EUROPEAN ACADEMIC RESEARCH
Vol. VIII, Issue 9/ December 2020

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Floating School - A Feasible Proposal for the Improvement of Multiserial Education in the Amazon Region

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Abstract

The riverside schools in the Amazon, are located in areas far from urban centers such as Manaus and Belém, are schools that have their own characteristics and for geographic reasons are areas that have a lower demographic density and consequently the number of enrollments is smaller. With school education as the only door to progress, the riverside seeks to adapt to the environment. With the variation of water levels, the structure of the school is drastically affected, causing disruptions in the school calendar. This information has been used over time as a means for the organizational pattern of these schools that are called multisection or unidocent and are present

in many regions in the north and northeast of Brazil. The multi-grade modality constitutes a preponderant way of offering elementary education in rural areas of the Amazon Region and its surroundings. The main objective of the research was to investigate the difficulties encountered in multi-grade rural schools, and to investigate ways of contributing to the improvement of pedagogical work. The construction of floating schools is one of the alternatives to serve these communities, as it is a project that meets one of the primary needs of communities near the lake of Janauacá in Amazonas, being a project that can be implemented in other communities in the region.

Keywords: Amazon, ribeirinho, school, multiseries, floats.

1. INTRODUCTION

The floods in the Amazon region, which generally take place from November to May, considerably regulate all activities carried out by the riverside peoples, changing their social tasks, teaching, work and leisure, all of which are determined by the rising and falling of the rivers.

Among several difficulties present in these regions, the school period, or school days, is one of the problems that contributes to the low school performance index of students in these communities. To think about education in the Amazonian environment is to try to demonstrate a relationship with its singularities and regional realities.

The river is the fundamental base of livelihood for the riverside peoples, the fertile lands around them are their important areas of agricultural productivity, in addition to being their important means of transport. The riverside working season is divided between swidden farming and family livestock fishing or artisanal fishing (Santana, 2013).

In order to achieve a good level of well-being and efficiency in riverside schools, countless possibilities for adapting buildings to localities, climate and terrain must be taken into account, but in the Amazon in most cases the relevant target is cost of buildings. As a consequence, we have uncomfortable buildings and without compatibility with the local reality, because with the lack of projects of

necessity not adequate to the social and human aspects of the built element, it is not guaranteeing a good level of efficiency in its uses and satisfaction of its users.

The multi-grade modality constitutes a preponderant way of offering elementary education in rural areas of the Amazon Region and its surroundings. When we think of multi-grade classes, we refer to classrooms with students of different age groups and totally different levels of education under the responsibility of a single teacher. Schools operate according to the water cycle of the rivers.

Perhaps this is a way to reduce the exclusion of knowledge not reached by the conventional form of education and the current model of a serial school. The challenges of the new century for school education include the plurality of knowledge, multiculturalism, technological advancement, the preservation of the environment, peace, interdisciplinarity in the set of learning of specific contents, and the multiserial model is proposed.

The main objective of the research was to investigate the difficulties encountered in rural multi-grade schools, aiming to analyze, understand and investigate ways to contribute to the improvement of pedagogical work, with the proposal of floating schools, which in the first instance would serve the communities neighboring the Lake of Janauacá.

The research was carried out in three municipal schools, located about 150 km from Manaus between the municipalities of Careiro da várzea and Manaquiri in the State of Amazonas. The data collection instrument used for the research were questionnaires previously prepared by the authors for students, teachers, administrative technicians of schools and the community in general. It became evident that multiserection, for the Amazonian context, is the result of a need and not a pedagogical alternative, but that it must continue in search of more effective educational alternatives.

Families residing in the communities near the lake of Janauaca, in general, are satisfied, but are very apprehensive about the lack of local structure and greater opportunities for their children, especially with the absence of schools that operate on a regular schedule. . According to residents, floods are increasingly frequent, reducing the school calendar by up to five months. The construction of floating schools that would serve these communities is a possible

proposal, as it is a project that, according to the interviews carried out on the spot, would meet one of the primary needs of the communities near the lake of Janauacá and that could also be implemented in other communities in the region.

