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## ASSESSING THE GRAPHIC QUESTIONNAIRE USED IN DIGITAL LITERACY TRAINING

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### ABSTRACT

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Aim/Purpose	To capture digital training experiences, the paper introduces a novel data collection method – a graphic questionnaire. It aims to demonstrate the opportunities and limitations of this tool for collecting feedback from socially disadvantaged participants of digital literacy training about their progress.
Background	In training of digital skills for disadvantaged audiences through informal educational interventions, it is important to get sufficient knowledge on factors that lead to their progress in the course of training. There are many tools to measure the achievements of formal education participants, but assessing the effectiveness of informal digital skills training is researched less. The paper introduces a small-scale case study of the training programme aimed at the developing of reading and digital skills among the participants from three socially disadvantaged groups – people with hearing impairments, children from low income families, and elderly persons. The impact of the training on participants was evaluated using different tools, including a short graphic questionnaire to capture the perceptions of the participants after each training.
Methodology	We performed a thematic analysis of graphic questionnaires collected after each training session to determine how the students perceived their progress in developing literacy and digital skills.
Contribution	The findings of the paper can assist in designing assessment of digital literacy programmes that focus not only on final results, but also on the process of gaining digital skills and important factors that facilitate progress.
Findings	The graphic questionnaire allowed the researchers to get insights into the perception of acquired skills and progressive achievements of the participants through rich self-reports of attitudes, knowledge gained, and activities during training

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	sessions. However, the graphic questionnaire format did not allow the collection of data about social interaction and cooperation that could be important in learning.
Recommendations for Practitioners	Graphic questionnaires are useful and easy-to-use tools for getting rich contextual information about the attitudes, behaviour, and acquisition of knowledge in digital literacy training. They can be used in applied assessments of digital literacy training in various settings. Their simplicity can appeal to respondents; however, in the long-run interest of respondents in continuing self-reports should be sustained by additional measures.
Recommendations for Researchers	Researcher may explore the variety of simple and attractive research instruments, such as “honeycomb” questionnaires and similar, to facilitate data collection and saturate feedback with significant perception of personal experiences in gaining digital literacy skills.
Impact on Society	Designing effective digital literacy programmes, including engaging self-assessment methods and tools, aimed at socially disadvantaged people will contribute to their digital inclusion and to solving the issues of digital divide.
Future Research	Exploration of diverse research methods and expanding the research toolset in assessing digital literacy training could advance our understanding of important processes and factors in gaining digital skills.
Keywords	digital literacy, digital divide, graphic questionnaire, elderly persons, people with hearing impairment, children, assessment

## INTRODUCTION

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That computers, the Internet, and the World Wide Web are now part of everyday life for many people is undeniable. Even if access by fibre or telephone lines to the home is not universal, the mobile phone has brought access to millions who use no other device. This fact is taken advantage of by business and industry, and particularly the retail trades, as well as by government, urged on by the economic advantages they see as achievable. Consequently, achieving ‘digital literacy’ becomes an important priority for public policies relating to technology application and use, since without the search skills, the ability to complete online forms, and the understanding to enable effective filtering of ‘fake news’ and fraudulent business, citizens are at a disadvantage.

We can define digital literacy as the ability to use computers to prepare information, to interact with external agencies online, to search for information on daily life needs or work-related topics, and to evaluate the information found on the web (Jenkins, 2009). This concept of digital literacy is wide and includes the elements of other “literacies” that are known from the 1960s and, especially, have diversified during the latest decade. According to Covello (2010), the sub-disciplines of digital literacy – computer, information, media, communication, visual, technology, and similar – converge and overlap depending on different definitions (Covello, 2010). However, for our purposes, digital literacy is also coupled with basic literacy, or the ability to read and write. This is an important element of using the internet and recognizing conventional symbols of some written language, as well as distinguishing them from and combine them with other visual symbols. Moreover, it leads to a very important ability to understand the logic of text and visual structures we find on the websites, and in narratives explicitly or inherently guiding these structures or reading ability. In society at large, the vast majority of the educated population are able to acquire both literacy and digital skills, either by being taught these skills as part of educational curricula or by self-tuition and practice, or by attending training events, or following online courses.

