

Enhancing Early Elementary Literacy Education with Flippity Tool: challenges, opportunities, and solutions

Franciely Pereira Moreira¹, Danielli Araújo Lima²

¹Programa de Pós-Graduação em Educação Tecnológica – Instituto Federal do Triângulo Mineiro (IFTM) Campus Uberaba, MG, Brazil

²Laboratório de Inteligência Computacional e Robótica (LICRo)
Programa de Pós-Graduação em Educação Tecnológica – Instituto Federal do Triângulo Mineiro (IFTM) Campus Patrocínio, MG, Brazil

danielli@iftm.edu.br, franciely@gmail.com

Abstract. *Active methodologies and gamification play a crucial role in engaging and motivating children, providing an interactive and meaningful learning experience. This experience report aims to describe and present the challenges and opportunities of using games to aid the literacy process in the early elementary school years. It also explores how the use of the Flippity digital tool can contribute to this process. To complement this report, we carried out a narrative review of the literature on the subject to enrich the reflection. The results show that using games with children in the literacy phase can bring good results and provide pleasant moments related to learning.*

Resumo. *As metodologias ativas e a gamificação desempenham um papel crucial no envolvimento e motivação das crianças, proporcionando uma experiência de aprendizagem interativa e significativa. Este relato de experiência visa descrever e apresentar os desafios e oportunidades do uso de jogos como auxílio no processo de alfabetização nos anos iniciais do ensino fundamental. Também explora como o uso da ferramenta digital Flippity pode contribuir para esse processo. Para complementar este relatório, realizamos uma revisão narrativa da literatura sobre o tema para enriquecer a reflexão. Os resultados mostram que utilizar jogos com crianças em fase de alfabetização, pode trazer bons resultados e proporcionar momentos prazerosos ligados ao aprendizado.*

1. Introduction

Ensuring student engagement and maintaining their involvement in the learning process is a constant challenge for educators, regardless of the mode of instruction—whether it be face-to-face, distance education, emergency remote teaching (ERT), or hybrid learning. Educators across all educational levels face the task of finding methods and approaches to captivate and engage their students. The integration of Digital Information Technologies (DIT) in the classroom has become increasingly prevalent. As academic research progresses on the use of Information and Communication Technologies (ICT), new questions arise regarding their potential to enhance learning in technology-mediated classrooms, as highlighted by [de Brito Lima et al. 2022].

During the Covid-19 pandemic, after the phase of Emergency Remote Teaching

(ERT) and the beginning of hybrid classes, with a combination of synchronous and asynchronous lessons and the use of educational platforms, we had the opportunity to experience an approach aimed at making classes more engaging and relevant. In this context, we decided to incorporate games into our educational environment, using the digital tool Flippity. This tool, which is linked to the Google platform and is free to access, allows the creation of online digital resources through data editing in an online spreadsheet [Abu-Bakar et al. 2022],. Each available game comes with instructions on how to perform this editing, enabling educators and users, in general, to customize the game according to their specific objectives and needs [Bratel et al. 2021].

The main objectives of this article are to explore the impact of gamification and the use of the Flippity tool in elementary school literacy education and to present challenges and opportunities for improving the implementation of gamification in the literacy phase. By describing and reflecting on the experience of using games as an aid in the literacy process, particularly in the early years of elementary school, we aim to highlight the potential benefits and challenges associated with this approach, specifically in a Daily Routine lesson. Additionally, we investigate how the digital tool Flippity can contribute to the literacy education of young learners. Through a documentary and bibliographic analysis, we enrich the reflection by examining related works in the field.

The results of this study reveal the positive outcomes of incorporating games into children's literacy education, promoting enjoyable learning experiences. Based on these findings, we offer practical recommendations that educators can implement to enhance gamification in the literacy teaching process. Overall, this work aims to contribute to the advancement of effective teaching methodologies in early elementary literacy education.

2. Theoretical foundation

In this section, we are going to present an overview of different types of education, explore the concept of gamification in education, and delve into the features and benefits of the Flippity tool. We will discuss how these elements intertwine to create engaging and interactive learning experiences for students.

2.1. Educational types and modalities

Presencial education refers to traditional face-to-face instruction that takes place in physical classrooms or educational institutions. In this mode of education, students attend classes in person and interact directly with teachers and peers. It allows for immediate feedback, real-time interactions, and a structured learning environment [Carneiro and Monteiro 2018, Martínez 2017]. Presencial education provides opportunities for hands-on activities, group discussions, and social interactions, which can enhance the overall learning experience.

