

# The use of Pixton software as a pedagogical resource in the teaching and learning process

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**Abstract**—Since Information and Communication Technologies (ICT) are quite embedded in everyday life, it is necessary to think about the potential that they can also present in education. In this way, it was intended to understand the potential that the Pixton software could bring to the teaching and learning process. Since it is a versatile, creative, and motivating software, an attempt was made to investigate the use of Pixton software as a teaching and learning strategy, to understand what its contributions are to the teaching and learning process. The use of the Pixton software proved to be an adequate resource and promoter of innovative contexts in the teaching and learning process. In general, and considering the results obtained, this software is motivating, creative, playful, adaptable, and transversal to all curricular areas of the 1st Cycle of Basic Education. In this context, Pixton proved to be a promoter of better levels of educational success, thanks to the high levels of interest, commitment, motivation, and involvement on the part of the students that were observed in the activities developed.

**Keywords**—*component, formatting, style, styling, insert (key words)*

## I. INTRODUCTION

Information and Communication Technologies (ICT) are increasingly embedded in society. Taking this reality into consideration, it is important to understand that the integration of ICT in education is necessary, as it has several potentialities, such as helping and making the teaching and learning process more attractive, both for students and teachers. It is in this area that we chose to carry out a study on the use of Pixton software as a pedagogical resource in the teaching and learning process, in a 4th year class of the 1st Cycle of Basic Education (1st CEB). The choice of Pixton comes from our belief that this can be an educational resource capable of creating motivating, playful and interesting environments, especially for students, in order to promote educational success through better consolidation of content. We begin the article with a brief theoretical framework of the investigation, within the scope of the Supervised Teaching Practice of the Master's course in Pre-School Education and Teaching of the 1st Cycle of Basic Education, focusing on ICT and the potential of educational

software in general, and Pixton in particular, which was pedagogically framed as educational software. Next, we briefly present the methodology used in the investigation and the data obtained. Finally, we present some final considerations, highlighting the main conclusions and limitations of the investigation.

## II. THEORETICAL FRAMEWORK

### A. ICT in society and in an educational context

The inclusion of ICT in society has transformed our daily lives, the functioning of society and, in turn, has consequences for the educational system. The development of societies influences the way citizens organize themselves, work, teach and learn. In this way, advancement and change processes, as a whole, led to changes and evolutions of which digital technologies were not left out. As ICTs have taken on an increasingly important role in everyday life, they are more present in the community. In this sense, [1] stated that ICT “(...) represents a determining force in the process of social change, emerging as the cornerstone of a new type of society, the information society.” Thus, [2] state that this generation is “(...) the first generation of teenagers that came into contact with the internet and mobile phones, which in many aspects appropriated these technologies, dictated trends and established practices.”

In the opinion of [3], “(...) despite the existence of several measures, investigations and reports that point to the need for a 'routine' use of ICT, it still cannot be said that these practices are already established in Portuguese schools.” In this way, and due to the representation they have been gaining in society, it is important to portray and reflect on the significant role they have in the teaching and learning process, as well as trying to introduce them more in schools in order to offer new and different ways of learning. Therefore, considering [2], “(...) the use of digital technologies in schools is still incipient during the first cycle. Children who have more contact with digital technologies in schools (...) have computers as an extracurricular activity or attend private schools.” Also [4] is in line with what was previously mentioned when it states that

due to COVID-19 there was a rapid evolution of technologies, but, at the same time, high rates of social and digital exclusion were revealed. Therefore, it is important that the school is the first to reflect on the need to fit its students into the real and current context that society finds itself in, in order to form individuals capable and able to overcome difficulties, but also to provide learning in an increasingly digital social context.

Firstly, it is necessary to understand that the introduction of digital technologies will not, and should not, replace all the traditional means that the school offers, or even the teacher himself. This introduction should be seen as a turning point in learning and in the interaction that exists between the teacher and the student, and the student and the teacher. According to [5], ICTs play an extraordinary role as they are “(...) democratizing means par excellence in access to knowledge, in observing learning that respects the rhythm of each student and in the development of individual skills; at the same time, they allow new forms of communication, language, new communication situations, certainly closer to the students.” Therefore, the school must provide and introduce integrated learning through digital technologies into the curriculum.