2. THEORETICAL REVIEW

The riverside schools in the Amazon, are located in areas far from urban centers such as Manaus and Belém, are schools that have their own characteristics and for geographic reasons are areas that have a lower demographic density and consequently the number of enrollments is smaller. This information has been used over time as an allusive tool for the organizational pattern of these schools that are called multisectional or unidocent and that are present in many regions of North and Northeast Brazil.

The indigenous, caboclos, riverside peoples, small natural immigrant farmers mainly from the northeast and central-south regions of the country represent the socio-cultural heterogeneity of the Amazon. The caboclo represents the vast majority, but the Amazon region still has Indians who have not been contacted, it is a region that has a large number of languages, some little known.

The cultural identity of the Amazon is very complex, since other values derived from its Portuguese, Spanish, Dutch, French, English, North American, Japanese, Syrian-Lebanese, Africans who came as slaves, and others, form the cultural identities of the Amazon. Amazon. Until today the implementation of public policies, the exploitation of wood, construction of industrial districts, construction of hydroelectric plants have stimulated the human, economic and social transfer from other regions of the country towards the Amazon (Hage & Barros, 2010).

In the educational area, many of the particularities that make up rural schools due to their great distances are largely neglected in relation to public educational policies implemented in the country.

2.1 Right to education

Brazilian educational laws offer us comprehensive legal support for the elaboration of public policies that include the singularities of life in the

countryside, are legitimate points of view to be considered in the educational policies and procedures of riverside schools.

Articles 23 and 28 of the National Education Guidelines and Bases Law 9394/96 - LDB, establishes that basic education may be organized in annual series, semester periods, cycles, regular alternation of study periods, non-academic groups. series, based on age, competence and other criteria, or by a different form of organization, whenever the interest of the learning process so advises. In addition to offering basic education to the rural population, the education systems will promote the necessary adaptations to adapt them to the peculiarities of rural life and each region. They are important adaptations, because jointly between the tasks of the riverside man and studies there is school failure.

LDB specifically proposes curricular content and methodologies appropriate to the real needs and interests of students in the rural area, its own school organization, including adapting the school calendar to the phases of the agricultural cycle and climatic conditions, adapting to the nature of work in the rural area. It consists of the composition of mechanisms and fundamentals that aim to legalize the affinity of rural schools, which must be delimited, in a close union with their essential truth, relating to the time and specific knowledge of the riverside populations, in their collective thinking, in the network science and technology accessible to the community.

The National Council of Education Chamber of Basic Education, through resolution CNE / CEB 1, of April 3, 2002, instituted the operational guidelines for basic education in rural schools. In its Articles 2 and 3 it establishes that the Guidelines, based on educational legislation, establish a set of principles and mechanisms that aim to adapt the institutional project of rural schools and that the Public Power, considering the importance of school education for the exercise of citizenship and for the development of a country whose model has as recommendations social justice, solidarity and dialogue between all, regardless of their insertion in urban or rural areas, should ensure the general access of rural residents to Education Education and Technical Education at Technical Level.

2.2 The multiseries school

As a political option to serve a population that has historically been excluded from school, multisiered schools were born in Brazil, as such a delay in educational provision is much more evident in developing countries and regions such as the Amazon.

Hage (2005), has made important contributions to the development of teaching and multiserial classes, highlighting concerns and contributions to the debate guaranteeing the quality parameters of public education achieved by social movements and their relations with the operational frameworks recommended by Brazilian educational legislation.

Many international organizations have been debating and partnering and creating mechanisms to overcome these historical delays in education. In 1990 the World Declaration on Education for All brought together several countries from almost everyone and formalized agreements for the universalization of basic education, with the intention of implementing what the Universal Declaration of Human Rights advocated, that everyone has the right to education.

