

Mobile Learning and Culturally Situated Practices for Equity in Brazil



Vivian Martins

Several previously dispersed tools, such as calendars, cameras, diaries, maps, and others, are now gathered and systematized in mobile device applications, enabling new uses and educational practices. Connection, ubiquity, context, and movement are mobile device features that contribute to education. Mobile learning, also m-learning, “refers to the learning that is involved with the mobility of students, where s/he can be engaged in the learning process in ‘anytime anywhere’ settings using mobile devices” (Al-Emran, 2021, p. 1).

Pedagogies that are sensitive to mobile connectivity have become more important due to the changes in Brazilian education, especially with the COVID-19 pandemic. Many students do not have computers and need to study using cell phones and tablets in Brazil. Recent research on the use of information and communication technologies in Brazilian schools and Brazilian residences (CGI.br, 2020a) has documented that 54% of urban school students used cell phones as the main device to monitor classes and remote activities during the pandemic. This is important for understanding the reality of Brazilian education and the relevance of mobile learning approaches, so as to avoid the pitfall of the digital divide and/or a potential out-of-context approach.

We seek to propose strategies for students to reach their full potential and learn with quality during this complicated moment for education (both during the pandemic and post-pandemic). We cannot realistically consider distance education for everyone if there are no appropriate resources and educational equity. We advocate for expansion of educational opportunities that personalize mobile learning to improve teaching practices, with the ultimate aim of accounting for students’ diversity and necessities.

V. Martins (✉)

Federal Institute of Rio de Janeiro, Rio de Janeiro, RJ, Brazil

e-mail: vivian.lopes@ifrj.edu.br

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2023

B. Hokanson et al. (eds.), *Toward Inclusive Learning Design*, Educational Communications and Technology: Issues and Innovations,

https://doi.org/10.1007/978-3-031-37697-9_6

This study is part of a doctoral research project on education conducted at the Rio de Janeiro State University. It aims to understand, in the context of research-training in cyberculture, what the learning and teaching tactics are with applications that are created daily in Brazilian educational networks, thus enabling the development of a Pedagogy of Hypermobility. *Hypermobility* (Santaella, 2007) is the union of physical space, mobile connection, and digital information. Thus, *Pedagogy of Hypermobility* refers to teaching with connection and movement, with a particular focus on pedagogical processes without walls, i.e., education without borders. In the following paragraphs, we contextualize the subject addressed in the Pedagogy of Hypermobility thesis (i.e., mobile learning) and present the research framework in this article.

The Mobile Learning Context During the COVID-19 Pandemic

Research studies in Brazil have investigated the use of information and communication technologies in Brazilian schools and Brazilian residences through the internet management committee in Brazil, *TIC domicílios 2019* or “ICT households 2019” (CGI.br, 2020a). Findings suggest that the mobile phone was considered the most used device to access the internet for 99% of the population. Of this 99%, 58% of the population only access the internet on a mobile phone; that is, they do not have other devices to access the internet. Other figures include: 58% of the students use their mobile phones to carry out school activities; 18% of urban school students and internet users access the internet exclusively by mobile phone; and 54% used cell phones as the main device to monitor classes and remote activities in the pandemic (CGI.br, 2020a).

The Brazilian K-12 educational system has a particularity, namely, that upper social classes study in private schools, and lower classes study in public schools. The study *Painel TIC Covid-19: pesquisa sobre o uso da internet no Brasil durante a pandemia do novo Coronavírus. 3ª edição: ensino remoto e teletrabalho* (TIC COVID-19 Panel: research on internet use in Brazil during the novel Coronavirus pandemic. 3rd edition: remote learning and telework; CGI.br, 2020b) reported that 87% of participants said that the institution where they studied offered remote educational activities, with a higher proportion among students in the private school system. In the same survey, 36% of participants reported difficulties in following classes due to lack or poor quality of internet connection.

How have mobile devices been used during the COVID-19 pandemic in Brazil? Reports suggest that cell phones were the main device used to engage in remote activities, but there are stark inequalities in students’ access to the internet, highlighting a significant difference between social classes in Brazil. The Brazilian economic classification criteria stipulates five groups, characterized by letters: classes A, B, C, D, and E. Class A is the highest and class E indicates lower purchasing power and poor quality of life. Families in class E receive up to two

minimum wages. Among participants of the survey (CGI.br, 2020b), 74% of D and E social classes accessed the internet exclusively by cell phone, and 10% stated that they shared their cell phones with other household members. For participants in A and B classes, 11% accessed the internet only by cell phone.