As [6] states, ICT plays an important and positive role, because it operates as a gateway that is capable of improving and training teachers, offering them continuous training, and “(...) making pedagogical challenges more attractive and dynamic (...)”, while promoting the improvement of the quality of education and waiting for the opportunity to develop citizenship. [7] also agrees with this when it mentions that “(...) education and technologies are inseparable”, as it argues that education is the process of developing skills that aims at better individual and social integration. In this context [7] also states that in order to develop these capabilities it is necessary that “(...) education is used to teach about the technologies that are the basis of the group's identity and action and that they are used to teach the basics of this education.” However, it is important to consider that the teacher also plays a central role in the use of ICT in the educational context, as it is essential that he understands the relevance of accompanying his students, by accepting students' ideas and proposals in a more digital context. In addition to this dimension and considering [8] due to constant changes in the educational sector “(...) teachers must be multifunctional, it is not enough to just be a teacher, but they must be able to provide a more holistic vision so that they can transmit confidence and a greater safety for students in the teaching-learning process.” In this sense, it is also emphasized that the teacher must awaken his students in order to achieve in them the pleasure, as a whole, of the content to be learned. Therefore, the teacher must master these digital tools so that they can make them profitable in the classroom context. It is up to the teacher to promote the introduction of ICT in a way that is not abrupt, but rather creative, diligent and controlled, always considering that they may be capable of increasing the learning that students acquire. From the point of view of [9] this constant change and adaptation requires teachers to “(...) “think outside the box”, do things differently, risk new approaches with their students, in their classrooms, in their schools. Then share and collaborate with other teachers.”

Following the aforementioned, teacher training and adaptation in the inclusion, adaptation and use of ICT cannot

be neglected, as students adapt quite easily to this “new” digital reality, as they increasingly find themselves more connected to ICT in the most diverse forms. In the opinion of [10] teachers are an “(...) essential element in the process of use, integration and appropriation of ICT in the educational context.” Even though schools offer technological equipment, the way they encourage their use must also be considered, as it is important to understand whether the use they are given contributes, or not, to the improvement of the educational system. This is because there is little point in a school offering and having technological equipment when the exploration that is carried out is poor in terms of promoting more creative and innovative contexts for acquiring learning.

In Portugal, several projects were promoted to promote the introduction of ICT. Between 1985 and 1994, the Ministry of Education created the MINERVA Project, with the purpose of promoting the use of computers as an educational resource. Also in 1996, the Nónio Século XXI Program was presented, with the aim of producing and applying the use of ICT in an educational context. In a closer timeline, the Student Profile after Compulsory Schooling (PA) and the Curricular Guidelines for Information and Communication Technologies (OCTIC) were created by the Ministry of Education. In addition to all this, it is possible to find in paragraph 3 of article 13 of Decree-Law no. 55/2018 of 6 July that the base curriculum matrix must include ICT components as elements “(...) of transversal curricular integration enhanced by the globalizing dimension of teaching, constituting this (...) an area of an instrumental nature, supporting the learning to be developed.” Taking this into account, the school must provide its students with a learning-enhancing curriculum that does not exclude, but rather uses and integrates ICT in all subject areas. According to [11], students must learn considering four domains – “digital citizenship”, “investigate and research”, “communicate and collaborate” and “create and innovate” – in an articulated way and aimed at developing PA skills. It is also worth mentioning the Educational Resources and Technology Team of the General Directorate of Education, which currently provides support and provides various digital resources for students and teachers.

### *B. Educational software: a brief reflection*

Initially, it is important to mention again that in the quality of teaching and in the teaching and learning process, both the environment and the use of software can stimulate and motivate students. According to [12], “(...) the elements that most contributed to the computer becoming one of the most versatile technological mediators in the field of education were programs and communication protocols, which are called software.” Defining software can be a task with a certain level of difficulty, as there are different concepts and these have undergone reformulations over time. However, it is important to distinguish educational software (ES) from educational software. In general, the SE is built from scratch with the intention of being used in the teaching and learning process. Educational software is any software, including educational software, that can be framed and contextualized didactically, that is, its use can be fitted into the objectives and content to be taught. [13] also agrees with this, when he states that “(...)

what gives software its character as an educational tool is its use in the teaching and learning process.”