The 1988 Constitution in Brazil states that teaching is the right of everyone and the obligation of the State and the family. It is a right confirmed by the Statute of the Child and Adolescent - ECA of 1990 and by the Law of Directives and Bases of National Education - LDB of 1996. For education in the field, the National Council of Education approved Resolution CNE nº 01/2002, which establishes the Operational Guidelines for Basic Education of Rural Schools, and CNE Resolution No. 02/2008 which establishes Complementary Guidelines, Norms and Principles for the Development of Public Policies for Service of Basic Education in the Countryside. These are Resolutions that recognize the characteristic way of life of the inhabitants of the countryside and provide guidelines for safeguarding universal entry, continuation and academic success with quality in all grades of Basic Education for the rural dweller.

According to the Education Forum of 2011, the multi-grade school is a reality in education that despite its controversies and criticisms should not be ignored, as there are arguments to be considered as every child has the right to study close to home and family, the tiring commute to school is a complicating factor for learning, as well as excessively dangerous transport for children.

2.3 The riverside environment

The Amazon stands out for having a unique biodiversity and culture, it is composed of an indigenous population of different ethnicities in absolute use of their own dialects and cultures. In addition to the indigenous inhabitants, there is the cabocla culture, represented by riverside dwellers who live on the banks of rivers, lakes and streams that are part of the Amazonian environment.

Ribeirinho is the common resident of the banks of the rivers. They live by the conditions offered by nature, adapting to the rainy season. Artisanal fishing is their main subsistence occupation, but they also cultivate small fields for their own consumption and can also practice extractive activities. They are mainly part of the hydrographic complex, located in the North of the country. Their occupations are closely related to rivers, which help as a way of movement, they also serve as a means of survival and leisure, and are therefore of great importance for riverside dwellers in the Amazon region (Conceição, Reis & Diniz, 2013).

The riverside communities have characteristics and specificities that are typical of the Amazon region, especially with regard to climate and environmental issues. It is a location that has a high rainfall rate, with a hot and humid climate, the forest is composed of dense vegetation and a period of river flooding that is well known throughout the region, the period is from November to May when the waters of the rivers rise, causing floods and floods in some states and municipalities that are increasingly frequent and larger.

As a result of the flooding phenomenon, school education in riverside schools in the Amazon suffers the consequences of this natural occurrence. The educational institutions that are located in the riverside lowland communities have an individualized school calendar, beginning the school year in September or October varying according to the period of the river's ebb and ending the school season in April or May, as well as the period of the river's flood.

Some typical characteristics of these environments, have a direct influence on schools, including precarious conditions, both material and didactic; difficulties in access and sequence in studies, caused by the distance between communities, entry and transportation to the places of classes; permanent alternation of teachers; pedagogical

ordering and teachers are lacking in multi-grade rooms that comprise early childhood education up to the first grades of elementary school.

In many cases, riverside schools operate in collective environments such as community halls, makeshift spaces, residences, parish centers, among others, but which are generally part of the municipal education system. They are educational places that allow teachers and students to live together in different stages of knowledge. The teacher graduates and builds his specialty, having as reference an environment that at first is unknown to him, but which has great capacities to grant the teacher, the construction of a training activity, traced in the reality of the place with cultural emphasis, which allows the establishment of an identity for both the teacher and the student.

2.4 Physical structure of multi-grade schools

Many problems hinder the teaching-learning process of riverside schools in the Amazon, such as the precarious physical structure of the multi-grade rooms, lack of pedagogical support faced by teachers and students, lack of school lunches that significantly interfere with students' performance and attendance, in addition to long distances faced by them.

Multiseries schools that find themselves in a precarious situation as riverside schools are one of the only forms of education provision in the Amazon, especially those in the municipalities of Careiro da Várzea and Manaquiri, are structured in a model of curricular organization centered on the grades, in content and evaluations. Teachers, students and parents make many comparisons between them and the serial classes in the city, expressing the desire for these schools to change to serial ones, as the only possibility for them to advance a quality teaching-learning process.

