

ONLINE EDUCATION IN SORTING WASTE

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Abstract

Waste sorting significantly helps to reduce the impact of human activity on the environment. There should be a functional system of collection and use of used packages to increase the effectiveness of sorting. Since 1997 the EKO-KOM Company has been in charge of waste collection in the Czech Republic and thanks to this company in the past twenty years there has been a significant increase in waste sorting not only from the side of manufacturers and other business entities, but also municipalities and inhabitants of the Czech Republic. The aim of this article is to introduce specific educational activities of the company for the target group of children and youth. As this target group spends most time online, the emphasis is placed on the online education. The main part of the article is devoted to the analysis of the new educational portal Edurama.

Key words:

Edurama. EKO-KOM. Online communication. Online education. Package recycling. Waste sorting.

Introduction

According to the latest available data, in 2016 every citizen of the Czech Republic sorted on average almost 45 kilograms of paper, glass, plastic or beverage cartons. And on the top of that recycled 11 kilograms of metal. That is, compared to 2015, approximately two kilos more. In total, almost 800,000 tons of packaging was recycled in the Czech Republic. The inhabitants of the Czech Republic have more than 307,000 colourful containers for waste sorting and the average distance to these containers from their house is about 96 meters.¹ These positive figures, which would stand in comparison with the developed countries of the European Union, have been achieved by long-term systematic work with an emphasis on communication and education of important target groups.² For more than 20 years the EKO-KOM Company has been applying good practice adopted from abroad as well as its own innovations. One of the ways to communicate with the target group of children and youth are the online educational programs for schools. Abroad, authors have been engaged in using online games³ and virtual reality in education.⁴ In the Czech Republic, the use of the Internet by teachers is predominant when preparing the classes rather than using it directly while teaching.⁵ More positive situation seems to be at high schools.⁶

1 *Výsledky třídění a recyklace v systému EKO-KOM za rok 2012 – 2016.* [online]. [2017-10-14]. Available at: <<http://www.ekokom.cz/cz/ostatni/o-spolecnosti/media/tiskove-zpravy>>.

2 JANOVSÁ, K. et al.: Analysis of Ecological Intensity of Metallurgical Production. In *Metalurgija*, 2015, Vol. 54, No. 1, p. 267-269.

3 MORENO-GER, P. et al.: Educational Game Design for Online Education. In *Computers in Human Behavior*, 2008, Vol. 24, No. 6, p. 2530-2540.

4 CHICIOREANU, T. D., OPROIU, G. C.: New Ways to Present the Information in the Teaching Activity. In FRUNZETI, T., JUGUREANU, R. (eds.): *Leveraging Technology For Learning*. Bucharest : Editura Universitara, 2012, p. 90-95.

5 DOSTÁL, J., KLEMENT, M.: Počítačem podporované vzdělávání – výsledky výzkumné sondy. In *Journal of Technology and Information Education*, 2012, Vol. 4, No. 3, p. 15-19. [online]. [2017-10-14]. Available at: <<https://www.jtie.upol.cz/pdfs/jti/2012/03/02.pdf>>.

6 KAŠPAR, P., KOZEL, R., NESPĚŠNÝ, D.: Current Issues of Social Networking site Facebook from the Perspective of Active Users. In DOUCEK, P., CHROUST, G. (eds.): *IDIMT-2011: Interdisciplinarity in Complex Systems: 19th Interdisciplinary Information Management Talks. Conference Proceedings*.

1 Education in waste sorting in the Czech Republic

In 1997 Law no. 125/1997 Coll., on Waste came into force and consequently the EKO-KOM a.s. Company was founded aiming at creating functional system of waste collection and reuse of packaging in the Czech Republic.⁷ The system is designed as a non-profit; the whole project was initially created and funded by just 12 companies. In the first phase, the company started pilot projects to verify different ways of sorted waste collection and prepared, in cooperation with teachers, the extensive and long-term educational project called *Tonda Obal*. The goal of this project is to teach primary school pupils to sort waste.

