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Uncovering the Dynamics that Drive Non-Formal Online Educational Activities: The Beaver Scouts Case Study

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In this article we present our findings regarding of providing online educational activities, delivered by six adults, during 13 weeks (first semester 2020) to 15 children aging from 5 to 7 (the Beaver scouts), on a non-formal education context. The activities combined guided play and problem-based learning activities. Our research objective was to analyzed the method followed, uncovering the dynamics the drove the activities and the consequences. We followed an action research approach in order to understand the feedback loops present in the delivery of online educational activities. The data was collected from the minutes of the meetings, the activities' plans and the notes taken from observations of the online activities and notes taken during the debriefing activities. We analyzed the data by means of a systemic analysis. Our findings are: 1) The diversification of activities (physical, artistic, and social) provided by the leaders and the parent´s support and participation fostered the children engagement and motivation to learn. 2) The continuous improvement of the teach and learning techniques and the right use of IT tools, facilitated the communication and the delivery of meaningful online activities.

Keywords: non-formal education, action research, systemic analysis, problem-based learning, online educational activities

INTRODUCTION

In this article we present the dynamics that drove the non-formal online educational activities developed by six voluntary adults (thereafter leaders) of Peregrine Falcon's Beavers Association (thereafter PFBA) delivered to 15 children aging from 5 to 7 (the so-called "beavers"), during the first semester of 2020. The PFBA has the goal of preparing children to ingress into the first rank (the rank of "cubs") of Peregrine Falcon Boy Scout Group (thereafter PFBSG). The PFBSG is one of the most traditional boys scout groups of Sao Paulo, Brazil. The FBPA usually develops face-to-face educational activities with the children; however, due to the COVID19 pandemic, the PFBA had to reinventing itself, delivering online activities during the first semester of 2020.

The PFBA follows the educational guidelines proposed on a document called Principles, Organization and Rules of Beavers (thereafter POR). The POR was created based on educational programs developed by Beavers' associations from the National Council Boy Scouts of Canada and the Boy Scouts of America.

The POR defines educational goals to stimulate children growth in five different areas: development of creativity and intellect, physical-motor development, social development and spiritual development. For each of these areas, POR proposes a set of learning goals and activities to accomplish these goals, in different levels of difficulties. For example, in physical and motor area, POR suggests activities

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such as jumping rope, spinning tops, flying kites, training equilibrium etc. The PFBA leaders planned and delivered their activities based on POR recommendations. This article presents the systemic aspects of the implementation of this educational program.

Theoretical Review

The PFBA provides non-formal educational activities. The non-formal education (thereafter NFE) can be understood by structured educational practices and processes (Shephard, 2014) carried out by institutions other than formal education institutions (Novosadova et al., 2007), with educational goals cleared defined. Researchers points out that non-formal education is learner-centered (Thompson, 2001). In addition, NFE is based on voluntarism (Madjar & Cohen-Malayev, 2013). In other words, differently than schools, where the students are obliged to attend, in institutions that provide non-formal education the individuals have freedom to join or leave whenever they desire. Another important characteristic of NFE is that it can be complementary to formal educational system (Fordham, 1979). Non-formal education can be directed to an specific segment of the community (Hamadache, 1991). NFE may also have the goal of fostering social participation and the development of sense of citizenship (Romi & Schmida, 2009). The NFE may aim to provide long-life learning (John & Cox, 2018).

The PFBA has all characteristics of a non-formal educational institution described previously: it is based on voluntarism and it provides non-formal educational activities directed to a specific segment of the community. More than that, the educational activities have goals cleared defined, complementary to formal educational system. In addition to that, the activities foster social participation and the development of the sense of citizenship of the children.

The PFBA leaders follow active learning approach centered on the learner, by combining guided play learning and problem-based educational approaches. Guided play learning is an educational approach used to teach children concepts while they are participating in playful activities scaffolded and mentored by adults (Fesseha & Pyle, 2016). Scholars (Weisberg, Hirsh-Pasek, & Golinkoff, 2013) pointed out that guided play may lead to better educational results than direct instruction (Weisberg, Hirsh-Pasek, Golinkoff, & McCandliss, 2014).

