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"Bibliostory—Educational Comic Stories." A Social Constructivist Approach to Media and Information Literacy Education for Children and Adolescents

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Abstract. Our paper presents a theoretical background for a Polish comic book „Bibliostory—educational comic stories" (Pl. *Bibliostory—edukacyjne historie komiksowe*). The comic targets children between 9 and 12 years of age and youths from 13 to 16 years of age. Each story illustrates one issue, such as information searching, organization of information, plagiarism, and information problem solving strategy. *Bibliostory* is based on two constructivist pedagogical concepts: the zone of proximal development (ZPD) and case-based learning/teaching. These concepts, on application level, are first of all associated with designing educational situations and relationships between teachers and students (educators and learners). The aim of our paper is to present the possibilities of application of these concepts in the educational comic books. We describe the general assumptions of two concepts, then we focus on elements applied in *Bibliostory* project. We also provide a review of literature on the educational potential of comic books.

Keywords: Bibliostory, case-based learning, cultural-historical theory, zone of proximal development, media and information literacy, educational comics, Poland.

1   Introduction

This paper presents theoretical background for creating a comic Polish book "Bibliostory—educational comic stories" (Pl. *Bibliostory—edukacyjne historie komiksowe*). The comic book was developed within the framework financed by the Ministry of Culture and National Heritage Program "Education. Media and Information Education" and published in 2015. The Regional Public Library and Culture Animation Centre in Poznan was the coordinator of this project.

The comic book consists of 24 stories. It targets children between 9 and 12 years of age and youths from 13 to 16 years old. Each story illustrates one issue, such as information searching, the organization of information, plagiarism, and information problem-solving strategy. One page is dedicated to one story only. "Bibliostory" is available online in Polish (http://wbp.poznan.ekursy.eu/course/view.php?id=30) under the Creative Commons Attribution–NonCommercial–ShareAlike 3.0 license. The chosen comic stories have been translated into English (http://wbp.poznan.ekursy.eu/mod/page/view.php?id=861). It, therefore, sets an example of a professional Open Educational Resource (OER) which can be used by

children and youths. Comics may also be used by parents and librarians in furthering the development of media and information literacy (MIL) among children and adolescents.

"Bibliostory" is based upon two constructivist pedagogical concepts: (1) the zone of proximal development (ZPD), (2) case-based learning/teaching. On the application level, these concepts are associated primarily with the design of educational situations and the pupil-teacher relationship. In our texts, we show the possibilities of their application in the educational comic project. First, we present general principles of both concepts and then focus on elements used in the "Bibliostory" project. We also review the literature on the use of comics in education.

2   The educational potential of comics

2.1   Educational Comics

According to McCloud, comics is a juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer [1]. Comics' narrative and images facilitate learning [2]. Comics has an influential visual aspect, and it is impressive and easily-remembered as well [3]. From the user-experience point of view, comics creates an experience through the representation the "reality" of information via the symbol systems which is easily understandable by an audience [4]. Comics reflects the importance of visual communication in modern culture; it is an important medium in the daily reading experience of students [5]. The comic book – reflecting the maxim that "a picture is worth a thousand words" – can, in fact, convey substantial amounts of information, even in its relatively short format [6, p. 117].

The educational potential of comics – especially of the new comic book form that arose in the 1930s – was recognized early on. Educational comic books are essentially as old as the comic book form itself [6]. According to Nyberg [7], the educational comic was a response to the criticism of comic book reading, made by the guardians of children's culture, teachers, and librarians, who feared the contamination of children's culture by comic books. Educators from the beginning condemned comic books as undesirable reading material [p. 29]. Publishers responded to their critics in a number of ways [p. 30]. The educational comics have been published since before World War II [8, p. 73]. In 1941 in U.S. a series True Comics started, offering biographies of "real life heroes". Booker [6] recalls Maxwell C. Gaines, one of the US pioneers of the comic book industry, who was so convinced of the promise of comic books as a scholastic tool that, in 1944, he named his enterprise "Educational Comics." Popular comics can be used, for particular types of audience, as a tool to communicate scientific information to a large population in an understandable, memorable and enjoyable way [2, p. 207].