Hybrid Teaching refers to the methodology in which face-to-face and online classes complement each other, with a focus on personalizing teaching, using various digital resources, in which the student has the possibility of learning at his own time and at his own pace [Bacich et al. 2015, Alves and Lima 2018]. Blended learning as an active methodology, according to [Moran 2015, Nortvig et al. 2018] enables students to learn better through games, activities, problem solving, relevant projects combining collaboration and personalization.

Online Distance Education, is a mode of education that relies primarily on digital

technologies and the internet to facilitate learning. It involves the delivery of educational content and activities through online platforms, learning management systems, and virtual classrooms. Online distance education offers flexibility in terms of time and, specially, location, allowing students to access learning materials and participate in discussions from anywhere at any time [Sampaio 2020, Al-Balas et al. 2020]. It typically includes asynchronous learning activities, such as pre-recorded lectures, online assignments, discussion forums, and collaborative projects. Online distance education enables individuals to pursue education remotely, making it suitable for working professionals, adult learners, or individuals who cannot attend traditional presential classes.

Emergency Remote Teaching (ERT) refers to a temporary shift from traditional presential education to remote instruction in response to unexpected circumstances or emergencies [Trindade et al. 2020]. It involves the use of digital tools and online platforms to deliver educational content and engage students in learning activities when physical attendance is not possible [Lima and Isotani 2022, Sendacz et al. 2022]. ERT is typically implemented as a quick response measure during crisis situations, such as natural disasters or pandemics, to ensure continuity of education [Appenzeller et al. 2020]. It may involve synchronous (real-time) or asynchronous (self-paced) delivery of lessons, depending on the available resources and technological infrastructure.

Table 1 presents a summary of different types of education, showcasing the definitions mentioned earlier. The table offers a comprehensive comparison between Presential, Hybrid, Online Distance, and Emergency Remote Teaching.

Table 1. Modes of Education: A Comparison of Presential, Hybrid, Online Distance, and Emergency Remote Teaching.

Mode of Education	Description	Authors
Presential Classroom Education	Traditional face-to-face instruction that takes place in physical classrooms or educational institutions. Students attend classes in person, interact directly with teachers and peers, and benefit from immediate feedback, real-time interactions, and a structured learning environment. It offers hands-on activities, group discussions, and social interactions, enhancing the overall learning experience.	[Velandia et al. 2018] [Martínez 2017] [Aretio et al. 2018] [Souza et al. 2018] [Alvareli et al. 2018]
Hybrid Education	A methodology that combines both in-person and online classes, focusing on personalized learning using various digital resources. Students have the opportunity to learn at their own pace and time. It leverages active learning strategies such as games, problem-solving, and relevant projects, promoting collaboration and customization of learning experiences.	[Alves and Lima 2018] [Hwang 2018] [Rahman et al. 2019] [Nortvig et al. 2018]
Online Distance Education	Relies primarily on digital technologies and the internet to facilitate learning. Educational content and activities are delivered through online platforms, learning management systems, and virtual classrooms. It offers flexibility in terms of time and location, allowing students to access materials and participate in discussions from anywhere at any time. Suitable for remote learners, working professionals, and individuals unable to attend traditional classes.	[Sampaio 2020] [Wenczenowicz 2020] [Al-Balas et al. 2020] [Unger and Meiran 2020] [Abuhammad 2020]
Emergency Remote Teaching	A temporary shift from traditional presential education to remote instruction in response to unexpected circumstances or emergencies. It utilizes digital tools and online platforms to deliver educational content and engage students in learning activities when physical attendance is not possible. ERT is implemented as a quick response measure during crisis situations, ensuring continuity of education through synchronous or asynchronous delivery of lessons.	[Appenzeller et al. 2020] [Trindade et al. 2020] [Castioni et al. 2021] [Lima and Isotani 2022] [Sendacz et al. 2022] [Silva et al. 2021]

2.2. Gamification and Flippity tool

Active methodologies are educational approaches that promote student empowerment in their learning process. Unlike traditional teacher-centered instruction, active methodologies aim to engage students actively, stimulating active participation, problem-solving, collaboration, and reflection [da Silva and Lima 2020]. There are different types of active methodologies, such as problem-based learning (PBL), cooperative learning, flipped