There are several ways of developing guided play activities such as: promoting games that involve physical activities (Hughes, 2017), organizing science experiments (Sliogeris & Almeida, 2019), fostering the development of numeracy skills (Eason & Ramani, 2020; Popoola, 2014), conducting storytelling activities (Cremin, Flewitt, Mardell, & Swann, 2016), organizing drawing activities (Sawyer & Goldstein, 2019), conducting origami creation activities (Afrianti, Respitawulan, & Rachmiatie, 2020), promoting block play activities (Ramani, Zippert, Schweitzer, & Pan, 2014; Trawick-Smith et al., 2017), conducting musical activities (Niland, 2009). During guided play activities the children have active role in their learning (Toub, Rajan, Golinkoff, & Hirsh-Pasek, 2016): they learn by doing, they learn by interacting with other children and adults.

Guided play activities may bring several benefits. Scholars (Weisberg, Kittredge, Hirsh-Pasek, Golinkoff, & Klahr, 2015) reported that guided-based activities, when well scaffolded, may enhance substantially the learning and sometimes provide even better educational results than those obtained by direct instruction (Fisher et al., 2011; Weisberg et al., 2014; Weisberg et al., 2013). More than that, researchers also point out that guided play may have positive impact on children's motor development (Palma, Pereira, & Valentini, 2014). In addition to that, scholars (Weisberg, Zosh, Hirsh-Pasek, & Golinkoff, 2013) pointed out that guided play may enhance children language skills and vocabulary acquisition (Hassinger-Das et al., 2016; Toub et al., 2018).

Guided play activities may involve children to work collaboratively in order to solve some problem. When this occurs, the guided-based learning may incorporate features of problem-based learning (thereafter PBL) which is also a learner-centered educational approach: the learners learn by doing activities with the guidance of the educators (Savery, 2015). The problems provide the stimulus and motivation for learning (Barrows, 1996). The problems don´t need to be complex: they need to be meaningful and adequate to the learners' age and knowledge. PBL has been used in formal educational systems, from the kindergarten level (Zhang, Parker, Eberhardt, & Passalacqua, 2011) to higher education (Torp & Sage, 1998). PBL has also been used in non-formal educational settings, such as boy-scout groups (de Lima Silva & Imbernon, 2014; Kleinfeld & Shinkwin, 1983; Rogers, 2007). The PBL approach fosters critical thinking and collaborative learning (Rangachari, 1996). In PBL activities the learners are stimulated to connect the new knowledge with their previous knowledge in using critical thinking (Fregni, 2019; Hognestad, 2015; Myhill & Brackley, 2004). Problem-based learning is also been used in online settings (Orrill, 2002) in K-12 education (Malopinsky et al, 2000).

Although scholars have reported the use of active learning approaches (such as PBL and play-based learning) in face-to-face (Arantes do Amaral & Brito,2018; Yu et al., 2018; Zhang et al., 2010) and online preschool context (Pittas et al, 2022; Siew et al.,2017) there is still a lack of information about the dynamics the drive the process. This article aims to discuss a case that addresses this gap.

Our research objectives were:

1) To understand active learning approach followed by PFBA leaders in order to deliver online educational activities to preschool children
2) To reveal the dynamics that drove the learning process.

The context

The leaders were a trained group of adults, most of them parents of children of PFBA or PFBSG. In order to become a leader, the adults were required to take training courses at Union of Boy-Scouts of Brazil (thereafter UBSB). In the previous years, the PFBA activities were accomplished regularly on PFBSG facilities, on Saturdays, from 2 to 5 p.m. Due to the Covid-19 pandemic, the face-to-face activities were cancelled. The leaders then decided to restructure the activities, adapting them to the online environment. The online activities were accomplished from March to June of 2020, by means of 13 meetings.