2.5 Pedagogical work of multi-grade schools

Several teachers of undergraduate courses conclude their graduation without knowing the existence of serial classes, revealing that teacher training courses in the various Brazilian educational institutions do not even debate the issue. This issue could be reduced if students in their degrees, promoted by the education system, provided teachers in activity with the necessary considerations on education in the field, in

accordance with the National Education Council Resolutions exclusive to education in the field (Brazil, 2008).

Teachers in multi-grade schools have a great puzzle because they work with the vision of uniting different grades at the same time, and have to produce different teaching plans and different appraisal techniques for learning, as far as the levels of education with which they are concerned.

Teachers feel anxious and distressed to want to do the job in the best possible way and at the same time, they feel disoriented, needing support to organize the school period, in situations that require up to six simultaneous grades.

Teachers feel pressured by the education departments to formulate conventional guidelines regarding the determination of class activity hours and the planning and elaboration of subjects.

The riverside people in their statements express a lot of discontent in relation to the teaching of multi-grade schools, mainly due to the discontinuity of classes in the period of floods that are more and more frequent, which according to their reports is a problem responsible for the damage to the schooling methodology in the field.

They are schools that can and must overcome difficulties such as the culture of serialization and the fragmentation of knowledge, promoting pedagogical work with teachers, students and the environment, as they are schools that must build a relationship of interdependence, association, cultural reference and of social arrangement in the community where they are.

3. MATERIALS AND METHODS

The research was carried out in three municipal schools, located about 150 km from Manaus, between the municipalities of Careiro da Várzea and Manaquiri in the State of Amazonas. The data collection instrument used for the research were questionnaires previously prepared by the authors for the students, teachers, administrative technicians of the schools and the community in general, as shown in figures 1a Escola São José do Paraná de Manaquiri and figure 1b Escola Municipal Aldenei dos Santos Barroso. It became evident that multiserection, for the Amazonian context, is the result of a need and

not a pedagogical alternative, but that it must continue in search of more effective educational alternatives.

Figure 1a - São José do Paraná de Manaquiri School

Figure 1b - Municipal School Aldenei dos Santos Barroso

The field research also raised the following aspects: (a) the use of wood applied to Architecture with adaptation to the regional reality combined with economic planning, which diversifies the use of new jobs in a rational way; (b) survey of wooden buildings in the region studied with analysis of the construction system, socio-environmental issues, typologies and treatments used in the buildings (c) photographic survey with the typological classification of buildings as a parameter, and the problems encountered, figures 2a and 2b.

Figure 2a - Photographic survey of the area.

Figure 2b - Photographic survey of the area.

The main focus of the study is the elaboration of an executive architectural project for a school in driftwood that will initially serve the communities close to the municipalities of Careiro da Várzea and Manaquiri, which can be reached by river or land and who suffer with the problem of constant flooding. Figure 3 shows the location of the municipalities of Manaus and Manaquiri on the demographic density map of the state of Amazonas, where the lightest colors correspond to

0.75 inhabitants / km² and the darkest ones correspond to 4.23 inhabitants / km² (IBGE, 2010).

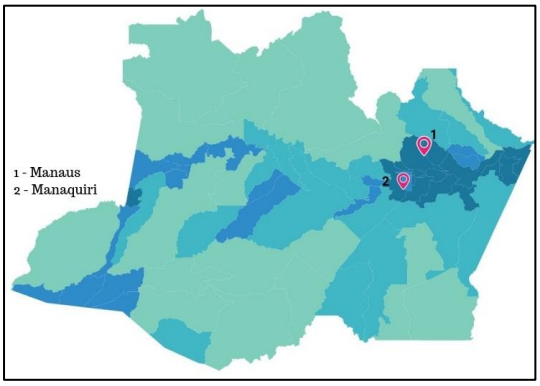

Figure 3 - Location map of the municipalities of Manaus (1) and Manaquiri (2) (Adapted from IBGE 2019).