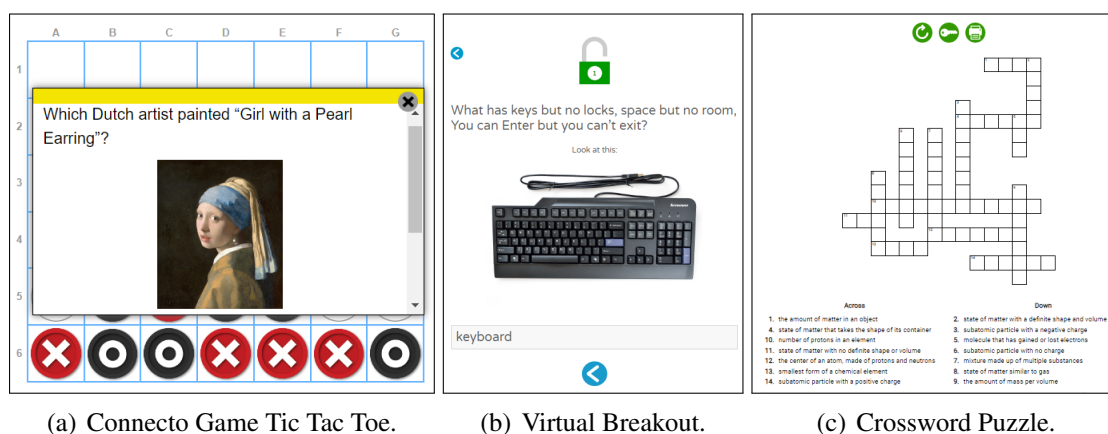
classroom, among others.

Gamification is one of the active methodologies that has gained prominence in recent years [Sendacz et al. 2022]. It uses game elements and mechanics in educational contexts, transforming learning into a more engaging and motivating experience. Gamification allows us to work with activities in a playful way using technological resources within the school environment, according to [Lima et al. 2017] gamification consists of a way of taking games with an educational purpose in which the student learns the content to be taught. For [da Silva and Lima 2020] educational games are tools that encourage students to learn with playful resources that aim to complement their academic training in a fun and pleasant way. Gamification can be applied in different areas of knowledge and educational levels, providing an innovative and effective approach to learning.

There are several tools that can support gamification in the classroom. For example, Kahoot is an interactive game-based learning platform. Allows educators to create quizzes, quizzes, and challenges for students to participate in in real time. Students can compete against each other, which makes learning fun and engaging. Classcraft is a tool that combines elements of RPG games (Role-Playing Game) with the classroom [Abu-Bakar et al. 2022, Sendacz et al. 2022]. Allows educators to create personalized student avatars and set rewards and challenges based on behavior and academic performance. Students can earn points, level up and unlock special powers, making the learning experience more immersive and interactive.

Also, we have Breakout EDU which is a platform that allows educators to create educational breakout games. Students need to solve puzzles, challenges and riddles to unlock boxes with locks. This tool promotes collaboration, problem solving, and critical thinking as students work in teams to find solutions and achieve game goals. In this work, we will focus on the Flippity Tool [Abu-Bakar et al. 2022]. Flippity is a versatile digital tool that allows educators to create various interactive activities and games using Google Sheets as a foundation. It offers customizable templates for flashcards, quizzes, randomizers, and more, providing an engaging learning experience for students.

When using the Flippity tool, we were able to see different ways of using it to create review activities, board games, quizzes, raffles and even to generate random work groups, as we can see in the Figure 1. The tool allows its use both in face-to-face classes



(a) Connecto Game Tic Tac Toe.

(b) Virtual Breakout.

(c) Crossword Puzzle.

Figure 1. Examples of some activities that can be developed by Flippity with thumbnails and links to instruction and demonstration.

and online classes, being a great alternative to work in hybrid and distance learning. Flip-

pity can help engage students in online activities, offering a playful and dynamic environment for learning, which enables an improvement in the quality of teaching and learning. The use of the Flippity tool together with other digital tools tends to bring benefits to online teaching, allowing teachers to create interactive and personalized activities for their students, contributing to a more dynamic and attractive education.

3. Methods

This work is a descriptive study, a type of experience report [Severino 2017], based on the experience of the teacher of the Religious Education discipline. The work was carried out in a city with a population of just over 700,000 inhabitants located in the southeastern region of Brazil, in a small municipal elementary school attended by 238 students. Through a brief survey, it was observed that they use cell phones and tablets regularly, but access to computers and other ICT tools at home is limited. Although such devices are part of their school routine, their effective use faces specific challenges.

For this report, we worked with two classes of 1st-grade students in the early years of elementary school, one class with 28 students and the other with 27 students, totaling 55 students. The activities took place in the year 2021, from April to May. In this work, we conducted a literature review, based on previously developed materials, including books and scientific articles [Gil 2008]. Articles on Hybrid Teaching, Active Methodologies and Gamification were used.

4. Experience report

We started our work in 2021, using Blended Learning to mitigate the educational impacts caused by COVID-19. For this purpose, we used the tools provided by Google for Education. Synchronous classes took place every 15 days via Google Meet, and asynchronous classes, as well as activities to be carried out in both, were made available through Google Classroom. The municipality provided tablets with mobile internet access on loan to students who did not have access to ICT at home, for the duration of the hybrid activities.