The educational approach

The PFBA´ leaders delivered the educational activities by combining synchronous and asynchronous activities. At the beginning of each week, the leaders proposed asynchronous activities to the children. The asynchronous activities were small challenges (such as building a drum, make a drawing or planting a bean seed) that the leaders asked children to do during the week. These activities lead to the creation of artifacts (such as drawings) that were used in the synchronous activities.

During the meeting (synchronous activities) the leaders presented the tasks accomplished previously by the children, praising their achievements and fostering a reflection about the activities done. More than that, during the meetings the leaders conducted new activities, in order to foster the development of creativity and intellect. As well as this, they also promoted activities to foster the physical-motor development and/or propose actions that would lead to social and spiritual development. The meetings were accomplished by means of communications software such as Google Meets and Cisco Webex. The children performed the activities with the support of their parents.

The collaborative planning processes

One month before the beginning of the semester, the leaders had a meeting in order to define the educational goals and the POR areas to explore. In addition to that, they discussed what worked and

what didn't in the previous semester. Finally, they created the semester schedule, assigning the pair of leaders that would conduct each weekly activity. This meeting was called "Beaver's Indaba" ("Indaba" is a Zulu´s word that means "important meeting"). The "Beaver´s Indaba" was accomplished two times during each semester, one before the beginning of the activities and the other after the end of activities. The second "Beavers' Indaba" meeting had the goal of creating a lessons-learned document. This document had two goals: the first one was to review the entire semester, analysing the impacts of activities on children´s learning. The second goal was to summarize the main findings in order to share it with other leaders, from all PFBSG branches (Cubs, Boy-Scouts, Senior Troop, Guide Troop and Pioneers), in a larger meeting called "PFBSG´s Indaba".

In addition to the Indaba meetings, the leaders also planned together the weekly activities. Following the master schedule, the pair of leaders designed to conduct the weekly activities planned the activities and shared the plan with the others leaders. The plan was then improved based on their feedbacks. After that the plan was submitted to the Teaching and Learning Methods' Team (thereafter TLMT) of the PFBSG. The TLMT had the role of overview the plan, in order to assure that the plan was in accordance to the POR principles and to figure out if there were any discrepancies. The TLMT also gave improvement suggestions and recommendations. After that the planning was then approved.

The online activities

The online meetings lasted approximately 90 minutes; during each meeting the children developed three or four 15 minutes long activities. The meetings were always led by the two leaders who planned it. The other leaders supported the activities, by paying attention to the behaviour of each child and making interventions whenever they judged that it was necessary. They also toke notes based on what they observed related to the children behaviour. These notes were used during the debriefing section (a meeting between the leaders after the activities) to foster reflection about what worked and what didn't.

Usually, the online meetings began with a small opening ceremony, where the national flag was raised and all members made a reflection or a pray together. After that there was a warm-up activity called "Icebreaking activity". In general, the focus of this activity was to develop playful physical activities such as gymnastics, "Simon says", dancing etc. The following activities varied, week by week. Sometimes the leaders presented the products created by the children during the previous week and fostered a discussion about it. In other occasions they proposed activities that led to the development of children skills, such as painting, drawing or discussing a specific topic. In the sequence, the children had 15 minutes break, in order to do their personal hygiene and have a small snack. During this break the leaders conducted meaningful conversation with the children, in order to improve the socialization, to reinforce the social bonds, to give short notices or to reflect about the previous activities. After that there was another set of two activities. These activities were complementary to the previous ones. For example, if in the previous activities the children made drawings of faces expressing feelings, in the following activity they would discuss the meaning of the feelings. During these activities the leaders challenged the children to share each other experiences and ideas. Finally, there was a closing ceremony. The children left the meeting and the leaders remained in order to perform debriefing activities. The debriefing activities lasted around 45 minutes.