1.1 Cooperation with target groups

Act No. 477/2001 Coll., on Packaging, specified the obligations related to the handling of packaging and packaging waste. The EKO-KOM Company is also required to promote waste sorting and communicate with target groups. The quality and quantity is given by authorization of the Ministry of Environment that EKO-KOM received for the first time in 2002. Thanks to this authorization, every manufacturer that is involved in the sorting system has a legal certainty that it has fulfilled its obligations enforced by law. The authorization process has been repeated since then and the requirements for the company's operation are becoming more and more difficult. Manufacturers and other business entities are therefore motivated to sort waste by constantly improving legislative. Other major EKO-KOM's target groups, such as government, municipalities and above all the citizens themselves, to whom the EKO-KOM Company shall constantly and actively communicate in order to explain, persuade and educate everyone so as to achieve optimal results in sorting packages and waste in general. Otherwise, there are large differences among individual municipalities.⁸ Their long-standing and systematic work is paying off as apparent from the increasing curve of the amount of sorted waste.

To be able to reach such positive results, the EKO-KOM implements, in cooperation with Regional and Local Authorities, technical support projects to improve the sorted waste collection system. That, for instance, involves providing sorting bags to the homes of citizens. Schools and independent businesses get paper-sorting boxes instead of bags. Besides that, the company also distributes stickers for the containers with basic information about the correct way of sorting waste, cooperates on creating and publishing of many informational and promotional materials supporting the idea of higher involvement of inhabitants on the system of waste sorting, including reusable materials, packages, etc.

Linz : Trauner Verlag Universitat, 2011, p. 289-297.

7 EKO-KOM – *O společnosti a systému EKO-KOM*. [online]. [2017-10-14]. Available at: <<http://www.ekokom.cz/cz/ostatni/o-spolecnosti/system-eko-kom/o-systemu>>.

8 BARÁNKOVÁ, L., BARÁNEK, P.: Cost-Benefit Analysis of the Current Municipal Waste Management in the Cities of Ostrava and Brno. In SLAVÍČKOVÁ, P. (ed.): *Knowledge for Market Use 2013*. Olomouc : Societas Scientiarum Olomucensis II, 2013, p. 8-21.

1.2 Communication and educational activities targeting the youngest consumers

The main goals one needs to achieve in a long-term communication campaign targeting consumers are:

- maintaining or increasing the involvement of inhabitants in waste sorting,
- increasing the amount of sorted waste,
- improving the quality of sorted waste for recycling,
- strengthening the position of existing „recyclers“ and further strengthening of social pressure on non-recyclers,
- deepening and improving the reach of TG respondents with the possibility of passing more detailed information.

The claim, representing all communication activities of the company is: „Má to smysl, třídte odpad! – It's worth it, sort your waste!“. In their communication campaigns the company has been more and more focusing on combining online channels with TV advertisement and carefully planned use of print media. The online environment is used above all for quality and complex media message. EKO-KOM can therefore target and adjust the message for individual target groups.⁹ An integral part of communication regarding waste sorting is education, especially training and further educational activities connected to direct approach. To improve the trends in waste sorting, the most important target group to be educated are the youth and above all children that might through systematic training take the waste sorting as a normal part of their lives. Young people spend more and more time on the Internet and on social networks and that is why the EKO-KOM Company tries to work with this trend and adjust to the needs of this target group. For the youngest consumers there is a website called *tonda-obal.cz*, for the youth then *samosebou.cz* and the webpage *jaktridit.cz* is designed for everyone who wants to learn more about the issue of waste sorting. Because young generation is eager for interaction, stories and experience the EKO-KOM Company has several profiles on Facebook and Instagram. Especially on Facebook users ask questions about waste sorting very often.

The most important thing in education the youngest consumers seem to be special educational programs. They serve to enrich the school educational program that each elementary, secondary and kindergarten in the Czech Republic creates in order to fulfil the requirements of the Educational Program Framework for the given field of education according to Act No. 561/2004 Coll. Part of the School Education Program, is also an on-going training of teachers who go through an accredited seminar of the Ministry of Education, Youth and Sports. This authorization requires EKO-KOM to ensure that at least 15% of the school population aged 3-15 is addressed annually through personal communication at schools or at public events aimed at educating children. In 2016, nearly 250,000 children were contacted, and more than 18% of the target group was reached.¹⁰ Since the beginning, the EKO-KOM Company has

9 Rozhovor s Ing. Lukášem Grolmusem, ředitelem oddělení komunikace AOS EKO-KOM, o nové komunikační kampani. In *EKO-KOMunikace*, 2017, No. 1, p. 2-3. [online]. [2017-10-14], Available at: <<http://www.ekokom.cz/uploads/attachments/Klienti/Ekomunikace/EKOKOMunikace%20012017.pdf>>.