From the perspective of developing an active teaching methodology based on the concepts of personalization, individualization, and differentiation, we sought to work with the Flipped Classroom model. In this approach, the classroom becomes a place to work on previously studied content and engage in practical activities, problem-solving, projects, group discussions, and laboratories. In this sense, the teacher has the opportunity to make an accurate diagnosis through the activities recorded in the virtual environment, identifying what the student was able to accomplish, the difficulties encountered, their interests, and the learning strategies used. This procedure allows for the implementation of a more personalized learning proposal.

To carry out the inverted classroom proposal, we used the digital tools provided by Google for Education. In this way, through Google Classroom, the theoretical part, explanatory videos, and games were made available that allowed students to access as many times as necessary, at their pace and in their time, to prepare the student for the discussion in the classroom, with the removal of doubts and resumption of concepts.

We worked with the students on the theme *Daily Routine*. At the beginning of the week, we provided the students with a video available on YouTube, featuring a song about the daily routine, as well as text using nonverbal language with images related to our daily routine. As an activity, we proposed a game called Snowman, available on the

Flippity platform. This game is similar to a hangman game, where the player (or players) have to guess the proposed word, with hints given for the number of letters and the theme associated with the word. With each wrong letter, a part of the snowman melts, as we can see in Figure 2(a).

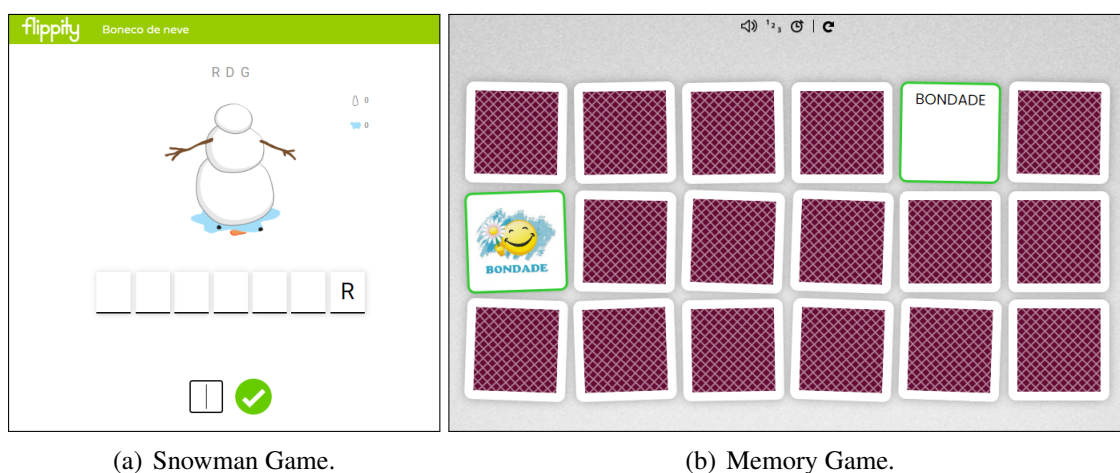


Figure 2. Games developed in Flippity tool.

On the day of the synchronous class, we proposed playing the Snowman game with the students. We explained the rules and divided the class into two groups. The game was played collectively as a group. We presented the rules and divided the class into two groups. The objective of the game was to work together as teams to discover the words. Each team member, following the pre-established rules, took turns suggesting letters that could be in the word. Each correct letter was written in the corresponding space. If the letter did not exist in the word, the snowman's body would melt. In this particular class, we focused on daily routine-related topics, such as sleeping, waking up, brushing teeth, and having lunch, among others.

The activity lasted about 30 minutes in each class, and with each word that the teams guessed correctly, it was evident how happy the children were to have collectively written a new word. Furthermore, we noticed that some students found the activity easier, either because they had already done it in the Classroom or because they had prior knowledge and could form the words with a few letters.

During the class, it was noticeable that some children were more advanced in the literacy process than others, which indicated the activities that needed reinforcement for some students and how much content could be advanced with the classes. In a second phase, an activity related to human values present in our daily lives was developed. To carry out this content, three synchronous classes and asynchronous activities were used. The asynchronous activities focused on assessing the students' prior knowledge on the subject that was being taught by the teacher.

In the synchronous classes, we were able to perceive the students' interest in the proposed activities, as well as their progress and difficulties. To carry out these classes, we used the Flippity tool and customized some games, such as the memory game (Figure 2(b)), where students had the opportunity to engage in the activity asynchronously. In a second moment, during the class via Google Meet, they were separated into groups and with the teacher's mediation, the teams aimed to associate the words with their respective

Memory Game images.