The continuous improvement processes

During the debriefing section the leaders discussed what worked and what didn't, sharing their views of the behaviour of each child. The discussion was based on the notes that the leaders took during the activity. The leaders discussed their impressions about each child, evaluating the degree of participation and the learning. In addition, they also discussed the efficacy of each activity. Based on this discussion, they planned together the improvements to be made in the following week's activities.

As the parents were always following the activities, the leaders sometimes asked their opinions about the tasks accomplished. Sometimes it was done by mean of electronic questionnaires, sometimes by interviews. The leaders also asked the children's opinions about the activities, in order to figure out their point of views (Figure 1).

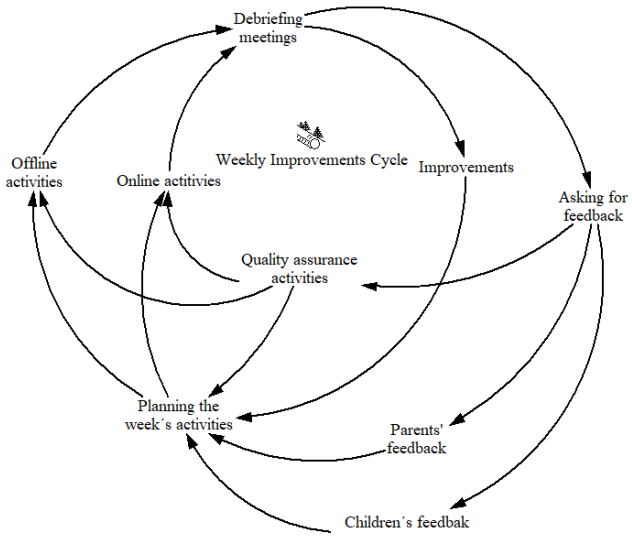

Figure 1
The weekly feedback processes

METHOD

In this research we followed an action research approach. Action research approach joins research (generation of knowledge) with practical actions (Avison, Lau, Myers, & Nielsen, 1999). The researchers and the subjects of the study work together (Stringer, 2008) in order to accomplish activities. Action researchers aim to find a solution to a given problem (Hansen & Brady, 2011) or figure out process' improvements (Sagor, 2000). In our research, action research was used to improve the online educational activities.

Action research can be accomplished by means of improvement cycles (Akella, 2010; Kolb, 2014). Each cycle may involve diagnosing a problem to be addressed, planning improvement actions, taking the corrective actions, collecting data about the results of the corrective actions and analysing then. By doing so, the researcher and the practitioners can, together, figure out ways of solving the problem or to improve the processes. The improvements may be incremental: therefore, the action research may be accomplished by means of several cycles. In this research we developed 13 action research cycles, one per week.

We followed the traditional action research flow: first we planned the educational action; then we developed the action with the children. After that we collected data related to the results of that action (by means of taking notes related to the children behavior) and analyzed it. Based on the results we planned the following action.

Data collection

The data was gathered from four different sources: the minutes of the meetings of the Indaba´s workshops, the activities' plans, notes taken from observations of the online activities and notes taken during the debriefing activities.

Data analysis

Data was analyzed following the five-phase data analysis approach, as proposed by Yin (2015). First, we compiled our database, by gathering information from the different data sources. Then disassembled the data into fragments, the verbs or small phrases that contained just one idea (Shiba & Walden, 2001). After that, the similar data was reassembled into broader categories. For each category we identified the recurrent themes, a sentence that captured the main ideas of each category (Bradley, Curry, & Devers, 2007). The recurrent themes were then interpreted by means of a systemic qualitative analyses (Arantes do Amaral, 2019). The causal loop diagram was used to represent interconnection between the recurrent themes (Cavana & Mares, 2004), helping to understand the systemic impacts of the educational approach followed. Finally, we draw the conclusions.

FINDINGS

Eight recurrent themes (thereafter RT) emerged from the analysis of the sources:

RT1: The attractiveness of the activities increased the children´s motivation and participation. The pursuit of merit badges also increased the motivation.