From the perspective of [14], cited in [15], there are several advantages that educational software presents us, such as: increasing students' attention and involvement; introduce students to the world of technologies; make classes more dynamic; find new and original ways to motivate and awaken students' interest; make education more efficient; among others. The correct use of ES allows them to be considered educational tools. However, SE is essentially concerned with achieving the educational objectives outlined in the teaching and learning process. This is justified in the “justification” of its design, as it was created so that it could be used as a teaching aid that could be used in any curricular area. ICT allows information, whether through text, images or others, to circulate from one location to another, regardless of distance. In turn, it allows information to reach classrooms and help students understand complex concepts. The teacher, taking into account the opinions already stated, can use ICT and software as a resource that contributes to the development of the teaching and learning process, whether through new ways of teaching or motivating all participants in these processes and contexts. pedagogical in order to encourage learning among students. In addition to the dimensions already mentioned, SE can be a very relevant tool in combating academic failure, through motivation and awakening interests. Because, according to [16] SE could be “(...) a strategy to provide differentiated responses to different levels of learning. It is intended that the SE has the dual mission of helping to learn and helping to play in a simple and fun way.” In short, SE promotes conditions for learning, exploration, and understanding. However, what is needed, always with content as the core, is to transform the classic teaching methodology into moments of leisure, response and respect, both for the specificities and the parity of each person, in a collaborative context.

### C. Pixton: a brief overview

The presence of ICT in schools, in assisting the teaching and learning process and in citizens' leisure, has been increasing. In the educational context, ICT allows, citing [17], “(...) to structure learning objectives and content, combining technologies, as well as face-to-face interactions.” In this way, the inclusion of ICT in any curricular area is beneficial. Firstly, it is necessary to understand, in a generalized way, what Comics (BD) are. A comic is a series of drawings that represent a story or a situation, which is normally divided into sequential rectangles, that is, strips. The use of comics as a pedagogical tool was already used, as its visualization in Portuguese school manuals was already present, at least, at the end of the 20th century. In addition, BD is integrated into the Portuguese Basic Education Programs and Curricular Targets, being present in the first two years of the 1st CEB. In the research carried out, ICT was included in an educational context through software that allows you to create BD quickly and free of charge, using different tools: Pixton. This resource can be accessed through the website: <http://pixton.com/>. In figure 1 you can see the Pixton software webpage:

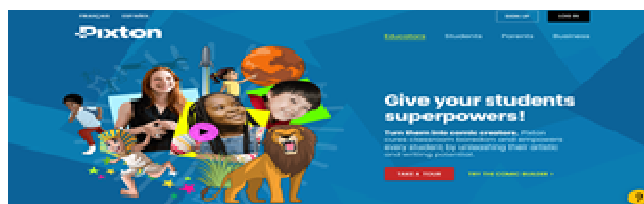


Fig. 1. Webpage of Pixton.

To access Pixton you need to have an account. This account can be “teacher”, “student”, “parent” or “company”. Once one of these options has been selected, it is necessary to register using your email or Facebook account details, and enter a password. If the user selects the “teacher” option, it will be necessary to enter data relating to the school where they teach and the school year. This allows only teachers/educators to create an account in this option. In the case of this investigation, a “teacher” account was created.

After creating the account and logging in, a page opens (Fig. 2) where you can create BDs and explore the software's various features.

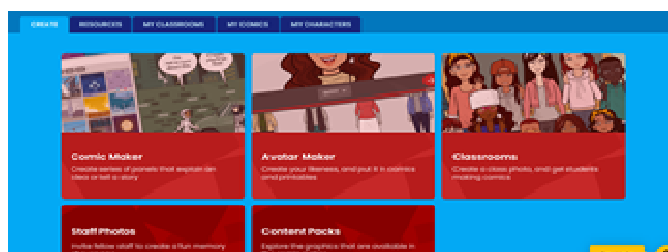


Fig. 2. “Create” tab (Create Comics and Characters).

In the “create” tab it is possible to create a comic (“comic maker”), an avatar/character (“avatar maker”), a class and its characters (“classrooms”), take a “group photo”, where each one is represented by their character (“staff photo”) and explore extra materials at the time of creation (“content packs”).

In the “resources” tab (fig. 3), it is possible to see/use ideas from other users for teaching (“lesson ideas”), have access to a guide that helps in creating comics (“comic school”), view/use proposals for BD beginnings (“story starters”), access a guide that explains how to use Pixton in diagnostic, formative and summative evaluation (“assessment”), self-evaluate the construction of the BD (“interactive rubric”) and access materials available for printing (“printables”).