At each conclusion of the weekly activities we noticed small advances in solving them, as well as the excitement of the students waiting for the new class. All the activities developed were aimed not only at the individual learning needs, but also at the group's. Therefore, the use of the active methodology sought to contribute to the literacy process, using games and games at all stages, providing playful moments and interaction with all participants.

5. Analysis and Discussion of the Report

In this section, the opportunities, challenges, and solutions during the ERT will be presented, from the perspective of teaching through gamification in the Flippity tool.

5.1. Opportunities

Developing online activities with such young children in this modality is a constant challenge, and without the support of parents or guardians, this task would be practically impossible to accomplish. We were able to notice in our synchronous classes, and even in messages left on the Google Classroom stream, the students' interest in the educational games provided in the Activities section. The same happened with the collaborative games we played during the synchronous classes, which undoubtedly made a huge difference. An important point to highlight is the students' behavior in following the rules during the game and their great interest in overcoming the proposed challenge. In this sense, games and play are important sources of development and learning that enable students to acquire knowledge and skills in language, cognition, values, and sociability [Vieira and Oliveira 2010, Sendacz et al. 2022].

Flippity allowed us to create customized games and activities, tailoring them to the specific needs and interests of our students. This personalization enhanced the learning experience and kept students engaged. Besides that, the tool offered a variety of interactive games, such as flashcards, quizzes, and memory games, which made learning fun and enjoyable for students. These activities promoted active participation, critical thinking, and problem-solving skills [Lima and Isotani 2022].

Using the gamification approach with Flippity that was easily accessible to both educators and students. It could be accessed online by students and parents, and the games and activities could be shared and played on various devices, making it convenient for remote learning or in-classroom use. Finally, the Flippity tool was seamlessly integrated with Google Sheets, allowing educators to utilize the data input functionality and create dynamic activities that could be easily updated and modified. This integration also enabled collaboration and real-time feedback among students.

5.2. Challenges

One negative aspect observed was that some parents or guardians who were present during synchronous classes did not understand the importance of using games during the lessons. Some of them raised questions during the classes, asking if we would only be "playing" and not addressing the correction of the supplementary activities provided in the Classroom. Another negative aspect was that some families did not encourage their children's participation in asynchronous classes.

In general aspects, utilizing Flippity may require educators and students to have

a certain level of technical proficiency in using digital tools and platforms. Adequate training and support may be necessary to ensure smooth implementation. Besides that, creating and implementing interactive games and activities using Flippity may require additional time and resources from educators. They need to allocate time for planning, creating, and reviewing the activities, as well as ensuring access to appropriate devices and internet connectivity.

Besides that, while Flippity provides engaging activities, tracking students' progress and assessing their learning outcomes may require additional strategies and tools. In our case, we had to use Google Classroom to provide updates and activities for students during the ERT period. Educators need to find ways to effectively monitor and evaluate students' performance and provide timely feedback. Despite all the challenges experienced, we cannot deny that the use of ICTs, when well applied within the classroom through organized and structured planning, brings positive results in the teaching and learning process. It stimulates participation, engagement, and cooperation among students.

5.3. Solutions for the challenges

Implementing these solutions can help address the challenges associated with technical proficiency, time and resource management, as well as assessment and progress tracking when utilizing Flippity in the classroom.

Parents information and support: A solution to solve the problem of parents and/or guardians who do not understand the importance of games during classes is to carry out clear and effective communication with families [Sendacz et al. 2022]. This can be done through virtual meetings, sending out press releases explaining the benefits of gamification in learning and how games are aligned with educational goals. It may also be helpful to make available informational materials, such as videos or articles, that address the pedagogical foundations behind using games in the classroom [Kong and Li 2009]. In the case of families that do not encourage student participation in asynchronous classes, one solution is to offer support and guidance to parents or guardians. This may include developing guides or tutorials that highlight the importance of active engagement in asynchronous tasks, while also conducting workshops for parents to show them how to support their children's participation and optimize learning resources.

Technical Proficiency: it is important to offer training sessions or workshops for educators to enhance their technical skills in using Flippity and other digital tools [Lima and Isotani 2022]. Provide step-by-step tutorials, video guides, or online resources to support their learning process. Additionally, fostering educator collaboration through a supportive network allows sharing experiences, tips, and best practices for utilizing Flippity. Peer mentoring or buddy systems aid less tech-savvy educators in learning from their more experienced counterparts. Involving students in the learning process by assigning them the role of "technology ambassadors", is also necessary. These students can help their peers and educators navigate and utilize Flippity effectively, providing guidance and support when needed.