10 GROLMUS, L.: Komunikace a vzdělávací aktivity AOS EKO-KOM. In *Sborník 18. konference Odpady a obce 2017. Conference Proceedings*. Praha: EKO-KOM, 2017, p. 116–119. [online]. [2017-10-14]. Available at: <http://www.ekokom.cz/uploads/attachments/OD/SBORN%C3%8DK%2017_20170619.pdf>.

been targeting children through a training project called Tonda Obal. At present a new educational portal Edurama has been prepared, allowing combination of various educational activities from different areas, and thus offer pupils more complex knowledge.

2 Educational program Tonda Obal

The Internet has gradually become a place where young people and children come across funny, informational as well as educational content. And for that reason there has been an increase of online activities and decrease of traditional contact campaigns in the Tonda Obal project. In 2016 the *tonda-obal.cz* website was visited by almost 64.000 users.



Picture 1: Web portal Tonda-Obal

Source: *Tonda-Obal*. [online]. [2017-10-14]. Available at: <<http://www.tonda-obal.cz/>>.

2.1 Contact campaign

The contact campaign takes form of a mobile educational exhibition called „Tonda Obal on the road“ aimed at primary school children. The exhibition took place 660 times in 2016 and was visited by almost 137 000 pupils. The children really like the exhibition accompanied by theme games at events that are prepared for general public. In 2016, 939 events took place under the “Tonda Obal” program, attended by over 200 000 children who were acquainted with sorting and recycling of waste.

2.2 Web portal Tonda Obal

For the smallest children, EKO-KOM has prepared the website *tonda-obal.cz*,¹¹ which is linked to the Tonda Obal School Education Program on the road. The web is divided into four sections: section for children under eight, for children over eight, for parents and for teachers. All sections contain lots of information and engaging pictures,

11 *Tonda-Obal*. [online]. [2017-10-14]. Available at: <<http://www.tonda-obal.cz/>>.

videos, games, and links to other interesting websites. The content of the site includes mainly information on packaging, sorting packaging, and children are introduced to the entire process of sorting waste, etc. Teachers and parents can find a number of educational materials that they can order or download, together with information about educational goals, seminars and other school events. The character of Tonda Obal accompanies the sections for children. With older children his role is less distinctive and users have their own space to click through the menu. The emphasis is placed on interactive communication. The part for younger children under 8 years old uses soundtrack and Tonda Obal has a much greater role here as he speaks to the kids while taking them through the world of waste sorting, explaining and helping them to use the web in the right way.

3 Educational program Edurama

The Edurama portal¹² is primarily intended for primary schools as an additional source of teaching. It is intended for teachers, pupils and their parents. It is a tool that helps children solve simple tasks to logical reasoning in an online environment that is much more attractive to them than any other form of education. Therefore, pupils can perform tasks both at school and at home, for example, together with parents, which increases the learning outcomes in a multiplier way. Additionally, the education is fun. The advantage of this project is that it does not involve only doing individual tasks, but it is a system of concepts according to the Educational Program Framework linked to environmental education. The key added value is that the teachers can, on the basis of their own decision, choose and modify tasks that pupils can solve in their own way.

3.1 Main benefits

The main objective of the project is to contribute to systematic environmental education through a dedicated portal providing methodically processed information to teachers and their pupils (or other persons and entities). The project is created in stages from the first grade of primary school, through secondary school to high schools. The web is full of interactive tasks, tutorials, and repetitions that accompany methodological aids and types for activities in and out of school. The portal is logically divided into 3 basic education blocks – environmental, technical and socio-economic education. Environmental education is divided into thematic areas and within these areas to individual chapters. In connection with the Framework Education Program, there is a link between environmental education and other educational areas and disciplines according to their topic. This enables the project to use cross-sectional themes that highlight the principle of integration. The fourth section – Teacher's Guide, complements the educational blocks. The Guide helps teachers to easily familiarize themselves when solving the problem, to compose training plans, to prepare appropriate materials for teaching, such as tests, revisions and worksheets. The manuals also contain methodological guidelines for compiling school education programs.