For some others, however, various circumstances and conditions put them at a disadvantage, and they become ‘victims’ of the digital divide. These groups include elderly persons who have never had any experience of using computers (although this is an ever-declining proportion of the population, as those retiring now have often had to use computers in their work), people with some physical or intellectual disadvantage, and those from poor economic backgrounds, where access to computer-based devices is difficult to achieve. In most economically advanced countries, access to digital technologies is not a problem, but digital inequalities are expressed through a lack of motivation and skills to use these technologies meaningfully and to derive benefits from them (van Dijk, 2012).

Designing successful digital interventions for digital inclusion of disadvantaged citizens becomes crucial for the institutions implementing them, and it also requires collecting sufficiently rich feedback from the training participants in order to find effective ways to engage them and to develop their digital literacy. This feedback in formal education is often measured by formal testing or examination, but in informal educational settings these examination forms may not be appropriate as they may lessen the motivation to participate and cause the drop-out of those who would benefit most from such education. Thus, a variety of assessment methods and tools is explored, especially, in relation to digital educational interventions (see the literature review below).

This paper is based on a Lithuanian project that was designed for three potentially disadvantaged groups: children from low-income families, deaf people, and elderly people. Digital literacy training employed digital reading and creating comics, implementing a close connection between digital reading and developing digital competencies (e.g., using digital devices for reading, searching, critically evaluating information, generating new information online, etc.) (Leu, Zawilinski, Forzani, & Timbrell, 2014).

The training was evaluated throughout using a variety of tools not only testing the effectiveness of the intervention, but also exploring the type of feedback that can be collected with these tools. In this paper we discuss the opportunities and limitations of using a graphic questionnaire. The research questions addressed in this paper relate to the usefulness of this particular tool for assessing the digital educational interventions:

1. How does the short graphic questionnaire reflect the progress of digital literacy training participants?
2. What are affordances and shortcomings of the short graphic questionnaire as an assessment tool for informal digital literacy training?

## **ASSESSMENT OF DIGITAL LITERACY TRAINING RESULTS**

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Assessment in education mainly refers to the activity of teachers helping the students’ progress and improve their learning, but also in refining the educational programmes. At present it is related to learning outcomes, i.e., what students need to know, to be able to do, and to understand at the end of a programme or a course and such assessment is mainly investigated in formal educational settings (Cedefop, 2016). The necessity to re-think the assessment in different environments and “*the need for assessment to account for the knowledge, skills, dispositions and attitudes necessary... for a changing and increasingly digital world is also increasingly acknowledged*” (Timmis, Broadfoot, Sutherland, & Oldfield, 2016). On the other hand, the informal educational settings and projects are catering for the learning needs of people outside schools and universities. Even in formal educational settings, teachers apply informal assessment practices. Informal assessment is often used for formative assessment when assessing *for* learning not *of* learning, i.e., when the aim is to improve learning directly and increase students understanding (Aracell Ruiz-Primo, & Furtak, 2007). Summative assessment is used to evaluate the level to which particular learning outcomes were achieved during the learning process (Calder, 2013). Here we are mainly interested in informal formative assessment type, but we will also address summative assessment studies in the digital environment.

In informal formative assessment, a teacher is eliciting response from participants, recognizes their responses, and uses the information acquired for the improvement of participants' understanding during the ongoing learning process. As a rule, teachers implement informal formative assessment through classroom talks and assessment conversations (Aracell Ruiz-Primo & Furtak, 2007). On the other hand, other informal formative assessment forms have been applied in digital literacy educational interventions.