Time and Resource Management: Create a repository of pre-designed templates and resources for Flippity games and activities. This can save educators time by allowing them to choose from a collection of ready-to-use materials that align with

their teaching objectives [Gaeta et al. 2019]. Another essential activity is fostering a collaborative environment among educators by encouraging them to share their Flippity creations and activities [Lima and Isotani 2022, Gaeta et al. 2019]. Through this practice of sharing resources, educators can collectively contribute to a shared pool of materials, saving time and effort for everyone. Additionally, it is necessary to help educators prioritize and plan their use of Flippity by providing guidelines or templates for integrating gamified activities into their curriculum. This can assist them in identifying the most impactful moments for gamification and optimizing their time and resources.

Assessment and Progress Tracking: It is important for education stakeholders to develop rubrics or feedback frameworks that align with the specific learning outcomes targeted through Flippity activities. This provides clear criteria for assessing student performance and helps educators provide targeted feedback to support students' progress [Lima and Isotani 2022]. Additionally, it is important to explore additional tools or features within Flippity or other educational platforms that offer analytics and progress tracking. These tools can provide insights into students' performance, allowing educators to identify areas of improvement and customize their instruction accordingly. Finally, incorporating peer and self-assessment strategies into Flippity activities is crucial. By encouraging students to evaluate their own work and provide constructive feedback to their peers, metacognition is promoted, and students are empowered to take ownership of their learning progress.

It is important to recognize that solving problems requires a strategic approach that considers the perspectives of students, parents, professors, and education stakeholders. Opportunities, challenges, and potential solutions for mitigating the challenges can be illustrated in Figure 3.

6. Final considerations

The COVID-19 pandemic accelerated the use of ICT in the classroom, prompting educators at all levels of education to adapt to the new reality and acquire new knowledge. This ensured that the isolation caused by COVID-19 remained only physical and not social, highlighting the essential role of digital tools in this process. With this experience report, we delivered a class on "Daily Routines" for early school literacy students. Additionally, to overcome the challenges of remote teaching and learning, we introduced gamified active methodologies to make the learning experience more playful.

In this report, we highlight the positive aspects of using Flippity in the classroom, as well as the benefits of gamification. Furthermore, it is worth emphasizing that the incorporation of games into our teaching practices made a significant contribution to the students' acquisition of knowledge. Through the proposed activities, students engaged in synchronous and asynchronous tasks, which fostered the development of skills such as rule-following, visual perception, self-control, observation, and memorization. Hence, the utilization of games proved to be a pedagogical tool that effectively supported the cognitive, affective, and social growth of the children involved in our classes.

However, we noticed that students and parents faced some difficulties, particularly because in remote teaching and learning, students have two instructors: their parents and the teacher. This situation can potentially hinder the teaching and learning process.

