one category, collaborating as a complementation in enhancement of the adoption of teaching strategies that include the use of mobile devices. In a broader sense, it enriches teaching practices and directs the learning environment inside and outside of school spaces.

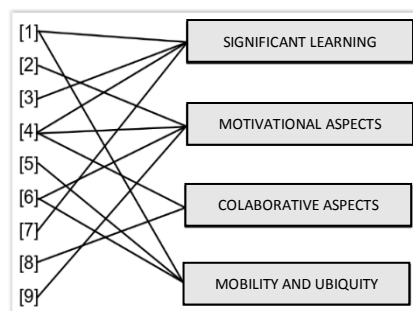


Figure 4. Learning guides | Source: prepared by the authors

We determined that learning guides can help highlight the importance of the school in the exploitation of crosscutting themes. This is pointed out by the National Curriculum Standards: "The school does not change society but it can, sharing this project with social groups that assume and articulate democratic principles, constituted not only as a demonstration of these principles, but also as an act of transformation" (BRASIL, 1998, p. 23).

A special point is the specifics of adult education regarding the use of mobile technologies (m-learning) in the classroom, because just typing in "application on sustainability" and expect that students interact with the resource is not enough. It is necessary to generate strategies that can insert and direct them toward a technological context in favor of meaningful and emancipatory learning.

## 5. CONCLUSION

The results obtained in this study demonstrated that mobile learning has contributed significantly to help reverse unsatisfactory student performance in crosscutting themes (sustainability) study, not only quantitatively but also qualitatively, when considering the motivational issues observed in participants' feedback. As mentioned, this paper focused to bring some strategies for help teachers in transversal themes classes using m-learning. Not with new ideas, but new possibilities of use without expertise in advanced technology.

Consequently, the proper use of applications made it possible to elaborate teaching strategies applicable to all areas of knowledge. Please note that this practice is not limited to the substitution of an artifact or to only make class more enjoyable; the challenge is in the intentionality of its use, i.e., generate new methods for transmitting knowledge, connecting the student to the world and spreading emancipatory and active learning in and outside of school.

Among the future possibilities of investigation, we can highlight the need to step up studies for the proposal and elaboration of activities in other areas of knowledge and the implementation of workshops / courses that can train teachers in the effective use of mobile devices in the classroom.

## REFERENCES

- Araújo JR, C. F. & Silveira, I. F. (Orgs.), 2014. *Tablets no Ensino Fundamental e Médio: princípios e aplicações*. TerraCota. v. 1. 176p. São Paulo.
- Ausubel, D. P., 1968. *Educational psychology: a cognitive view*. Holt, Rinehart and Winston, New York.
- Barbosa, J., Saccol, A. Z. & Schlemmer, E., 2011. *M-Learning e U-Learning: Novas Perspectivas da Aprendizagem Movel e Ubiqua*. Pearson Prentice Hall, São Paulo.
- BRASIL. Ministério da Educação, 1998. *Parâmetros Curriculares Nacionais (PCNs) – terceiro e quarto ciclos: introdução*. Secretaria da Educação Fundamental, Brasília.
- Böck, V. R., 2008. *Motivação para aprender e motivação para ensinar*. CAPE, Porto Alegre.
- Boruchovitch, E., Bzuneck, J. A., & Guimarães, S. E. R. (Orgs.), 2010. *Motivação para aprender: aplicações no contexto educativo*. Vozes, Petrópolis, RJ.
- Brophy, J., 1999. Research on motivation in education: Past, present, and future. In T. C. Urdan (Ed.), *Advances in motivation and achievement: The role of context*, vol. 11, (pp. 1–44). JAI, Greenwich, Connecticut.
- Carneiro, R. et al, 2005. *Transversalidade e inclusão: desafios para educador*. Senac Nacional, Rio de Janeiro.
- Castells, M., 1999. *A sociedade em rede. A Era da Informação: economia, sociedade e cultura*. Paz e Terra. São Paulo.
- Demo, P., 2001. *Desafios modernos da Educação*, 4ª edição. Editora Vozes, Rio de Janeiro.
- Hwang, G. J., Wang, S. Y., & Lai, C.L. 2015. *Seamless flipped learning- a mobile technology-enhanced flipped classroom with effective learning strategies*. Journal of Computers in Education, 2(4), 449-473.
- Hwang, G. J., & Wu, P. H. 2014. *Applications, impacts and trends of mobile learning - a review of 2008-2012 publications in selected journals*. International Journal of Mobile Learning and Organisation, 8(2), 83-95.
- Kawamura, E. M., 2009. *Temas Transversais: contribuições para o ensino e aprendizagem de Matemática*. Dissertação de Mestrado – Universidade Bandeirante de São Paulo, SP.
- Marchesi, Á., 2006. *O que será de nós, os maus alunos?* Artmed, Porto Alegre.



- Moreira, M. A. & Masini, E. A. S., 2006. *Aprendizagem significativa: a teoria de aprendizagem de David Ausubel*, 2ª ed. Centauro Editora, São Paulo.
- Moraes, C. R. & Varela, S., 2007. Motivação do aluno durante o processo de ensino-aprendizagem. *Revista Eletrônica de Educação*, p. 1–15.
- Nogaro, A., 2014. Aprendizagem e fatores motivacionais relacionados. *Revista Espaço Pedagógico*, v.21, p. 419–434.
- Oliveira, M. K. Jovens e adultos como sujeitos de aprendizagem. In: Ribeiro, V. M., , 2002. *Educação de jovens e adultos-novos leitores, novas leituras*. Mercado de Letras, Campinas.
- Santaella, L., 2010. *A aprendizagem ubíqua substitui a educação formal?* Available at: <<http://revistas.pucsp.br/index.php/ReCET/article/view/3852/2515>>. Accessed: 10 mar. 2015.
- Santos, E. & Weber, A., 2013. Educação e cibercultura: aprendizagem ubíqua no currículo da disciplina didática. *Revista Diálogo Educacional*, v. 13, n. 334, p. 285.
- Santos, J. C. F., 2008. *Aprendizagem Significativa: modalidades de aprendizagem e o papel do professor*. 2ed. Editora Mediação Distribuidora e Livraria Ltda, Porto Alegre.
- Tapscott, D. 2009. *Grown Up Digital: How the Net Generation is Changing Your World*. McGraw Hill, New York.
- Totti, A.R, Gomes, C.A.S, Moreira, S.P.T. & Souza,W.G., 2011. *M-Learning: Possibilidades para a Educação a Distância*. Available at: <http://www.abed.org.br/congresso2011/cd/181.pdf>.
- UNESCO, 2015. *Educação para cidadania global: preparando alunos para os desafios do século XXI*. Ministério da Educação, Brasília.
- Valentim, H. D., 2009. *Para uma compreensão do Mobile Learning: Reflexão sobre a utilidade das tecnologias móveis na aprendizagem informal e para a construção de ambientes pessoais de aprendizagem*. Available at: [http://run.unl.pt/bitstream/10362/3123/1/Hugo\\_Valentim\\_M-Learning.pdf](http://run.unl.pt/bitstream/10362/3123/1/Hugo_Valentim_M-Learning.pdf). Accessed: 10/set/2015.