According to the learning theories, creative activities make the learning process more efficient [3, p. 1447]. Using humor and comics as teaching aids not only livens up the lessons, but also encourages the students to participate in the training process to create the information and the comment by themselves (Erdem as cited in [3, p. 1449]). The constructive training approach of comics, which are funny, questioning as well as educational, affects students' academic achievements in a positive way [3, p. 1451]. Images reinforce understanding and help commit it to memory. Humor is used effectively in some comics to capture the reader's attention and make the message more memorable [9, p. 54]. In the 21st century classroom, teachers recognized the inherent value of comics narratives and sought to incorporate them into their lesson plans for history and social studies units [10]. In 2015, Digital Humanities Quarterly published a special issue on comics as scholarship (http://www.digitalhumanities.org/dhq/vol/9/4/index.html). Comic arts have gained popularity and credibility in recent years also because of their increasing quality and variety [11, p. 46]. Besides, as Upson et al. [14] write, comics stimulate these parts of the brain that handle visual elements as well the parts that handle language, they can potentially give the brain more opportunities to connect with the content that one would have with a strictly text-based book [p. vii].

2.2 Pop culture in education. Examples of educational comics

Behen [12] poses a rhetorical question: If the popular culture of today's teen is what drives their behavior and motivates them, why not use it to connect with them? [p. 2].

One of the best-known examples of educational comics is Art Spiegelman's Maus, describing the World War II and Holocaust experience of author's parents. Maus was the first comics to win Pulitzer Prize in 1992 [13]. Humphrey [8] recalls comics published by US government bodies in the 1950s to teach adults and children about topics including fire safety, civlil defense, or economics. He also assumes that each year in the US more than 30 educational comics have been published. Also, the Disney Company, known for its animated films, engaged in the 1940s in comics publishing market, issuing a series of Mickey Mouse comics with an educational aspect, for example, presenting the health advantages of drinking milk [6]. Vassilikopoulou et al. [5] enumerate several educational comics that influence classroom teaching in the U.S. In France, La Cité internationale de la bande dessinée et de l'image – provides several educational comics on its website (http://www.citebd.org/). Negrette [2] presented an example of the use of comics to communicate information about the sustainable use of the Mayan nut to low literacy rural communities in Mexico. In this country, comics is one of the preferred communication media which provides the principal reading access for inhabitants. Tuncel and Ayva [3] recall four Turkish examples of the use of comics in education: 1.in teaching of social sciences at primary school; 2. in teaching history; 3. in the training of science and environment; 4. in the teaching of the human rights. The

last example is their study that showed how the success of learning has increased thanks to using comics in the classroom as it has created a positive change in the approach of students to the lesson. Duke Center for the Study of the Public Domain offers an educational comic book with intellectual property as the main subject, Bound by Law (http://web.law.duke.edu/cspd/comics/). The British publisher, Icon Books, offers an Introducing… Graphic Guide series, where philosophers or social topics are presented in a comic-approach way (http://www.iconbooks.com/introducing2/). McNicol [9] describes the importance of health education comics, which deal with topics such as AIDS, sexual health, or diabetes.

The current trend in educational comics is to let students become the authors of their comics [5]. In 2001 in the US The Comic Book Project was founded, challenging students to produce their comic books [10]. In 2009-2010, the EduComics project was held within EU Comenius program. The project's outcomes are training material for teachers accessible online (http://www.educomics.org/). The exemplary tool for comics creation is ComicLab, produced by ItIsArt.Ltd (http://www.webcomicbookcreator.com/).

3   Comics in information literacy education

The comic is an art based on criticism. Criticism is forming a discussion platform which provides thinking, questioning, identifying the negations, finding an alternative point of views to the problems [3, pp. 1447-1448]. The activities, which provide a critical way of thinking, should be placed more than usual during the lesson [3, p. 1451]. Moreover, as McCloud writes, when you enter the world of cartoon – you see yourself (…); we don't just observe the cartoon, we become it! [1, p. 36]. Comics creates an interactive experience for an audience that allows them to interact in the world of information presented [4, p. 92]. According to Paziuk [10], in the 1990s in the US, there was a strong educators' advocacy calling for the inclusion of comic books in childhood education, in both the classroom and the library. As Farmer [11, p. 35] writes, graphic novels increase the librarians' "cool factor" and street cred. Behen [12], in her book Using pop culture to teach information literacy advocates for a practical approach to reaching teens in the library with methods that spark their curiosity and interest. To change students' expectation that library is boring. Upson et al. [14] propose a graphic guide to student research, titled Information Now. Its publication in Chicago coincided with the publication of Bibliostory in Poznan. Moreover, both comic books are complementary – while Bibliostory's target groups are children and teenagers, Information Now addresses the information needs of undergraduate students. Librarians wrote both. In the preface, the authors write about their motivations: we decided to make this book as a comic because we believe that comics can more efficiently teach concepts and skills

than traditional prose, thanks to their use of engaging combinations of text and images and appropriate utilization of metaphor and relevant context [p. vii].