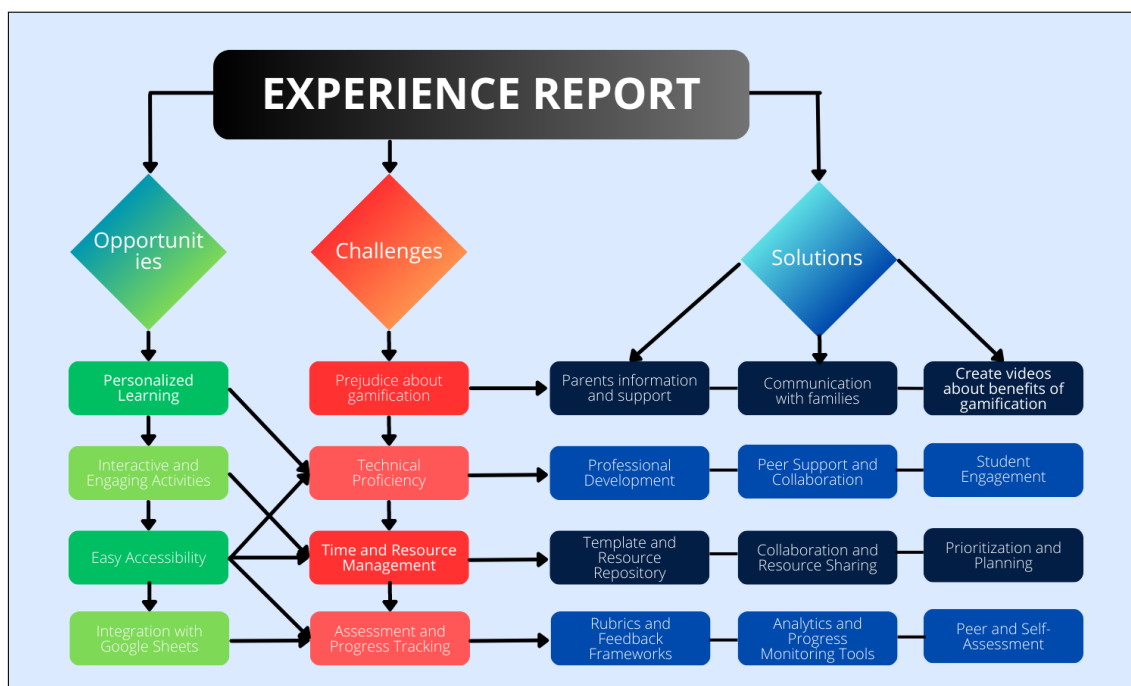


Figure 3. Diagram for opportunities, challenges and some solutions for minimize the challenges.

To address these challenges, we proposed solutions that include providing training for parents to familiarize them with the new active methodologies and emphasizing the use of active methodologies, specifically incorporating games for learning. Furthermore, to avoid overburdening teachers, it is crucial to establish a collaborative network for sharing activities among educators. This collaborative approach promotes efficiency and supports teachers in managing their workload effectively.

Future work should prioritize a longitudinal study to gauge the lasting effects of gamified active methods and Flippity usage on student learning, engagement, and retention. Crafting targeted strategies to boost parent participation and collaboration in remote teaching is key, involving informative resources and tailored workshops. Additionally, exploring scalability and replicability of these methods, while designing teacher development programs, can advance integration across varied educational settings and empower educators in implementation.

References

- Abu-Bakar, L., Rajdi, N. Z. I. M., Shahrulnizam, N., Asri, M. M., and Rahman, M. S. A. (2022). Online in-class quiz by using flippity. net platform on year-1 students of doctor of veterinary medicine, universiti malaysia kelantan.
- Abuhammad, S. (2020). Barriers to distance learning during the covid-19 outbreak: A qualitative review from parents' perspective. *Heliyon*, 6(11).
- Al-Balas, M., Al-Balas, H. I., Jaber, H. M., Obeidat, K., Al-Balas, H., Aborajoo, E. A., Al-Taher, R., and Al-Balas, B. (2020). Distance learning in clinical medical education amid covid-19 pandemic in jordan: current situation, challenges, and perspectives. *BMC medical education*, 20(1):1–7.

- Alvareli, L. V. G., Bento, M. C. M., and de Oliveira, N. A. A. (2018). A student look on the use of virtual learning environment tools in the face to face teaching learning. In *2018 13th Iberian Conference on Information Systems and Technologies (CISTI)*, pages 1–5. IEEE.
- Alves, F. B. and Lima, D. A. (2018). Uso de la clasificación para el análisis y la minería de datos en la herramienta de enseñanza-aprendizaje google classroom. *Nuevas Ideas en Informática Educativa*, 4:589–594.
- Appenzeller, S., Menezes, F. H., Santos, G. G. d., Padilha, R. F., Graça, H. S., and Bragança, J. F. (2020). Novos tempos, novos desafios: estratégias para equidade de acesso ao ensino remoto emergencial. *Revista Brasileira de Educação Médica*, 44:e155.
- Aretio, L. A. et al. (2018). Blended learning y la convergencia entre la educación presencial ya distancia. *RIED. Revista Iberoamericana de Educación a Distancia*.
- Bacich, L., Neto, A. T., and de Mello Trevisani, F. (2015). *Ensino híbrido: personalização e tecnologia na educação*. Penso Editora.
- Bratel, O., Kostiuk, M., Bratel, S., and Okhrimenko, I. (2021). Student-centered online assesment in foreign language classes. *Linguistics and Culture Review*, 5(S3):926–941.
- Carneiro, D. V. and Monteiro, P. O. (2018). Representações sociais docentes: Ead e educação presencial. *EaD em Foco*, 8(1).
- Castioni, R., Melo, A. A. S. d., Nascimento, P. M., and Ramos, D. L. (2021). Universidades federais na pandemia da covid-19: acesso discente à internet e ensino remoto emergencial. *Ensaio: Avaliação e políticas públicas em educação*, 29:399–419.
- da Silva, C. L. M. and Lima, D. A. (2020). Revisao sistematica da literatura a partir dos termos gamificação e jogos serios na educação a distancia. *V Workshop em Tecnologias, Linguagens e Mídias na Educação*, 5(1):481–497.
- de Brito Lima, F., Lautert, S. L., and Gomes, A. S. (2022). Learner behaviors associated with uses of resources and learning pathways in blended learning scenarios. *Computers & Education*, 191:104625.
- Gaeta, E., Beltrán-Jaunsaras, M. E., Cea, G., Spieler, B., Burton, A., García-Betances, R. I., Cabrera-Umpiérrez, M. F., Brown, D., Boulton, H., and Arredondo Waldmeyer, M. T. (2019). Evaluation of the create@ school game-based learning-teaching approach. *Sensors*, 19(15):3251.
- Gil, A. C. (2008). *Métodos e técnicas de pesquisa social*. 6. ed. Editora Atlas SA.
- Hwang, A. (2018). Online and hybrid learning. *Journal of Management Education*, 42(4):557–563.
- Kong, S. C. and Li, K. M. (2009). Collaboration between school and parents to foster information literacy: Learning in the information society. *Computers & Education*, 52(2):275–282.
- Lima, D. A. and Isotani, S. (2022). Guidelines for google classroom usage as an e-learning tool during covid-19 pandemic based on similarity search. In *Anais do XXXIII Simpósio Brasileiro de Informática na Educação*, pages 289–300. SBC.