The majority of research into digital literacy also has been conducted in formal educational environments, such as schools, colleges, and higher education institutions. Probably the most comprehensive resource in this context is the UK's Joint Information Systems Committee's *Developing digital literacies* (JISC, 2014a) and the associated page of *DL evaluation resources* (JISC, 2014b). According to Katz (2005), digital literacy assessment should support and guide curricula innovations and changes and guide individual learning. These assessments are conducted in different forms, such as online examinations, large-scale multiple-choice tests, compositions of different tests, and self-assessment tests. Overall, the most common evaluation method is the survey questionnaire focusing on individual knowledge (Covello, 2010).

There are several projects looking into the assessment of the achievements in digital environments. Brinson (2015) has compared results of assessment of different learning outcomes in virtual and remote laboratories versus traditional hands-on laboratories (55 studies altogether). He has identified that learning outcomes were defined in terms of: knowledge and understanding (modelling theoretical concepts and applying them to problem solving), inquiry skills (make observations, creating hypotheses, generating experimental designs), practical skills (proper use of equipment and technology), perception (degree of engagement and expressing interest), analytical skills (critique, interpret, recognize patterns in data, generate models of understanding), social and scientific communication (degree of collaboration, sharing of findings, display of results) (p. 223). Despite this variety of outcomes, knowledge and understanding were assessed most often (in 95% of studies) and inquiry skills most seldom (in 7%). Perception was assessed mainly qualitatively (in 53% of studies) and was linked to the satisfaction and motivation of students. These were clearly linked to higher learning outcomes overall and especially to higher perceived outcomes in practical skills (measured in 16% of studies) in both physical and virtual environments. Analytical and social communication skills were also measured rarely (in 15% and 9% of studies respectively). The instruments used in assessment are closely related to the type of learning outcomes. Thus, quizzes and examinations were used most often (71%), followed by surveys and questionnaires (40%), interviews or observation (18%), course grade (11%), and laboratory report (9%) or laboratory practical (9%) (Brinson, 2015, p. 227). The results show that science learning, regardless of environment, is mainly measured as "an acquisition of a body of conceptual knowledge than a systematic way of thinking and observing..." (Brinson, 2015, p. 228).

Ketelhut, Neson, Clarke, and Dede (2010) have also compared the results of assessment of inquiry skills in science acquired in three multi-user virtual environment implementations based on different theoretical underpinnings and "paper-based" curriculum. The data for assessment was captured throughout the study using qualitative (semi-structured interviews in various phases of intervention, teachers' expectations chart, written assignment in a form of a letter) and quantitative (four types of surveys, log data) methods and instruments. They have found that the assessment among groups varied not so much in relation to the differences in the implementations, but to the assessment strategy employed, especially in measuring knowledge and understanding content.

The study of the experts' opinions about the effectiveness of digital game-based learning by All, Nuñez Castellar, and van Looy (2016) has provided further insights into the assessment of digital based learning and its complexity, especially in experimental settings. They demonstrate that the results of assessment can be influenced by different elements external to the game, such as, the role of an instructor, meaningful learning context, characteristic of the environment, or previous game and computer experience of the participants. The experts suggest that effectiveness studies in laboratory

environments should be avoided as they diminish motivation and enjoyment of the learning process and this results in lower cognitive learning outcomes. However, the requirements of internal validity of assessment instruments were applied to quantitative survey instruments and not relevant to our cases.

As Gerling, Schulte, and Masuch (2011) note, gaming can play a role in digital training and, in applying gaming for frail seniors in nursing houses, found that,

*‘the engagement of elderly players transcends into their everyday life, and their social interaction increases among one another. Most importantly, the evaluation showed that games were perceived as enjoyable leisure activity, supporting the approach of applying digital games to raise the quality of life among frail elderly by fostering activity’.* (p. 6)

Gerling et al. (2011) used pre-prepared instruments specifically intended for evaluating gaming, but also observation of the participants. The results showed the changes in the participants, such as increased social interaction, joy and satisfaction with the elements of the game and scenery and mastering simple game operations. While the production of comic strips (the focus of our training exercises) is not a gaming activity, it does involve interaction among the training participants and such interaction may be similarly beneficial.