The parents reported that the children were motivated to participate in weekend online activities; the activities were particularly interesting to them since they differ from those that were accomplished in their schools. The children demonstrated special interest to the physical activities, to the drawing activities and to accomplish science experiments. The challenge of pursuing merit badges also motivated them, since the badges were seen by them as a recognition of their efforts. In addition to that, the children were also proud to wear their badges in their uniforms.

RT2: The parents participation improved the attractiveness of the activities.

The data collected from the observation of the meetings revealed that the majority of the parents participated actively on children's activities, by providing the necessary resources (such as paper, color pens, computer access) and also working with the children in some activities (such dancing together or playing together, for example). The notes of observation revealed that the children got more excited when working with their parents in their activities.

RT3: The collaborative planning made the activities more diverse and interesting.

The data collected from the activities plans revealed very diverse set of activities. As the leaders have different backgrounds and expertise, the activities proposed by each one reflected this diversity. For example, one leader was a cartoonist: therefore, the activities proposed by him challenged the children to draw, in different ways. Another leader was knowledge management expert: therefore, the activities proposed by him promoted critical thinking and reflection.

RT4: The continuous improvement processes were very effective, leading to optimization of the teaching and learning techniques used.

The data collected from the notes taken during the debriefings meetings and Indaba workshops revealed that the activities offered to the children improved substantially in quality along the semester. The leaders changed the activities based on the observation of the children behavior, customizing the activities in order to make them more meaningful and more attractive.

RT5: The right usage of IT tools fostered the planning process, the communication and the attractiveness of the activities.

The leaders and parents made use of several different IT tools that allowed efficient communication, collaboration and knowledge sharing.

RT6: The leaders' participation in courses and training help them to develop skills that make the activities more interesting to the children.

During the semester the leaders also improved their skills, by participating in courses provided by PFBSG. For example, all leaders participated in a short course about the usage of songs and dances to foster the development of intellect and motor skills of the children. Some of the songs and dances learned were used by the leaders in activities.

DISCUSSION

RT1 allowed us to understand that the more attractive were the activities, the more the children became motivated in participating in the following week activities, therefore increasing their learning opportunities (Figure 2, feedback loop "Keeping children motivated"). More than that, we can also affirm that rewarding children with merit badges also increased their motivation to participate, reinforcing this feedback loop.

RT2 helped us to understand that the parent's support was key, not only by providing means to children to participate in activities but also by making the activities more attractive. In several activities the children had to interact with their parents. Therefore, the more the parents were interested in fostering the children's learning the more they interacted with the children during the activities. Doing so, the activities became more attractive, therefore increasing the children´s motivation and willingness to participate in the following week activities (Figure 2, feedback loop "Parents'support"). It is interesting to notice that this dynamic ("Parents'support") reinforces the previous dynamics ("Keeping children motivated").

This led us to our first finding: *The diversification of activities (physical, artistic, and social) provided by the leaders and the parent´s support and participation fostered the children engagement and motivation to learn.* This finding is alligned with the findings of other researchers, that pointed out that the impacts of well-designed educational activities on motivation and learning (Arantes do Amaral & Fregni,2022)

RT3 let us to understand that the collaborative planning led to diversification of the activities, which contributed to attractiveness of the activities, therefore boostering children's motivation (Figure 2, feedback loop "Diversity of activities"). In addition to that, RT4 allowed us to understand that the continuous improvements of the teach and learning approaches used by the leaders contributed to make the activities more attractive to the children (Figure 2, feedback loop "Teaching and learning approaches"). Therefore, these two dynamics ("Diversity of activities" and "Teaching and learning approaches") also reinforced the dynamic of the learning ("Keeping children motivated").

RT5 helped us to understand that the selection of adequate IT tools facilitated not only the collaborative planning processes but the development of the online activities as well (Figure 2, feedback loop "Correct use of IT tools").