According to Torres (2011), the municipalities of Careiro da Várzea, Manaquiri and Iranduba are part of the strip delimited by the Metropolitan Region of Manaus, presenting diversified characteristics of territorial organization. In the 2010 Official Census of Brazil, the municipality of Careiro da Várzea was considered the most rural municipality in the country, where only 4.18% of a population of 23,930 inhabitants were living in an urban area, figure 4.

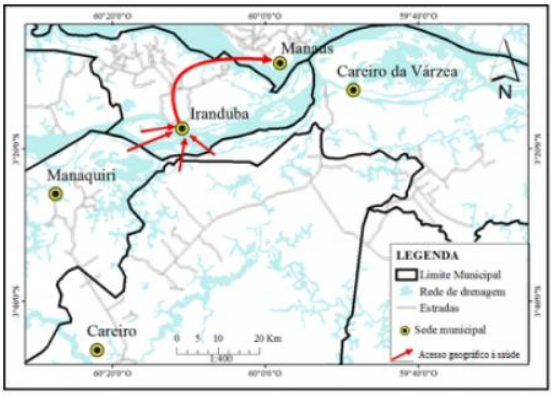

Figure 4 - Municipalities under study and belonging to the Metropolitan Region of Manaus (Source: Anjos, 2019).

4. RESULTS AND DISCUSSIONS

All the interviewed educators assured that the multisserie education system in the Amazon context can lead to school failure in some way, as long as there is no motivation on the part of the teachers and a participation by the students in the activities developed. The exchange ratios will always be valid in a school space, being no different within a serial class. When we join together in a single room, students from different levels of schooling they start to relate to each other, in a relationship of exchange of knowledge that will occur spontaneously. The educators' difficulties are many, including precarious classrooms, without the minimum comfort and lack of didactic resources, figures 5a and 5b.

Figure 5a - Internal environment of the room with all levels of elementary school 1.

Figure 5b - Internal environment of the room with initial levels of elementary school 1.

One of the shortcomings we perceive in the system is that there is no specific training for teachers working in such areas to teach classes in multiseries classes. Very rarely, according to reports, the municipality offers some courses and lectures that help guide teaching practices and methodologies, but for serial teaching standards, as reported by a teacher:

> "We who work in multisite schools have many difficulties, in fact not only us students as well. The pedagogical methodologies passed on by the secretariats are very complicated, clearly showing the lack of experience and experience of those who plan actions in the field, most

> of the time they do not know the dynamics and difficulties of the riverside communities, which are similar, not equal. We work and live in the community, we understand the problems well, and it is our responsibility to make some adjustments, which depends a lot on the dynamics and degree of commitment of the teacher. One of our major difficulties, among others, is the interruption of the school year due to the floods in the riverside communities, which each year seems to be getting more complicated".

The study makes it clear that there are obstacles in dealing with time within the classroom, as the teacher needs to organize specific themes for each grade. In the course of on-the-spot analysis, we could conclude that there are disagreements in the way that many educators define multiseries teaching.

The survey also showed that many students living in the cities investigated sought to do regular serial teaching in public schools in the urban area of Manaus, through an unusual routine, which is crossing the river daily by unsafe vessels to study.

The riverside communities of the Amazon, mainly the majority of schools in the initial grades of elementary school, are made up of multiserial classes, schools that have the purpose of serving students who live in places where the demographic density is low, with not enough students to integrate serial classes, the maximum number of students per grade in these schools was 15 students. In elementary school classes from 1st to 5th, classes are taught to students with great age difference, aged 6 to 14 years, where the subjects taught are, in general, selected by the teacher according to the learning needs presented by the students.

Multiserial schools need to come out of oblivion and be included in government actions, with the implementation of procedures that must have the participation of those involved. Schools must be examined in their socioeconomic, environmental, cultural and educational context in the countryside, as their challenges and difficulties are more comprehensive than how they are currently treated. The difficulties of men and women in the countryside are left aside and are transformed into an accelerated growth of migration from the countryside to the cities.