Apart from the assessment in different digital environments or means, occasionally, research relates to the assessment of digital literacy training of disadvantaged groups. One of the latest projects concerns students with specific disadvantages in the case of a Mexican study of *‘young people with mild intellectual disability’* (Aquirre-Martínez, Casas-Moreno, & Paramio-Pérez, 2018). Given the nature of the disability, the evaluation of the programme related to intellectual issues such as the ability to process information, communicative ability, and behaviour related to processing information. A number of quantitative methods were used to measure the achievements of the participants and these demonstrated their interest and engagement with digital platforms and materials as well as progress in all measured intellectual and communicative abilities. It has shown that digital intervention can help even the most disadvantaged group of participants (in this case poor, intellectually-disabled, young people without access to computers).

A wide-scale survey was used to assess the impact of digital literacy training completed by five hundred thousand participants throughout India. The questionnaire used in the study included questions on the conduct and delivery of the training, perceived value and the impact on individuals’ knowledge, comfort and frequency of usage of the digital technologies after the training. (Nimish, Kar, & Ilavarasan, 2017).

An examination of the literature reveals, as noted earlier, the survey questionnaire as the dominant evaluation instrument, often allied with follow-up interviews with trainees and trainers. It is this strategy that we have employed in this investigation.

However, both questionnaires administered at the start and at the end of training sessions, as well as interviews, only capture the finalized opinions, perceptions or results achieved by the study participants. Therefore, we have tried to introduce an additional feature – a short graphic questionnaire administered after each training session. We hoped to capture the progress of the participants, as well as its end result. In this paper we present what results this instrument has yielded, its affordances, and problems it caused.

## **EXPERIMENTAL SETTING**

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Our experimental intervention included training for digital book reading and creation in three different natural environments. Ethical issues of relevance to this type of research are important: the learners must understand and agree to participate in an experiment whose purpose is to have a positive impact on their lives, but the data will be used for research purposes and may help to formulate a policy to reduce the digital divide. The project organizers and researchers ensured that these things were clear and that participants volunteered to engage in training and research.

The experimental intervention was carried out by public libraries situated in different regions of the country with different community features. It involved three groups of participants who are likely to have lower digital abilities and opportunities to use digital technologies: the group of seniors (participants in the University of the Third Age), low-income children (pupils in a day-care centre), and people with hearing impairment (in collaboration with the Disabled Persons' Association). The organizers confirmed that a significant number of people from two groups (seniors and children) do not see the need to use technology, and some have only a poor digital capability. People with hearing impairment use digital technologies intensively for communication, but this group experiences significant reading difficulties. In all three cases, we tried to invite those who rarely use digital technology at the moment. This was not possible in all cases, so we included participants who use only one device or use very little technology.

Finding material that would be suitable for digital reading of all three groups proved to be problematic. Our attention was attracted by a Lithuanian graphic novel “*10 litų*” telling a story of two heroic pilots, Darius and Girėnas, flying over the Atlantic Ocean. The graphic story based on true historical events became popular with the public and was awarded a number of literary prizes. It also publicized the medium of comic books, which was never previously popular with a wide audience. There are many successful attempts to use comic books in training literacy and digital skills (Kirchoff, 2017; Sockman, Sutton, & Hermann, 2016; Wallner 2017, 2018; Wilson, 2013). As one of the partner libraries had experience in working with comics, we decided that this would be a suitable reading material, stimulating interest and curiosity of all our participants.

We developed a training scheme in which we identified the learning outcomes and several data collection methods to assess the impact of an experimental intervention. The learning outcomes were entirely pragmatic and closely related to the training tasks. It was important for us to follow the process of mastering digital skills and reading skills. Both types of abilities were coupled with practical tasks and discussion of tasks, so we expected to see increased motivation for reading and work with computers, despite a short period of training.