RT6 allowed us to comprehend that the more the leaders participate in courses and trainings, more they applied what they have learned in the activities, making them more attractive to the children (Figure 2, feedback loop "Leaders' skills").

This led us to our second finding: *The continuous improvement of the teach and learning techniques and the right use of IT tools, facilitated the communication and the delivery of meaningful online activities.* This finding is in accordance with the findings of other scholars, who have studied the continuous improvement of teaching and learning techniques (Arantes do Amaral & Gonçalves,2015)

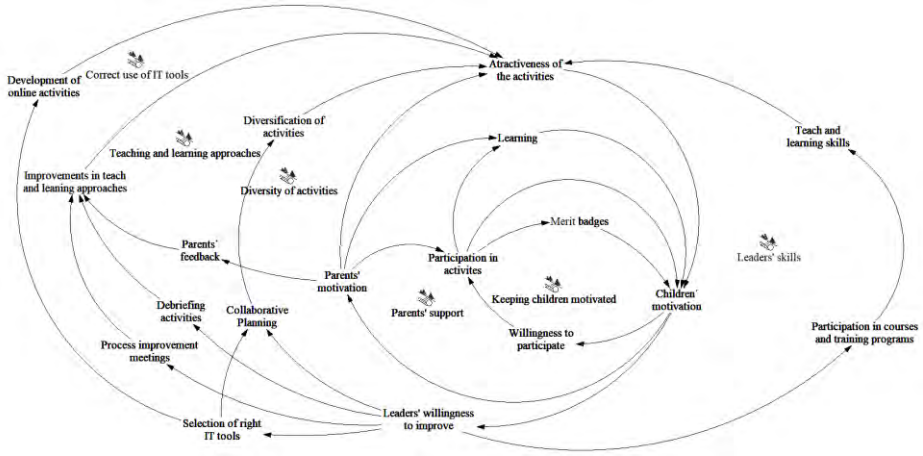

Figure 2
The dynamics of the online activities

CONCLUSION

What can be learned from this experience?

Coming back to our research objectives, we uncovered six intertwined dynamics that drove the learning process. The children's learning dynamics was driven by the attractiveness of the activities. However, the attractiveness of the activities was driven by five dynamics: the parent´s support, the diversity of activities, the continuous improvement, the correct use of IT tools and the leaders' skills.

It is interesting to note that the leader´s willingness to improve (Figure 2, represented by the variable "Leader´s willingness to improve") was driven by the children´s motivation. The children's achievements made the leaders to do their best to develop new skills in order to make the activities even more meaningful and exciting. The debriefing activities, that were accomplished right after the end of activities, helped the leaders to figure out rapidly what actions should be taken in order to improve the following week activities. Doing so they make the activities become more and more attractive along of the semester.

In addition to that, it is interesting to note that the children´s motivation also enhanced the parent´s motivation. When the parents' realized the impacts of the activities on children learning they become interested in given more support, not only to the children, but also to the leaders, giving feedback about the activities (Figure 2, represented by the variable "Parents' feedback"). In addition to that, they become more interested in doing the activities with children during the online meetings contributing not only with the attractiveness of the activities, but with the continuous improvement processes as well.

The correct selection of IT tools also facilitated the management of the activities and the communication between all involved. The usage of videos, drawing tools and interactive tools also contributed to make the activities more attractive.

We do understand that this research has limitations: it was developed in a specific context (online activities), with small number of preschool children under an abnormal circunstance (the COVID-19 pandemic). More than that, it was accomplished in a non-formal context. However, based on the evidence here presented, we may speculate that dynamics revealed can be present in other educational contexts.

For future research, we intend to accomplish new action research cycles, improving the teaching method, reinforcing the positive feedback learning loops in order to make the teaching and learning experience more meaningful for those involved.

Finally, we may say that the dynamics described here, in a non-formal education can be useful to motivate teachers to apply the lessons learned in formal educational settings.

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