- Lima, D. A., Oliveira, C. C., Pestili, L. C., Silva, E. C., Bezerra, M. A., and Lima, H. A. (2017). Uma proposta de sistema de aprendizagem com conteúdo gamificado e com reforço guiado por algoritmos bio-inspirados. *Anais do Computer on the Beach*, pages 140–149.
- Martínez, V. (2017). Educación presencial versus educación a distancia. *La cuestión universitaria*, (9):108–116.
- Moran, J. (2015). Educação híbrida: um conceito-chave para a educação, hoje. *Ensino híbrido: personalização e tecnologia na educação. Porto Alegre: Penso*, pages 27–45.
- Nortvig, A.-M., Petersen, A. K., and Balle, S. H. (2018). A literature review of the factors influencing e-learning and blended learning in relation to learning outcome, student satisfaction and engagement. *Electronic Journal of E-learning*, 16(1):pp46–55.
- Rahman, K., Wahid, A., Afandi, I., Bali, M., and Hakim, L. (2019). Effectiveness of teams teaching-hybrid learning (tthl) in higher education. In *WESTECH 2018: Proceedings of 1st Workshop on Environmental Science, Society, and Technology, WESTECH 2018, December 8th, 2018, Medan, Indonesia*, page 263. European Alliance for Innovation.
- Sampaio, R. M. (2020). Práticas de ensino e letramentos em tempos de pandemia da covid-19. *Research, Society and Development*, 9(7):e519974430–e519974430.
- Sendacz, N., Isotani, S., and Lima, D. A. (2022). Literature review on technologies and games that motivated people to practice physical activity during the pandemic. *RENOTE*, 20(2):280–289.
- Severino, A. J. (2017). *Metodologia do trabalho científico*. Cortez editora.
- Silva, C. M., Toriyama, A. T. M., Claro, H. G., Borghi, C. A., Castro, T. R., and Salvador, P. I. C. A. (2021). Pandemia da covid-19, ensino emergencial a distância e nursing now: desafios à formação em enfermagem. *Revista Gaúcha de Enfermagem*, 42.
- Souza, C. L., Mattos, L. B., Stein, A. T., Rosário, P., and Magalhães, C. R. (2018). Face-to-face and distance education modalities in the training of healthcare professionals: a quasi-experimental study. *Frontiers in psychology*, 9:1557.
- Trindade, S. D., Correia, J., and Henriques, S. (2020). Ensino remoto emergencial na educação básica brasileira e portuguesa: a perspectiva dos docentes. *Revista Tempos e Espaços em Educação*, 13(32):2.
- Unger, S. and Meiran, W. R. (2020). Student attitudes towards online education during the covid-19 viral outbreak of 2020: Distance learning in a time of social distance. *International Journal of Technology in Education and Science*, 4(4):256–266.
- Velandia, N. A., Rincón-Báez, W. U., and Cruz-Pulido, J. M. (2018). Desempeño de mujeres y hombres en educación superior presencial, virtual ya distancia en colombia-women and men performance in face-to-face, virtual and distance higher education in colombia. *Panorama*, 12(1 (22)):57–69.
- Vieira, L. d. S. and Oliveira, V. d. X. (2010). A importância dos jogos e brincadeiras para o processo de alfabetização e letramento. *Encontro de Produção Científica e Tecnológica–EPTC*, 5:1–11.
- Wenczenovicz, T. J. (2020). Distance learning, face to face difficulties: perspectives in times of covid-19. *Revista Ibero-Americana de Estudos em Educação*, 15(4):1750.