Motivated by these glaring inequities, our research examined the cultural and social impacts of technology on education. Pegrum (2014) reflected on mobile learning to promote social justice in socially marginalized situations: “Mobile devices may lead to new educational opportunities which otherwise would not exist or would be difficult to access” (p. 40). We can see this reality in Brazil reflected in the data above. Thus, how can teachers promote mobile learning actions to provide better learning conditions?

In addition to access issues, students showed interest and engagement with mobile learning. Pebriantika et al. (2021) found in a survey of 110 students that “the significance level of 0.001 ($p < 0.05$) indicates that there is a significant influence between the adoption of mobile learning on student interest in learning during the COVID-19 pandemic” (p. 222). Farias and Silva (2020) found in a survey of 100 students that mobile devices are facilitating tools in the Brazilian school space: “There were significant changes in the use of devices in education, such as greater motivation on the part of students (45%), expansion of student learning and expansion of the teachers’ information capacity (60%)” (p. 24). These results are important to expand the use of mobile learning after the pandemic, too. This can be done by thinking about practices that are more contextualized with students who fully experience digital culture.

Purpose and Research Questions

The overarching question that guided this work was: How did technological events that merged into our culture invite us to rethink education? The purpose of the current research was to create an educational design for an online course in which teachers signed up for continuous education in the Federal Institute of Rio de Janeiro. We¹ reflected on current pedagogical models, continuous and seamless learning and collaborative learning, with a mobile and hypermediatic curriculum supported through interactivity and diversity.

This study aims to answer the following specific research questions:

- RQ1: How have mobile devices been used during the COVID-19 Pandemic in Brazil?
- RQ2: How could educational environments be improved to create culturally situated learning?
- RQ3: What factors should teachers consider when designing learning situations in mobile contexts?

¹“We” includes the researcher, the advisors, the research group, and sometimes the research participants. We comprehend the research as a collective construction.

Methodological Approach

The methodology in this doctoral study is research-training in cyberculture (Santos, 2019), an epistemological fusion of multi-referential theories (Ardoino, 2003), and research on everyday life in schools (Alves, 2011) and cyberculture (Lévy, 1999). The methodology addresses the convergence between educational processes and scientific investigation considering contemporary culture mediated by digital technologies (Santos, 2019). Online education is one of the training possibilities considering contemporary culture and the technologies, for example. The research-training in cyberculture is based on life stories, whose methodological path is the narrative of life during educational experiences.

I am a professor-researcher at the Federal Institute of Rio de Janeiro. I developed my doctoral research field in my professional practice as a professor-researcher in distance education and educational technologies, especially in teacher training courses at the level of continued education. The teacher-researcher develops training environments that encourage students to narrate their training processes, to share their classroom experiences and insights regarding in-person and online classroom, with written, image, and audiovisual narratives. The teacher-researcher studies these narratives and the events in the field research.

Two outreach programs of the Federal Institute of Rio de Janeiro were used as a research field: teacher training for online education and teacher training for communication, culture, and art. The research interlocutors (students in continued education) were mostly in-service teachers working in the metropolitan region of Rio de Janeiro. The participants worked as teachers or education professionals. There are 52 participants in total. Their level of education ranged from undergraduate (completed or in progress) to graduate, and their ages varied between 23 and 58. The research participants lived in the State of Rio de Janeiro, in the region called Baixada Fluminense.

We created a didactic design to act as a research activity—that is, we created ambiances that answer our research questions. For example, if I want to research mobile learning, I develop training with mobile learning experiences and encourage students to share narratives about learning experiences, e.g., how students learn using mobile phones. The procedures used in this research followed five integrated stages: teaching dilemmas, research and training practices, the emergence of data, conversation with data (analysis procedures), and findings report.

Teaching dilemmas are the uneasiness caused by educators' practice, which promotes the need for research. In our study, we devised research questions and transformed them into educational processes and research actions. Research and training practices are researchers' methods and means (procedures) to instantly raise notions that better explain the research phenomena. To explore the participants' narratives, the professor-researchers activated research and educational practices, such as chat forums, training diaries, recorded conversations, and student assessments. The data emerged from face-to-face and online conversations, pedagogical practices, and the activities produced in the training. Data analysis is carried out through an expanded

triangulation including emerging data from the field, the researcher's experience, and the theoretical references studied. The researcher attributes meanings related to his/her involvement in the investigation. From this data analysis, the researcher creates subsumption notions, which is the development of theoretical-practical notions created from what made the most sense to the researcher. Those notions emerged from the analytical lenses and approaches used during the analysis of the data from the practice, the field experiences, and the narratives. The findings reported relied on the systematization of results produced from reflections, possibilities for practical applications, or indicators.