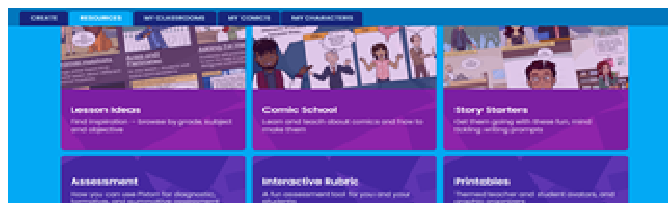


Fig. 3. “Resources” tab (Resources and guidelines).

In the “my classrooms” tab (fig. 4), the user can view and/or create their class(es). It is important to note that the teacher has the possibility of allowing, or not, some resources/options, such as: the creation of non-binary

characters, access to weapons and conflict situations, access to religious options/resources, etc.

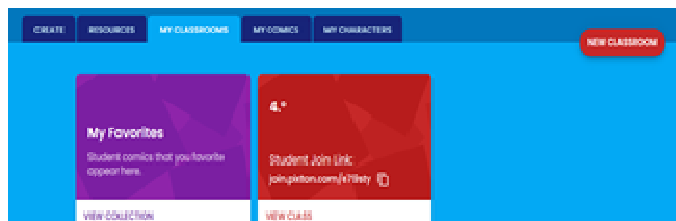


Fig. 4. “My classrooms” tab (class).

In the “my comics” tab (Fig. 5), the user can create a comic (“create a comic”), search for ideas (“need an idea?”) and view their creations.

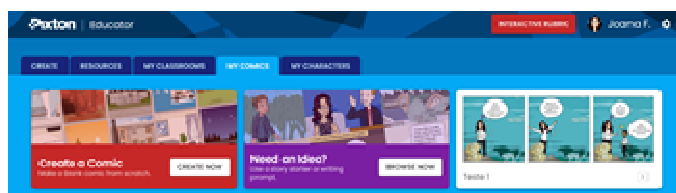


Fig. 5. “My comics” tab (Access to creations).

In the tab “my characters” tab (Fig. 6), the user can view, create, and manage their characters..

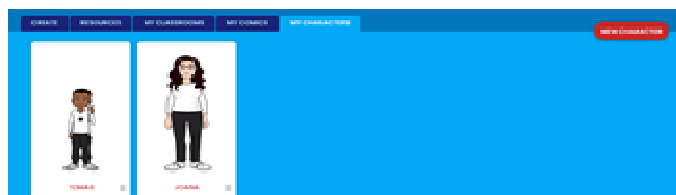


Fig. 6. “My characters” tab (Character management).

Regarding the creation of comics, the user must go to the “create” tab and select the “comic maker” option or the “my comics” tab and select the “create a comic” option. comic” (create a comic). By clicking on the previous option, the user is presented with the initial page for creating comic strips (pictures) (Fig. 7).

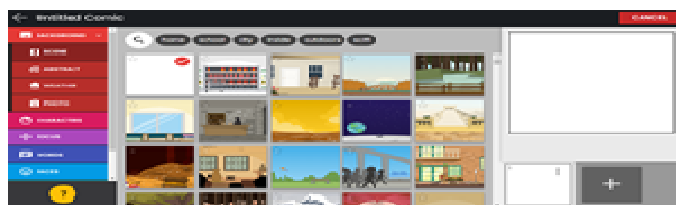


Fig. 7. Vignette creation home page.

Once you have finished creating the BD, just click on “done” – in the top right corner – to save. If you want to edit this comic, or any vignette, just go to your comics (“my comics”) and click on “edit”. If the user wants to save the BD outside of the software, click on “download”. If you want to print, click on “print” and if you decide to share via a link, click on “share”.

Given the summary presentation, it is important to remember that the Pixton software is assumed to be educational software since its construction was not made for

educational purposes, but can be used in an educational context, as proven in the research. In this sense, it offers a variety of “instruments” that allow, by erasing, dragging, modifying, recording, publishing and printing, to create comics that vary the characters, their skin color, their position, their facial expression, the their positioning, the environment in which they are located, the objects present, their colors, among many other options. Due to some updates, the Portuguese version no longer exists, but there is still a version in English, French and Spanish. Although there are some paid “decorations”, these do not interfere with the use of the software, they only limit, although not beyond the aesthetic sense and do not cause major interference, the user's choices.