The nature of the training precluded any kind of examination or formal testing. However, we carried out a pre-intervention questionnaire, collecting demographic data and self-efficacy of digital skills. The post-intervention data collection included a focus group discussion with filling in a shorter self-efficacy questionnaire and semi-structured interviews with the trainers. A short graphic questionnaire that we examine in the present paper was one of the instruments used to grasp the results of the learning process after each training session.

The duration of the training varied and depended on the local conditions, although we tried to equalize the number of classes. In all cases, there were 8-12 participants. However, each organizer was free to develop their own training concept and to choose the teaching methods and materials, including comics, that would be most suitable for their participants.

### **SHORT GRAPHIC QUESTIONNAIRE FOR PROGRESS ASSESSMENT**

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While developing our experimental intervention we were also preparing our data collection and training assessment tools. As we could not use control groups for the natural experiment for several reasons related to context, resources, and ethics, we chose to conduct the pre- and post-intervention questionnaire surveys. To increase the possibility of actually capturing the immediate outcome of learning we also wanted to introduce some form of data collection after each training session. We wanted something to become a part of the training and blend in with the game of comics but could not find an example of a tool that we could conveniently use.

The idea of a graphic questionnaire was suggested by some colourful images of digital literacy assessment models that we have played with and turned into a graphic questionnaire. Its purpose was to determine how the participants evaluated the results of their participation in training as this went

on: newly acquired reading comprehension, new skills of working with technology, engagement in training.

The research question we sought to answer by using this questionnaire was: *Have the students been successful in digital reading, creative writing and acquisition of digital skills? If so, how do they describe it?*

The study was aimed at identifying the progression and ranking of progress made by the participants. Our simple graphic questionnaire is shown in Figure 1.

The main question - “What do you remember from this day’s activity?” - is divided into six parts (starting from the left upper cell as the first):

1. What did I learn about comics? (knowledge and understanding).
2. What did I learn about computers and the internet? (knowledge and practical skills).
3. I did the following... (practical skills).
4. I remembered the following... (attention and engagement).
5. I liked the following.... (engagement and motivation).
6. I did not like the following... (barriers, difficulties, dissatisfaction).

**Figure 1. A filled example of a short graphic questionnaire “honeycomb”**

**Note:** The upper right corner provides instruction about filling in the cells of the “honeycomb”, the central cell holds the main question, the outer cells the parts of the main question and handwritten answers. The English translation is below.

- What did I remember today? (Facts about Darius and Girėnas biographies, how to reach Lithuanian comics);
- What did I learn about comics? (History, how to read and create comics);
- What did I learn about computers and the internet? (How to find comics on the internet, save and find them on the computer);
- I did the following... (2 comics with Comic Page Creator app, 2 photos with comics filters);
- I liked the following.... (To create comics, to take photos of my groupmates);
- I did not like the following... (Empty)

The training participants completed a “honeycomb” after each training session. The received data was interpreted using thematic record analysis. The themes are based on the research questions, and the success of the “honeycomb” questionnaire is assessed by the success in answering the main research questions of this study.

Not all participants in each session filled in the “honeycombs”, and not all completed forms were given to teachers. In addition, there was no requirement to record something in each area. However, the analysis of fragmentary data obtained allows some generalizations to be made about the perceptions of participants and the usefulness of the graphic questionnaire.

## WHAT WE HAVE FOUND USING QUESTIONNAIRES

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### *ANALYSIS OF THE “HONEYCOMB” RESPONSES OF THE DEAF PARTICIPANTS*

The group of deaf people participated in four training sessions. In total, 12 participants completed the “honeycombs”, which were distributed as follows: 6 received after the first session, 6 after the second, 8 after the third, 4 after the fourth session

Most new knowledge about comics was gained during the first two sessions. The participants highlighted “heaps of new knowledge” and first impressions: getting to know the comic book “Leičiai”, meeting with a comic book creator, comic book media in general, languages in which comics are published. Many emphasized gaining knowledge of Lithuanian comic books. Participants emphasized novelty or surprise and excitement (note: our translation of the original):

- *It was my first contact with T. Mitkus. It was interesting, I was surprised by the comic book “Leičiai”.*
- *Remembered Marvel - the largest comic book network.*
- *In Lithuania, most comic books are created by women, although in other countries those by men are more common.*
- *You do not need to learn how to draw [to create comics].*

In the third lesson, the participants got to know the history of the comic book and created stories themselves. They noted that they “liked to imagine the story of the comic book”, but the abundance of historical knowledge also causes confusion, because it is difficult to identify what they learned.