12 *Edurama*. [online]. [2017-10-14]. Available at: <<http://beta.edurama.cz/>>.

As it is an online learning tool, it is used to increase teachers' ability to use information technology for education. Activating teaching methods then make it possible to speed up the process of modernizing education. Online education knows no boundaries, so the active use of the Edurama portal helps to develop mutual cooperation between individual schools, public and state administration and the progressive business community. Methodically processed information focusing on content allows understanding the necessity of respecting the basic natural patterns. Awareness of the importance of ecosystems and natural resources for human society helps pupils understand the importance of a responsible approach to environmental protection. Children can debate and think about the changes brought about by the different human activities in the solution of the tasks, and identify the possibilities and ways of solving the problems.



Picture 2: Homepage of the Edurama portal

Source: *Edurama*. [online]. [2017-10-14]. Available at: <<http://beta.edurama.cz/>>.

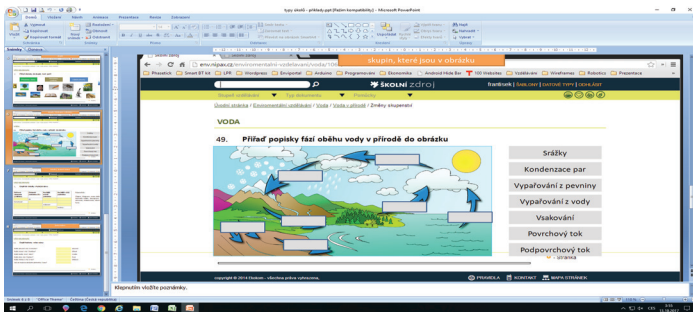
3.2 Operation of the portal

The test version of the project is available at *beta.edurama.cz*. The visitor can log on to the site as a pupil, teacher, or parent. According to the choice of sign-up the visitor then gets to different layers of the educational portal. Whereas the teacher can access the tasks, results and teaching methods, the pupil can only see the tasks. After logging in, the teacher can choose one of the three blocks of education and then the thematic area. These thematic areas can be found in a library as each area is in a shape of a book that is further divided into individual chapters. Every chapter includes tasks for pupils. It is up to the teacher to have the pupils do the tasks individually on a PC, together on a digital board or as homework. These tasks are also available as pdf files so the teacher can easily download them or print them and use them as worksheets offline. Tasks' results are evaluated by the system and presented either individually or collectively. The system can be modified and expanded. Teachers can choose from hundreds of tasks and thousands of photos and author's drawings specially made for this site to prepare for each level of education. A team of teachers was involved in creating the content of the project, whose task was to link the tasks with the Framework Educational Program. All tasks were supervised by Masaryk University in Brno.

3.3 Organization of tasks

The tasks include methodology with methodological and expert notes, warnings, instructions and / or sample solutions. Teachers will find an analysis of the Framework Educational Program from the point of view of environmental education and the key concepts according to the Framework Educational Program. When applying ecological education in connection with other educational areas, the teacher can find helpful resources in other books of the library that can provide new, cross-sectional tasks. When selecting a suitable task, the teacher chooses not only the content, but also the assignment and completion of the task. These are primarily the following types of tasks:

- task without a choice of answer options,
- task with a choice of one or more options of correct answers,
- sorting task (in sequence),
- placement task, respectively assignment task,
- add-on task.



Picture 3: Assignment task

Source: *Edurama*. [online]. [2017-10-14]. Available at: <<http://beta.edurama.cz/>>.

The pupils record their answer and save it. The answers have various forms. Besides selecting the right answer or writing it, the pupil can also add a picture (photo) that shows the result of an experiment that he conducted. While saving it, the confirmation message appears. The task is then considered as done. If the teacher wants the pupil to have an immediate feedback, he / she can give the pupil an immediate overview of the evaluation. For example, when all of the word terms are properly assigned to the displayed objects, the rating automatically shows up, showing the correct and total attempts, as shown by the percentage of success. The partial correct assignment will be evaluated and highlighted immediately.