In general, the potential that Pixton has to make classes more interactive, dynamic and attractive was what made it a resource for the investigation. Furthermore, and considering everything previously mentioned, we believe that it allows the teacher to capture the attention of their students and motivate them. The fact that it is software that allows easy adaptation to the objective is an advantageous aspect. This is because the teacher can start, for example, by creating a comic book where he leaves only the balloons for the students to fill in, or he can even give complete freedom to the students in its construction, as long as there is a framework and a connection to the educational objectives and their respective objectives. contents. This means that it is software that can also be characterized as an author's system, as it can be used both to teach (when the teacher uses this resource to contextualize situations associated with teaching) and to learn (when students are asked to answering questions, filling in “blank” texts or creating their own comics in the form of activities for their colleagues). In this way, students will have to have already acquired certain content and can, in this way, test their knowledge in the form of a self-assessment. At the same time, it allows students to work collaboratively with their colleagues, discussing what content to introduce into the activities and correcting the answers obtained. This process can promote greater student involvement in their learning process, both individual and collaborative. In addition to these aspects, BD and software promote various skills and can be worked on in various areas. This resource also allows the teacher to teach the content or complement it. Thus, it allows you to assess your students' knowledge, by filling in balloons, or building a comic related to a certain topic. Among other diverse ideas and modes of exploration.

In short and considering the potential and offers of the Pixton software, it can be a tool capable of captivating students' attention and bringing them up to date with the involvement of digital technologies.

### III. METHODOLOGY

The purpose of the study is to investigate the use of Pixton software, assumed to be educational software, included as a resource in a teaching and learning strategy in a 1st CEB class. Through this investigation, we intend to understand how ICT influences the teaching and learning process of students, focusing the study on the Pixton software. This was a qualitative investigation, within the scope of an action investigation, as it was intended for the researcher to obtain a

more appropriate knowledge of reality, as it is a cyclical process between investigating, acting and reflecting. It can favor the carrying out of further studies, which seek to familiarize students with educational/educational software, so that activities can be carried out, in order to acquire learning, on the part of students, through the use of digital resources. However, this study may not be sufficient to understand the phenomenon in question. Since this investigation is limited to a given school and a given class, the results and conclusions to be drawn cannot be generalized. For this reason, this investigation can be seen as an exploratory study that will be complemented by other investigations that may be carried out in this field.

This investigation was carried out in the context of Supervised Teaching Practice in the 1st CEB (PES 1st CEB) in a Basic School located in the municipality of Castelo Branco. The participants were 28 students from class A of the 4th year. This class was made up of 12 female students and 16 male students, aged between 9 and 10 years old. This investigation also included the participation of the Cooperating Advisor (OC) who collaborated during the PES 1st CEB and in collecting information on the topic, and four teachers from the 1st CEB, who allowed the collection of teachers' opinions to be expanded. For data collection, the techniques and instruments used were document analysis, participant and non-participant observation, field notes, photographic records and semi-structured interviews. Subsequently, the techniques used in data analysis were content analysis and data triangulation.

#### IV. DATA ANALYSIS

##### A. Practical sessions

The exploration and implementation of activities that used the Pixton software were included in the didactic plans, always built taking into account the Curricular Programs and Goals, and the PA. Furthermore, the activities were always planned taking into account the programmatic contents and objectives proposed by the OC. Therefore, before building the Didactic Unit (DU), we sought to understand and integrate, whenever possible, the activities that involved the Pixton software in planning. The use of the Pixton software at PES 1.ºCEB took place in two sessions, on different days.

The activities implemented were based on the following aspects: explanation of content related to the comic; presentation of activities; analysis of the “gapped” BD; and filling out and creating the BD on paper and digital media (using Pixton software). In general, in the first implementation session, students had to decipher some sentences that would allow them to complete the balloons and subtitles of a “gapped” comic, allowing them to obtain the following result (Fig. 8):



Fig. 8. Result obtained from BD (April 25, 1974), using Pixton software.