Practical elements of comic book creation arise from the second session, and the participants point out not only that they “described the comic story” or “wrote the story,” but also that they remembered the process and acquired new knowledge about Lithuanian comic books.

Practical training in creative skills comes with the skills in Internet use from the second lesson. It focuses on the search for comics online, the comic websites, the Lithuanian comic book search and reading online. Participants indicate that they have learned:

- *Where to find Lithuanian comic books online.*
- *To find and view Lithuanian comic books online.*
- *About useful websites with Lithuanian comics.*

The third and fourth sessions were dominated by practical knowledge of the Internet, the use of tablet computers and apps. One of the topics that pops up here is general web search skills. Participants point out that they have been searching for information about leisure hobbies (knitting, sports, games) on the Internet and also used social media and communication tools in the Internet (Facebook, Skype, etc.). Now this knowledge is complemented by comic book search tools. The digital comics clearly made an impression on the participants, because in the “honeycombs” they emphasize the previous knowledge about paper comics as limited, and new as they expand into the web space. One of the participants says that he has learned “nothing new about computers and the Internet”, but the other five point to their new familiarity with the comic strip and initial attempts to create comics from their own photos. Participants in the fourth session emphasize what they have done and their practical skills:

- *I learned to use the program in practice.*
- *I made the picture.*
- *I created a comic story and comic book.*



- *I learned to create a comic by computer.*

All the “honeycombs” clearly indicate that participants liked the training. More specifically, from time to time it is stated that they liked to “*create a comic book*”, “*everything about comic book media*”, “*comic books of Lithuanian authors*” or “*new knowledge about comics.*” Rarely, participants indicate what they have remembered. Only three participants point out something more specific than “comics”, though it is still vague, the Marvel comics network, how to use the app and how to use the tablet.

***ANALYSIS OF THE “HONEYCOMB” RESPONSES OF THE SENIOR PARTICIPANTS***

The seniors’ group completed the “honeycombs” in only two classes, but marked the knowledge and skills acquired through several occasions. The work of the seniors’ group was also much more intense than that of the deaf people. A total of 11 responses were received from respondents: ten in the first round and eight in the second round.

The knowledge of comics in this group was more applied, than general. Only one participant noted that he had learned the history of comics. The others have emphasized that they learned how to read and create comics:

- *We learned how to create comics*
- *How to create a comic book with heroes and pictures*

First the participants learned how to download and save comics, save and share images. Later, more sophisticated and more creative processes appear:

- *How to create comics from photos.*
- *How to create and edit them (comics).*
- *How to create comics with Comic Strip (an app).*

Interestingly, in the “honeycomb” section “I remembered...”, the participants unexpectedly highlight the knowledge gained by reading one of the comics, although they do not name this particular comic book on any other occasion. They say they have remembered:

- *Interesting facts about Darius and Girėnas’ biographies.*
- *Stasys Girėnas comes from a large family, 16 children.*

Acquiring internet and computer skills is also closely related to the search for, use of, or creation of comics. Participants mention the search for and retaining of images as important knowledge about the use of computers and the Internet on both occasions. First, the knowledge of image search and retaining the found items. Later, they emphasize saving their own pictures and working with an app “Comic Strip Creator”.