4 Theoretical framework. Application of the social constructivist approach to the "Bibliostory" project

The constructivist, more precisely a social constructivist approach formed the theoretical foundation of the "Bibliostory" project. Two concepts were used for the project: the zone of proximal development, and case-based learning/teaching. In this section, based on selected stories, we set the most significant assumptions and show the manner of their application in the "Bibliostory" project.

4.1 Instruction in the zone of proximal development

The zone of proximal development. ZPD, the Vygotskian cultural-historical theory, assumes the following: (1) learning is the activity of the learner and the assisting individual, (2) learning means mastering cultural tools, especially language, (3) learning is a social process, (4) reflection and the sense of agency are important in learning process, (5) learning/teaching strategies: scaffolding and mediated learning experience, (6) learning occurs through action, in an authentic, real context [cf. 15]. ZPD defines the differences between tasks which the learner can solve without or with the assistance of a more experienced person (scaffolding). For example, two children may solve a task well, yet have different potential to solve more arduous task with the assistance of another person. As Gołębniak and Zamorska underline, ZPD is not a range of task, but a zone in which higher mental functions grow from the maturing functions ("seeds"); the assistant's task is to provide the conditions and challenges supporting the growth of learner's potential which may but does not need to develop [19]. A teacher or a competent peer may be the assisting person [17]. Tudge and Rogoff [18] underline how important it is for the learner and the assisting person to maintain a partnership and work together. The assisting person (e.g. an adult) should include the learner's ZPD in interaction, as well as share with them the understanding and importance, and recognize their needs. Vygotsky names such relations intersubjective relationship. Such a relationship, in a narrower sense, may be interpreted as a tool to transmit such amount of information which will allow the learner to perform a set task and not overwhelm them at the same time.

Media and Information Literacy and the zone of proximal development. Vygotsky's concepts are the subject of interest within the MIL field. Limberg et al. [21] have provided the foundation for the understanding of information literacy from the perspective of socio-cultural approach, which classifies as a theory of Vygotsky. Wang

et al. [20] have shown the possibilities of using ZPD in MIL academic training based on the carried out educational project. They drew attention to the role of dialogue and lean on existing relationships in the group.

The application of the zone of proximal development in the "Bibliostory" project. Interaction is seen as a means of development and more broadly, as a means by which a person enters into the culture via learning, i.e., takes over the intellectual tools of the society [18]. Learning takes place through instruction and imitation. Gołębniak and Zamorska underline that meaningful imitation does not necessarily involve mechanical copying. It is a process of active transmission of tools used by the assisting person [19]. The stories in the "Bibliostory" project are static. It means that the figures of the virtual assistants are not supposed to follow the reader (a child) or match them. Nonetheless, there are stories that build frustration when for example, the protagonist does not possess the necessary tools. The story titled "How to prevent invasion of the Little Red Riding Hoods: and advanced search in the library catalog" sets a good example (Pl. *Jak zapobiec inwazji czerwonych kapturków: czyli wyszukiwanie zaawansowane w katalogu bibliotecznym*). The protagonist is a fantastic His Catalogueness (PL: *Jego Katalogowatość*). The moment, the readers recognize him, he is in despair because cannot find the "Little Red Riding Hood" book. There are multiple book publications, however he seeks for a particular one. A schoolgirl assists him. She appears in a role of the assisting adult who shows how to handle the catalog. This particular story is underpinned by the assumption that a simple search in the library base is a general ability. Because of this, the story tells of an impossible task since the character is not capable of narrowing his search results in the catalog. The comic book shows a rule which cannot be mechanically applied by clicking the same buttons presented in the graphics. Imitating the girl's action requires object reflection.

Forman and Cazden [22] studied how children of 9 years of age or alike cooperate when performing different tasks (*peer tutoring*). They observed that two peers cooperate more efficiently when working together than on their own. During problem-solving, they take different yet complementary roles: the observer and the performer (they may swap roles). In the course of the social interaction, they may develop a problem-solving strategy. Subsequently, the strategy is internalized [22]. The studies show the interactions among peers in the zone of proximal development. They have become an inspiration for posting peer cooperation topics in the "Bibliostory" project. The comic story "Where do I know this pic from? Uncle Google and image search" (Pl. *Skąd ja znam tę fotkę: czyli wujek Google a wyszukiwanie obrazem*). The main characters are two boys searching for the author of a certain graphics. One of the boys takes the role of a performer and step by step explains how to determine the author. This story has two levels: (1) the instruction of how to use the Google Images search engine, (2) the material that presents the structure of a social situation that reveals the manner of

solving the problem, which can then be internalized by the parties concerned. The first level allows the readers to learn a task (solve the information problem). The second level educates them how to organize their learning and reasoning processes [16].