In this paper, we address the research considering everyday life in schools (Alves, 2011) as an epistemological option. This approach goes beyond the limiting assumptions of modern science. We assume the research unpredictability and deepen our studies into everyday ordinary logic. We comprehend the research as a process, a path, and not merely a result. We understand the complexity of school time-spaces since our world's reading cannot be understood as the totality of routines and the multiple webs that cross them. We value the knowledge produced by practitioners (de Certeau, 2011) in the same horizontality as renowned theorists and dialogue with their narratives, which drive us to articulate ideas and understand what we research. Narratives created in the research field (narratives written by in-service teachers during the outreach program) might contribute to the further understanding of the teachers' perception of contextual mobile learning.

These narratives were fundamental for the collection and analysis of data. We understand narratives as any production or expression coming from the research participants. Narratives can emerge from life experiences (recorded by the researcher or made available by participants in virtual learning environments) and procedural and training evaluations (written in diaries, conversations in forums, chats, collaborative murals, and others). We analyzed these data to understand educational processes that are effective and significant to students. We read or watched the narratives, selecting the ones that were more significant during the process, transcribing them if necessary, and inserting them in a separate digital space (each researcher gathered them wherever they preferred, whether in text files, groups in chat applications, folders in the computer, or other similar spaces). The criteria for selecting the narratives was acceptance of participation in the research and narrative's contribution to the study, according to the researcher's analytical lenses.

Below, we highlight narratives from the two outreach programs mentioned above. For the complete research, other narratives were analyzed but could not be included here due to the length of the text and the framework of this work.

Preliminary Findings

We intended to systematize and evaluate the inventive uses of mobile devices in Brazilian teachers' routines, understanding pedagogical questions related to these uses. The new ways of learning present many challenges to the educational processes

and contemporary pedagogies, especially during the COVID-19 pandemic. We know technology alone does not solve all problems. We need to comprehend the ways that people use technologies in their routines to improve learning methodologies. We aimed to understand how professionals perceive mobile learning, especially in the emergence of authorship, autonomy, citizenship, accessibility, and student content production in the era of connectivity in Brazilian educational contexts. This can improve culturally situated mobile learning.

The educational and research experience presented specific apps for each activity, as shown in Fig. 1. Taking advantage of the increasing use of mobile phones, the proposal was Bring Your Own Device (BYOD), a trend in the area in which users take their own mobile phones to the dynamic. We took two tablets to the training, but they were not used by participants, as they always preferred to use their own.

Moving to the research field practice, we built teaching designs using apps. To understand Fig. 1 and comprehend the educational/research process, we organized Table 1, which describes the training and investigative strategies used.

Other activities and courses were developed during the program (Fig. 1). The activities were designed to be online and non-online tasks, students needed to have internet network access (mobile internet or other) to access the activities.

The narratives of the participants (Table 2) highlighted the importance of including apps in their training to provide real experiences with a practical eye for mobile learning. We also proposed activities using the participants' professional experiences (e.g., a biology teacher produced his evaluative activities about biology classes). Thus, the participants were inspired to create mobile experiences in their own pedagogical practices. During the hypermobility and ubiquitous education course, students participated in the Wiki of collaborative writing to create a Pedagogy of Hypermobility concept.