In the second intervention session, even though the initial desire was to give students more autonomy in using the software, we had to take into account the security measures imposed and the pandemic situation we were facing. Therefore, given that it was not possible for each student to have access to a computer, or that there were enough computers for small groups, the activity was designed and developed so that it could be implemented in a large group. Firstly, the “gapped” BD was presented and analyzed. They were then invited to record in their daily notebook how they would complete each space. After everyone had written their answers in the diary notebook, the challenge was for students to share their ideas, allowing them to complete the comic as a large group, using various proposals presented by different students. In this sense, as students shared their proposals, they were written on the board and a sentence was constructed, which grouped the shared proposals. If any improvements needed to be made, this was always done in a large group and all ideas and opinions were always heard. With this work, we obtained the following result (Fig. 9).



Fig. 9. Result obtained from the BD (5 Rs Policy), using the Pixton software, in the digital version.

It is important to highlight that the students recorded in the printed blank BD, as it was being filled in the software. The intervention sessions, even though it was only possible to carry out two, demonstrated that the Pixton software allowed the students to feel motivated and involved to consolidate the contents and to show that they had acquired them. Furthermore, and given the research carried out and its limitations, it enabled collaborative work to be carried out, due

to the fact that spaces were created for sharing and discussing student proposals. By printing the comic book blank, students could also keep a version of the comic they had created and with a summary or a connection to everyday life. Due to the vast curriculum that needed to be taught and the limited time to do so, it was not possible to hold more intervention sessions. In addition to these regulations, the pandemic situation we were facing did not allow this investigation to be carried out as initially planned. Because, initially, it was expected that the students would be the ones to build a comic book. In this way, the implementation of collaborative work would be evident, and, in this way, it would force students to master the content involved in the activities/vignettes that they would present to their other colleagues. In this context, it can be said that a formative assessment would take place that would give students all the clues regarding the knowledge they had already acquired and those contents in which they needed further study. We are convinced that if these activities could have been implemented, a more playful and less formal context would have been created, which could have made students even more motivated because they felt they were playing a more central role. Another factor that contributed to this was the lack of digital resources on the part of the school and students. However, considering the study carried out, it helped us understand that the Pixton software can be beneficial in the teaching and learning process.

#### *B. Semistructured interviews: content analysis*

To understand the teachers' opinion regarding the importance of ICT in personal terms and in the educational context, also focusing on the contributions of the Pixton software in the teaching and learning process of 1st CEB students, five semi-structured interviews were carried out: to OC and four teachers from the 1st CEB. Regarding ICT training, we were able to conclude that initial training is very weak or non-existent and teachers felt the need to carry out training in the ICT area. Regarding the use of ICT for personal purposes, the interviewees use them in their daily lives and consider them important. Regarding the use of ICT in the educational context, they also consider them important and use them in the teaching and learning process. However, they do not use it as often as they would like due to lack of equipment and training. Regarding the use of Pixton software in an educational context, they consider that its use can be advantageous, motivating, playful, creative, versatile and adaptable [author system]. The OC also adds that the use of the software could be more advantageous if there were more digital resources.

#### V. FINAL CONCLUSIONS

Since today's society is increasingly linked to digital, and needs ICT to integrate into society, education needed to adapt, having included ICT in the teaching and learning process. Thus, and to promote ICT, through the Pixton software, in the classroom context, we were able to conclude that the software was possible to be used in the educational context, bringing a new and unknown digital resource to the classroom. Regarding the application of Pixton software to carry out activities using digital resources, Pixton proved to be advantageous, as it allowed the creation of a motivating and attractive

environment, and allowed students to carry out collaborative work, in construction of comics capable of summarizing the content taught, always in an environment where interaction between students with high levels of motivation was evident. Analyzing the use of Pixton in acquiring students' learning in the teaching and learning process, we can say that the software had a positive impact on the teaching and learning process. Furthermore, and because it was an unknown software for the class, it allowed the creation of a motivating, playful and attractive environment, capable of arousing the interest of students, while they put their learning to the test. However, this research had some limitations, namely the pandemic situation we were facing, the lack of digital equipment and the extensive curriculum. These constraints took away students' freedom and made more individualized and active work impossible. Therefore, it is recommended that more intervention sessions be carried out, with various classes/years, where students are allowed to have more autonomy in constructing a story according to the content worked, and that a comic book be constructed with the summaries of the content worked on throughout an entire academic year.

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