The lack of adapted pedagogical guidance for multi-grade riverside schools makes it possible to create pedagogical options created

in the classroom. They are original creations that involve local materials, new organizational models and the overcoming of obstacles that appear in the educational circumstance. In this context, the multi-series systematization does not differ from the serial form, even if in a given school organization structure there is a diversity of capacities and performance options for education technicians.

Students in multi-grade schools have low school performance, with a high failure rate, mostly caused by the lack of reading and writing. Teachers justify the inefficiency to their accumulation of assignments and jobs, they have little time to attend to students who cannot read or write, at the same rate that they feel pressured by the education secretary to present a high rate of achievement, as a way to hide the worrying failure and dropout rates.

The multi-grade school can be defined as the public administration of socialization of admission to education, although it has neglected the essential pedagogical choices, such as ordering choices that serve a small number of students, in a small physical space and a small amount of students and professionals.

The difficulties of multiseries are centered essentially on educational problems, when we should also take into account issues related to infrastructure, funding, management, and teacher training, as there are many financial, human and material obstacles. There is a need for positive aspects, including the creation of physical spaces for interdisciplinary work, group work, libraries equipped with computers, greater integration and socialization among students, in addition to the usual classroom environments.

The construction of a floating school is a viable and economical solution for riverside locations, as it takes into account the reality of Amazonian constructions, the inconstancy of river floods and the distances from communities to more developed municipalities. Regardless of the pedagogical model employed, it is a solution to the irregularity of the school period, as long as the minimum operating conditions such as transportation and school meals for students, teachers and administrative technicians are maintained.

4.1 Floating school model

The research observed that teaching in multi-grade classes in the Amazon region does not have a public policy that meets their

specificities, where the periods of flooding of rivers are increasingly long and the precariousness in the offer of education, increases school dropout and demotivation of teachers and students, perpetuating the negligent posture that the state has always adopted with the education of the peoples of the Amazon.

The construction techniques for housing in the Amazon region are responsible for significant environmental impacts and low performance of the schools studied due to the decrease in the term. Figure 6 shows some schools affected by the floods. The combination of some regional materials, more efficient projects and some constructive techniques, can improve the design of more effective constructions, where the floating school proposal is a viable alternative to improve multi-series teaching and the problems of distance between communities and the school.

Figure 6: Schools without classes in the period of river flooding.

The proposal for an architectural project for a floating school is the recommendation of a popular constructive possibility in wood in a sustainable and economically viable way for the periods of flooding of rivers in the Amazon region.

In the elements of separation of the environments, the sealing walls, the second floor of the administrative building and ceilings will be used double wooden walls with Expanded Polystyrene (EPS) core, due to the need to combine easily obtainable materials and employment in the region, aiming at conditions of comfort, energy savings and ease of installation.

The school's project consisted of three independent and interconnected floating bases (one administrative block and two classroom blocks), where the entire hull structure will be made of naval steel. The floating bases will always have an adjustable position at the

margins, according to the periods of rising and falling of the river, figure 7.

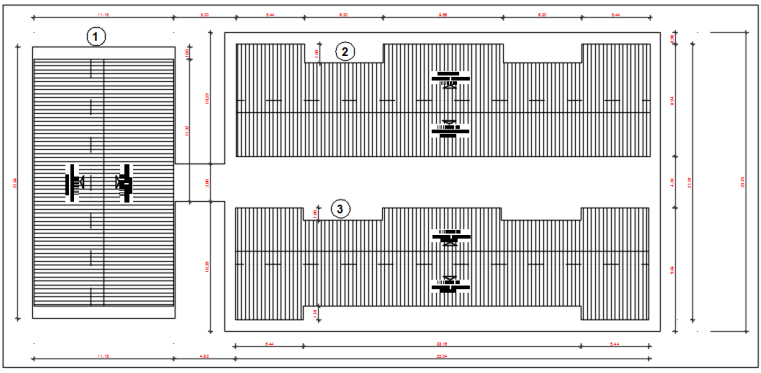

Figure 7 - General layout of the floating school: (1) - Administrative block; (2) and (3) Classroom blocks.