Vygotsky pays lots of attention to the adult-child relations. It is hard to compare, in which relationship (adult-child, child-child) the child gains more and which relationship better supports their development. On one hand, in the task as a discussion on any subject, interaction with peer gives more freedom. On the other hand, implementation of tasks that require specific skills may need adult assistance. The evaluation of benefits depends, to some extent, on the type of a task. The task may involve competence not popular among adults, and which more experienced peers have [18]. The tasks associated with the activity of the youth, often relate to MIL education. Nonetheless, the stories of the "Bibliostory" project relate not only to the relationship between peers, but also to a broadly discussed, by the cultural and historical theory, the child-adult relationship. The story titled "The Old World Swallowtail: that is, what can I do with someone else's text about a Polish butterfly" sets a good example (Pl. *Paź królowej: czyli co mogę zrobić z cudzym tekstem o polskim motylu*). The action takes place at school's biological laboratory. Two girls are supposed to prepare the description of the Old World Swallowtail (butterfly) to present in the booklet about Polish butterflies. They present the results of their work, but it turns out that they have paraphrased the article about the butterfly from Wikipedia without giving a source. The adult assisting in this story is a biology teacher. The teacher does not begin with a negative assessment of the lack of sources. Instead, she navigates questions in such a way to help the girls understand the meaning of paraphrasing and the reason why providing the source is meaningful. She adapts to the situation (ZPD of the girls) by providing them with as much information as necessary to help them understand what has happened and let them identify and solve the problem on their own. The example questions that she poses are: "Does the description refer to the results of your observations?", "Did you measure those butterflies?" Such actions let the girls delve into self-reflection and cope with the situation by the necessary information. When the clues seem insufficient, the teacher assists in solving the problem by providing them with the information. She suggests inserting a hyperlink to Wikipedia source below their article (fig. 1).

Fig. 1. Excerpt of comics "The Old World Swallowtail: that is, what can I do with someone else's text about a Polish butterfly", being a part of "Bibliostory—educational comic stories"

ZPD gives the flexibility regarding its use in the development of learners of all ages. This concept focuses on problems unsolvable without the assistance of an individual who is at least a step forward or an individual who has knowledge or experience. The readers of the stories of the "Bibliostory" project are children aged 9-16. The level of their ZPD may vary: it may not be the same among peers or be the same among individuals of different age. With this in mind, no age marks have been introduced into the "Bibliostory" project. The readers are free to chose stories and instructions therein that are within their ZPD.

The "Bibliostory" project includes pop-culture elements, evocations of places or situations that may be within the reader's recognition potential. It builds a shared context, the narrator/protagonists of the stories share the meanings given to these objects with the readers. Moreover, the project motivates readers to constant search for new discoveries. For example, in comics titled "Photo contest, or: Why it's not worth messing up with Imperator" (pl. *Konkurs fotograficzny, czyli dlaczego nie warto zadzierać z Imperatorem*) Imperator, a hero of a popular science fiction saga "Star Wars", apprears. The „Bibliostory" readers will associate Imperator with unethical behaviour (in "Star Wars" saga Imperator represents "Dark side of the Force"). In the excerpt of comic story presented below Imperator appears to the boy who used someone else's picture to win the photo contest (fig. 2).

Fig. 2. Excerpt of comics "Photo contest, or: Why it's not worth messing up with Imperator", being a part of "Bibliostory—educational comic stories"

4.2   Case-based learning/teaching

The case method of instruction is a Socratic approach that took root at the Harvard Business School in the 1920s and has spread to business schools around the world [23]. Spackman and Camacho [23] describe a cased-based library instruction, claiming that it might be an effective pedagogical approach that can be adapted to a library instruction context. The case itself consists of a brief problem statement built around a narrative structure. This storytelling element captures student interest and accentuates the inductive and constructivist nature of learning through cases. The focus is to identify the information that would meet the needs of the case and explore the library and Internet resources to obtain such information. The objective is not to teach students how to conduct an analysis, but how to gather and assess the information they would need for analysis [23].