Participants in the training sessions provide information about what they were able to do during their classes but emphasize different aspects of this work as shown in Table 1:

**Table 1. Aspects of independent work emphasized in the “honeycombs”**

<b>Independence and amount</b>	<b>Techniques</b>	<b>Tools</b>
<i>I made two examples of comic stories</i>	<i>Made a comic by collage technique and saved by e-mail.</i>	<i>Two comic strips with Comic Strip Creator</i>
<i>I created three comics myself</i>	<i>I created a comic from several pictures.</i>	<i>Two photos with comic filters</i>

It is much more important for some participants to mention the theme of the original comic that they have created during training. Participants present evidence of their creativity:

- *I made a comic “Little daughter’s”.*
- *I created a comic book “At kindergarten” with my program.*
- *I made a comic strip about a daughter and a mother.*
- *Comic book “Library cat”.*
- *Humorous comic about a funny story.*

Most of the participants are motivated and attracted by the creative work process. Some of them enjoy this touch of creativity:

- *It is great fun to create story pictures.*
- *I enjoy working with a tablet, creating comics.*

The other things important for the engagement are:

- *The style of work (like), we just did practical work that has been very useful.*
- *It is fun to create a comic from photos, saves time for drawing them.*

It is also worth mentioning those who are satisfied with the social aspects of communication:

- *I have shown comic strips for group buddies.*

No one in the group of seniors mentions any unpleasant things or demotivating factors.

### ***ANALYSIS OF THE CHILDREN’S GROUP “HONEYCOMBS”***

There were ten participants in the group of children from low income families. They completed “honeycombs” after each of the five classes: ten were returned after the first class, 7 after the second, 8 after the third, 6 after the fourth, and 5 after the fifth.

Participants in the children’s group completed the “honeycombs” after each session, and the length and variety of responses decreased with each session. This is due to two factors: one is the greater number of lessons and shorter breaks between them and the completion of the “honeycombs”. This factor directly led to the second; the command of children’s attention. Filling in the same form every time obviously frustrated them. We observe a similar issue with responses in the group of deaf people, although the length of their responses remains similar after all sessions, but the number of filled-in cells decreases.

Replies show how knowledge about comics changes throughout the training. In the beginning, children mention facts: that comics appeared “*in America and Japan*”, that they “*are colourful*”, “*I know what manga is*”, that they “*are different*”.

Later, their knowledge relates to the process of creation, i.e., they find out how to create comics, “*that can be arranged from cards*”, “*that it’s hard to come up with comic strips without text*.” Some features of comic strips are identified: “*there are logical comic strips*”, “*they are funny*.” Next, children name specific abilities when they try out the process themselves: “*how you can create from photos*”, “*you can create comic books with Foto Talks*”, “*how to take photos for comics*”, “*you need to make something like 50 photos*”, “*photos are taken for comics*”.

The second training session was clearly intended for general comic book creation, since in the “honeycomb” section, “I have made...” the children point out:

- *I created a comic text.*
- *I wrote and produced comics.*

and even

- *I created a story about Garfield and the president.*

Fewer children admit that they learned new things about the Internet or computers. Only the first-day “honeycombs” indicate that they’ve learned how to turn on a computer or a tablet, how to

change the wallpaper or download the app. During other days, only one respondent wrote that “*I learned to use Foto Talk*”.

This is obviously in conflict with what is indicated in the “I made” section. In it, on the first day, children focus on taking pictures, downloading apps, and the fact that they signed up on a tablet. The creation of photo and photo comic strips also dominates in the third and fourth workshops. Meanwhile, on the last day, the children claim that they photographed themselves (“*I took a selfie*”, “*I photographed us*”).

Among the things remembered we also find facts (“*comics came from America*”, “*became popular in the 20th century*”, “*I learned new gadgets*”) and instrumental skills (“*how to use the internet*”, “*how to use filters*”, “*how to create comic strips*”) knowledge. However, in the second session there are more general, more abstract things:

- *Comics are not only pictures that need to be drawn.*
- *How to get insight from the pictures.*
- *I remember how to do bubbles for comics* (here the instrumental knowledge is combined with the more abstract understanding of the text-to-image ratio).