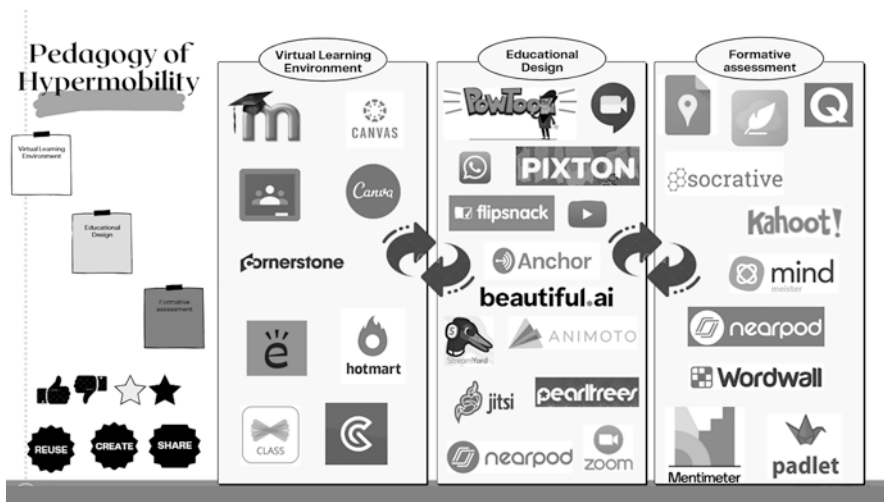


Fig. 1 Apps used during the training

Table 1 Training and investigative strategies

| Overview of activities created during the outreach program: teacher training for online education | | |
|---|--|--|
| Course | Activity | Apps |
| During the entire outreach program | Participants developed a life/educational narrative sharing their experiences during the outreach program. | Diaro. |
| Online education | Participants created word clouds about online education. | Word Cloud. |
| Hypermobility and ubiquitous education | Participants created Pedagogy of Hypermobility notion in the Wiki of collaborative writing. | Google Docs. |
| Multimedia resources | Participants created transmedia to produce courseware: Comics, memes, podcasts, videos, and storyboards. | Comic Strip It!, Anchor, Powtoon, Pixton, and Animoto. |
| Virtual learning environments | Students developed online courses. | Edmodo, Google Classroom, GoConqr, Seesaw Class, Pearltrees, and Symbaloo. |

Table 2 Participant narratives

| Narrative | Emphasis |
|--|--|
| “Pedagogy of Hypermobility, to me, is a pedagogy that works with the development of the subject, regardless of geographic location, concerning the content or desired information. Thus, it is possible to have instant access to content through the web.” | Geographic location Instant access |
| “A pedagogy created in fluid spaces; it is an intersection from connection in time-space displacements in every routine context.” | Fluid spaces Connection |
| “It is necessary to expand the internet infrastructure in all Brazilian regions.” | Expand the internet infrastructure |
| “I believe that this pedagogy will allow an expansion between what is taught and what is learned. It is a new way to build knowledge, breaking the barriers and conservative limits of education and opening a unique space to create, reflect, and innovate.” | Breaking educational limits |
| “Without the primary need of a steady space in the Pedagogy of Hypermobility, there is simultaneous interaction of many people in different places, transcending traditional teaching models and scholar ambiance.” | Interaction Teaching models |
| “I believe it is important to think about educational practices around the city. It is a way to explore further when it comes to contextualizing the curriculum to students’ reality. It is also a way to bring more meaning to education, to remember that culture is the way we live, and to value—instead of erasing or underestimating—students’ daily experiences.” | Education around the city Students’ reality |
| “Through virtual environments, such as the Google Arts & Culture app, we can interact by adding different articles of our world knowledge. This platform is full of features that we can explore, such as the selfie function that allows the individual to have the face feature compared to some work” [work of art]. | World knowledge |

From the narratives and group constructions in the field, we highlight factors that teachers should consider when designing learning situations in mobile contexts: (1) deconstruction of geographic location and steady space, (2) instant access on the web, (3) fluid spaces, displacements in all routine contexts, (4) the battle to expand the internet access, (5) the creation of a new way to build knowledge, (6) the contextualization of the curriculum to students' reality, and (7) the expansion of world knowledge with applications.

Discussion

Some subsuming notions emerged from the field experiences, the narrative of participants, and theoretical references. I created these six subsuming notions based on my significant learning during the research-training in cyberculture. We considered the following six topics to analyze the Pedagogy of Hypermobility, mobile learning, and culturally situated practices for equity in Brazil.

1. **Education without walls:** The power of mobile learning allows educational processes to be conducted anywhere. The school is not the only possible place, as education can occur in different spaces around the city.
2. **Education in movement:** In mobile and ubiquitous computing, systems constantly interact with people in a distributed, dynamic, and interactive way. Wireless communication allows mobility between devices and educational processes in displacement, and teachers could use this.
3. **Access:** Uploading content on websites can help students, because they do not have to download them on their mobile phones. If it is not possible, light and responsive content can be created to not overload students' phones.
4. **Freeing education:** Inspired by Paulo Freire, we can help students think of problematization, oppression, and awareness of their position in the world, liberation, invention, and claim for better education conditions for all students.
5. **Personalized and contextualized information:** Computational systems are set and adapted to the users' needs, environment, preferences, and uses. Computational systems are aware of the context and many times that happens in a way that is unperceived by the user.
6. **Urban micronarratives in hypermobility:** Students can explore their creativity and reinvent their everyday life by appropriating the urban space. With their mobile phones in their hands, they can record, narrate their urban experiences, and share pedagogical experiences throughout the city. Students can write about urban experiences in a collective blog or develop a collaborative mapping on Google My Maps (Martins et al., 2021), for example.