The Harvard Business School was the pioneer in case method teaching. Barnes et al. [24] presented theses that were central to an understanding of their efforts to help instructors work more efficiently in case discussion classes.

First, we believe that when educational objectives focus on qualities of mind (curiosity, judgment, wisdom), qualities of person (character, sensitivity, integrity, responsibility), and the ability to apply general concepts and knowledge to specific situations, discussion pedagogy may well be very effective. [p. 3]

Barnes et al. [24] underlined the importance of learner empowerment in this pedagogical approach, i.e., students taking responsibility for their education simultaneous with teacher's role as a facilitator who supports them in constructing their knowledge.   The examples provided by the teacher help the learners use new texts in practice and at the same time relate them to their experience. According to Barnes et al. [24], such an approach supports the culture of innovation.

The primary assumption of the case-base learning is the teacher's need to identify the problem and demonstrate its solution based upon example. The "Bibliostory" project depicts solutions to information problems. Each solution requires an action such as the application of an adequate source of information or understanding the effects of a presented action. The story "Wolne Lektury: this is where I will find Stas and Nel but not Harry Potter" (Pl. *Wolne Lektury: tam znajdę Stasia i Nel, ale nie znajdę Harry'ego Pottera*) sets a good example. The main protagonist is a student who has to read a young adult novel "In Desert and Wilderness" by Polish novelist, the Nobel Prize laureate, Henryk Sienkiewicz. This popular novel tells the story of two children Stas and Nel. The protagonist wants to borrow the book from a library, it turns out, however, that it is unavailable. The librarian explains that the book is in the public domain because its copyrights have expired. She points to Wolne Lektury (the Polish digital library run by the Modern Poland Foundation), from where he can legally download a free copy. The boy opens Wolne Lektury website and finds the book he was searching for. The problem was solved. This comic story portrays a method of problem-solving, i.e. the source of public domain books. This example potentially teaches the readers how to solve an information problem of similar nature.

The cases presented in the "Bibliostory" project relate to daily activities typical of children and teenagers. The idea of using such a construction was to encourage the readers to reflect upon their mode of actions and refer the examples to these actions. This forms the basis for constructing new knowledge.

5   Role of "Bibliostory" in information literacy education

The "Bibliostory" project embraces different methods of using comic books. The comic book contains valuable tips for librarians which may inspire them to use it as an MIL

education tool both in the passive and active way. The passive one means displaying/ presentation printed stories on the library's walls, or publishing stories on the library's website or in social media (e.g. Instagram, Facebook). The examples of an active way of "Bibliostory" usage are ready-to-use scenarios of classes for different age groups that librarians and teachers may use. Bibliostory authors propose the scenarios at the beginning of the book they base on comic stories.

Promotion of "Bibliostory" among Polish librarians. "Bibliostory" was published both in electronic and print version. Since it was a Ministry-funded project, the print versions were free of charge. The Regional Public Library and Culture Animation Centre in Poznan sent printed version to the libraries in the region. The country promotion of "Bibliostory" took place on The Internet. An independent portal for librarians, Pulowerek.pl each week published a different story from the book. This promotional campaign lasted six months. According to Pulowerek.pl's statistics, each story had 188 displays on avarage. Parallel, The Regional Public Library and Culture Animation Centre in Poznan was publishing the stories on its website.

In January 2016, IL Committee of Polish Librarians' Association announced a "Bibliostory" contest for libraries. The library that wanted to participate, had to send an idea of comic stories application during media and information literacy class. The printed versions of "Bibliostory" were drawn among participants.

6   Conclusions

Our paper has discussed the pedagogical framework on which an educational comic book was developed. Two constructivist pedagogical concepts, the zone of proximal development and case-based learning/teaching provided a basis to design "Bibliostory". The key categories, like interactions between learner and more experienced person, and meaningful imitation are reflected in stories, especially in activities of comic book characters. "Bibliostory" is embedded in the social and historical context of culture, i.e. stories reflect current children and adolescents' reality. This makes "Bibliostory" easy to understand and implement in learning media and information competences by children and adolescents.

Our analysis contributes to the broader discussion on the application of pedagogical approaches in MIL education. We agree with Jacobs [25] who claims that "instructional strategies and techniques are an important part of teaching but they must be informed by an understanding of pedagogical theory" [p. 257]. Therefore, we claim that it is not sufficient to base only on information and media practices while designing educational materials. We present how the social constructivist understanding of learning and teaching process influences decisions on design the comic stories.

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