The organizing and controlling of the creative process involves remembering (“I remember”) the number of photos you need to create a comic book (e.g., “*that needs a lot of pictures*”).

Under the heading “I liked...”, filled in by the children, a very important motivating factor - independent participation in the creative process and its management. They liked the ordering of pictures (“*put comics together*”, “*create comics from given photos*”) and the writing process (“*I liked that we had to write our own text*”, “*write funny comics*”), but also drawing and taking pictures.

Another important motivation factor, i.e., access to the device is mentioned by only one participant who likes “everything, but most of all keeping the tablet in your hand.” This factor also appears under the heading “Did not like”, where a couple of children point out that they disapproved of “needing to share a tablet”, “sharing a tablet with friends”. Other things that were not liked relate to the request of a teacher to stop reading (instead of working on the assigned task) and the need to think (“I dislike thinking”).

## DISCUSSION AND CONCLUSION

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The completed “honeycombs” from all three groups reflect the special features of the group members as well as the duration, structure, and content of the training itself. Although developed according to a general scheme, all training was applied to the needs and characteristics of each group. Therefore, we can see that the participants not only completed the “honeycombs” with different frequencies, but also indicated the mastering of different knowledge and used various comic book creation tools.

Despite the differences, we see some general trends in assessing acquired knowledge and abilities. In both adult groups, there is a distinction between knowledge of comics, their structure and reading characteristics, from a more specific comic book creation process. This separation is less visible in the children’s “honeycombs”, where, in general, less emphasis is given to specific practical skills for working with tablets and the Internet. It is possible that this is related to the preconceived belief that they know everything (several children even claim they have not learned “anything because I know everything”). Children combine the whole process of comic book creation into a single whole without splitting it into separate elements.

We also can see other differences between the adult groups. The seniors emphasize memorizing the knowledge and skills of working with technology, such as downloading comics, sharing images, creating text bubbles, saving and sending photos, and using special comic strip apps. Only one senior participant points out that he has “*a lot of new information about pictures and writing*”. The group with

hearing difficulties in addition to hands-on skills values the novelty of the knowledge but does not stress remembering things.

The greatest satisfaction to all participants is given by the creation of a comic book itself, whether it should be produced from the given photos or created by themselves from scratch. The responses of seniors and children groups about the number of comic strips created or their titles can be viewed as the expression of pride in works created and creative achievements. Seniors also clearly state that the training was useful to them and appreciated the acquisition of practical skills.

The least visible features in the “honeycombs” are of the social environment and cooperation. This is partly due to the structure of the “honeycomb” itself, as well as the participants’ perception of what they need to write about.

The results collected with the help of a simple graphic questionnaire during the training show the progress of the participants and the acquisition of knowledge in detail. We can follow the pleasures of the creative process and pride taken in the work done during the sessions, the specific impact of some elements of training (e.g., historical knowledge derived from reading a comic book or understanding how many pictures are needed for creation of a comic strip). The users register their impressions and achievements in a variety of ways, and it is possible to follow the cognitive impact (I remembered...) and emotional reactions (I liked..., I disliked). Compared to other instruments this type of questionnaire does not provide any data for assessing the level of knowledge or skills acquired or the achieved learning outcomes as with the tests (Brinson, 2015) or qualitative interviews (Ketelhut et al., 2010). On the other hand, it seems to provide data similar to observations, namely, the progress of mastering operations, the items attracting attention, the joy of creative process and pride in one’s own creation (Gerling et al., 2011). This is useful when the investigators do not have the possibility to observe or film participants.

On the other hand, administering the same questionnaire (even a short one) after each session is a trying experience for the trainers and becomes tedious for the participants. If the training goes on for a longer time, this approach would require more diversity and imagination to keep the reporting fresh and participants engaged in this activity.

The findings are based on a small number of participants and short time trainings, thus the experience of using a short questionnaire administered after each training session is limited. However, we have found it useful for our purposes and suggest further investigation of its possibilities.

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