Conclusion

The EKO-KOM Company has been engaged in a long-term systematic communication and education of important target groups. Thanks to that there has been on-going increase in waste sorting of business entities, municipalities and consumers. The aim of the article was introducing specific educational activities of the company for the

target group of children and youth. This target group is considered the most important as the company sees the biggest potential in achieving the permanent change in the behaviour of the population in relation to sorting waste and packaging. The target group of children and youth spends more and more time in the online environment and that is why the EKO-KOM Company has started to focus on the online form of education. The article also presents some long-term and some brand new educational online projects of the company. Online education tools bring active involvement to all: primary school teachers, pupils as well as their parents. As the article points out the online education can be used either according to age group of the pupils or it can combine various areas of education. It offers the possibility to choose from simple single tasks to complex tasks, from managing one thematic area to interconnecting different areas, which present the basic benefits of online tools compared to traditional printed educational materials. Therefore, the educational portal Edurama, which is a prototype of modern education for Czech primary education, is currently being developed.

Acknowledgement: The article was supported by a specific university research by Ministry of Education, Youth and Sports of the Czech Republic No. SP2017/17 Creating system for analyzing internal and external environment of industrial enterprises.

References:

- BARÁNKOVÁ, L., BARÁNEK, P.: Cost-Benefit Analysis of the Current Municipal Waste Management in the Cities of Ostrava and Brno. In SLAVÍČKOVÁ, P. (ed.): *Knowledge for Market Use 2013*. Olomouc : Societas Scientiarum Olomucensis II, 2013, p. 8-21.
- CHICIOREANU, T. D., OPROIU, G. C.: New Ways to Present the Information in the Teaching Activity. In FRUNZETI, T., JUGUREANU, R. (eds.): *Leveraging Technology For Learning*. Bucharest : Editura Universitara, 2012, p. 90-95.
- DOSTÁL, J., KLEMENT, M.: Počítačem podporované vzdělávání – výsledky výzkumné sondy. In *Journal of Technology and Information Education*, 2012, Vol. 4, No. 3, p. 15-19. ISSN 1803-537X. [online]. [2017-10-14]. Available at: <<https://www.jtie.upol.cz/pdfs/jti/2012/03/02.pdf>>.
- Edurama*. [online]. [2017-10-14]. Available at: <<http://beta.edurama.cz/>>.
- EKO-KOM – O společnosti a systému EKO-KOM*. [online]. [2017-10-14]. Available at: <<http://www.ekokom.cz/cz/ostatni/o-spolecnosti/system-eko-kom/o-systemu>>.
- GROLMUS, L.: Komunikace a vzdělávací aktivity AOS EKO-KOM. In *Sborník 18. konference Odpady a obce 2017. Conference Proceedings*. Praha : EKO-KOM, 2017, p. 116-119. [online]. [2017-10-14]. Available at: <http://www.ekokom.cz/uploads/attachments/OD/SBORN%C3%8DK%2017_20170619.pdf>.
- JANOVSKÁ, K. et al.: Analysis of Ecological Intensity of Metallurgical Production. In *Metalurgija*, 2015, Vol. 54, No. 1, p. 267-269. ISSN 0543-5846.
- KAŠPAR, P., KOZEL, R., NESPĚŠNÝ, D.: Current Issues of Social Networking site Facebook from the Perspective of Active Users. In DOUCEK, P., CHROUST, G. (eds.): *IDIMT-2011: Interdisciplinarity in Complex Systems: 19th Interdisciplinary Information Management Talks. Conference Proceedings*. Linz : Trauner Verlag Universitat, 2011, p. 289-297.

MORENO-GER, P. et al.: Educational Game Design for Online Education. In *Computers in Human Behavior*, 2008, Vol. 24, No. 6, p. 2530-2540. ISSN 0747-5632.

Rozhovor s Ing. Lukášem Grolmusem, ředitelem oddělení komunikace AOS EKO-KOM, o nové komunikační kampani. In *EKO-KOMunikace*, 2017, No. 1, p. 2-3. ISSN N/A. [online]. [2017-10-14]. Available at: <http://www.ekokom.cz/uploads/attachments/Klienti/Ekomunikace/EKO_KOMunikace%20012017.pdf>.

Tonda-Obal. [online]. [2017-10-14]. Available at: <<http://www.tonda-obal.cz/>>.

Výsledky třídění a recyklace v systému EKO-KOM za rok 2012 – 2016. [online]. [2017-10-14]. Available at: <<http://www.ekokom.cz/cz/ostatni/o-spolecnosti/media/tiskove-zpravy>>.

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