Limitations

The limitations of the study are the low number of studies on mobile learning in the COVID-19 pandemic; the lack of knowledge of the research methodology in the North American context; and the short time for the study (four months, on average) demanding long-term research on upcoming opportunities.

Conclusion

During the doctoral study reported here, we were affected by the COVID-19 pandemic, and it changed all areas of our lives—especially the educational area. We lost our physical school space and gained educational processes mediated by digital technologies with substantial use of mobile devices by students. Hence, we were interested in exploring how educational environments could be improved to create culturally situated learning.

Based on analysis of the narratives and joint constructions, we reflected about the systematization of educational practices that promote mobile, ubiquitous, connected learning and teaching environments in different spaces, which come from different knowledge sources regarding the emergence of teaching, research, authoring, and knowledge production devices in hypermobility.

Notably, the production of narratives about experiences with educational practices using apps is a challenge, especially due to the difficulties associated with internet access in Brazil. Mobile learning allows educational uses in the palm of our hands, such as data collection for research, space interventions, virtual or amplified reality, content production, collaborative learning, among others. Such actions can happen instantly and are not necessarily attached to a given physical space. For this reason, we must improve our pedagogy to create the best environment for our students and minimize social inequality and educational exclusion.

References

- Al-Emran, M. (2021). Mobile learning during the era of COVID-19. *Revista Virtual*, 61, 1–2. <https://doi.org/10.35575/rvucn.n61a1>
- Alves, N. (2011). Everyday life in schools. In W. F. Pinar (Ed.), *Curriculum studies in Brazil*. International and Development Education. Palgrave Macmillan.
- Ardoino, J. (2003). *Para uma pedagogia socialista* [Towards a socialist pedagogy]. Editora Plano.
- CGI.BR. (2020a). *Pesquisa sobre o uso das tecnologias de informação e comunicação nos domicílios brasileiros – TIC Domicílios* [Research on the use of information and communication technologies in Brazilian residences – ICT households 2019]. https://cetic.br/media/analises/tic_domicilios_2019_coletiva_imprensa.pdf
- CGI.BR. (2020b). *Painel TIC Covid-19, pesquisa sobre o uso da internet no Brasil durante a pandemia do novo Coronavírus. 3ª edição: ensino remoto e teletrabalho* [Panel TIC Covid-19,

- research on internet use in Brazil during the new Coronavirus pandemic. 3rd edition: Remote learning and telework]. https://cetic.br/media/docs/publicacoes/2/20201104182616/painel_tic_covid19_3edicao_livro%20eetr%C3%B4nico.pdf
- de Certeau, M. (2011). *Practice of everyday life*. University of California Press.
- Farias, J., & Silva, R. (2020). Mobile learning (aprendizagem em movimento): Os dispositivos móveis como ferramentas facilitadoras no espaço escolar [Mobile learning (learning on the move): Mobile devices as facilitating tools in the school space]. *Revista Prometeu*, 6. http://lte.ce.ufrn.br/prometeu/revistas/revista_2020/2.pdf
- Lévy, P. (1999). *Cibercultura* [Cyberculture]. Editora 34.
- Martins, V., Santos, E., & Correia, A.-P. (2021). Google My Maps as a conduit to culturally rich learning experiences. In M. Simonson & D. J. Seepersaud (Eds.), *43rd annual proceedings of association for educational communications and technology: Volume 2 – Selected papers on the practice of educational communications and technology* (pp. 406–414). Association for Educational Communications and Technology (AECT).
- Pebriantika, L., Wibawa, B., & Paristiowati, M. (2021). Adoption of mobile learning: The influence and opportunities for learning during the Covid-19 pandemic. *International Journal of Interactive Mobile Technologies*, 15. <https://doi.org/10.3991/ijim.v15i05.21067>
- Pegrum, M. (2014). *Mobile learning: Languages, literacies, and cultures*. Macmillan.
- Santaella, L. (2007). *Linguagens líquidas na era da mobilidade* [Liquid languages in the age of mobility]. Paulus.
- Santos, E. (2019). *Pesquisa-formação na cibercultura* [Research-training in cyberculture]. EDUFPI.