Figure 8 shows the bathroom and classroom block with a capacity for 20 students per room. With the use of double walls and filling with EPS on the walls, ceilings and floors of the floating school, it was sought, in addition to thermal comfort, to absorb the noise coming from the rooms and the movement of people on the second floor of the administrative building. The cost-benefit of applying EPS is satisfactory compared to other insulators because it is a non-polluting, recyclable, physically stable product, of low cost, easy to acquire, easy to handle and apply when compared to other products such as glass wool.

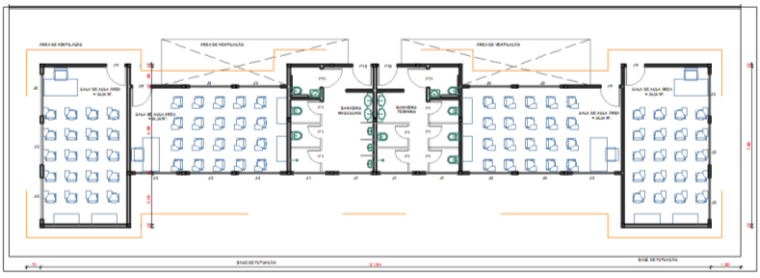

Figura 8 - Planta baixa do bloco flutuante 3 de salas de aula e banheiros.

The front view of the classroom block is shown in figure 9 where the part of the roof with an opening between the two waterfalls can be seen for better ventilation circulation for the ceiling. The naval steel support

base features rubberized elements on the side that prevent the impact between the floating bases and the mooring vehicles.

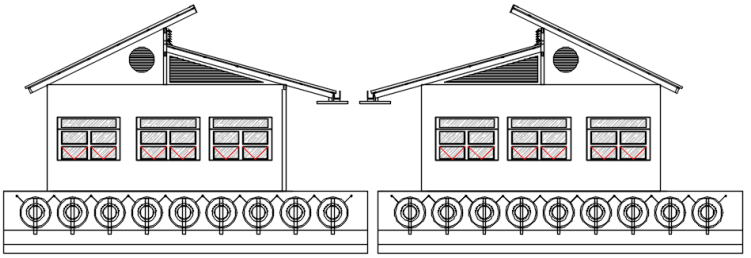

Figure 9 - Front view of blocks 2 and 3 of classrooms.

5. FINAL CONSIDERATIONS

As the multiserection represents the only social space that exists in rural areas for riverside communities in the Amazon, then the challenge is not to end the multiseries towards serialization, since we start from necessity and law, and not from the pedagogical model. We understand that the school provides riverside residents with access to the means essentially implemented for the fulfillment of citizens' rights, socialization, personal growth, where education methods start to elaborate mechanisms and public policies that offer this right.

The great relevance of the study is to ensure that all individuals from the metropolis or riverside, order themselves in serial, or multi-serial schools, or any other way that we come to elaborate, enjoy the privilege of efficient teaching and make full use of this right. Attend organizing socializing / learning by human times that go beyond the applied teaching method.

Families living in the communities near the lake of Janauacá are generally satisfied, but are very concerned about the lack of local structure and greater opportunities for their children, especially with the lack of full-time schools (normal). Approximately 60% of the population is between 0 and 16 years old, that is, most of them are of school age. During the entire flood period, students are out of the classroom, as schools are flooded.

The parents' concern with the formation of their children causes the transfer of families or children to the home of relatives, friends or acquaintances in Manaus, which is often not an experience

with satisfactory results due to the great cultural shock among those involved.

According to residents, floods are increasingly frequent, reducing the school calendar by up to five months. The construction of a floating school that would serve these communities is a viable proposal, as it is a project that, according to the interviews carried out on site, would meet one of the main needs of the communities near the lake of Janauacá and that could also be implemented in other communities in the region.

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