

POSSIBILITIES AND RESOURCES OF THE EPODRECZNIKI.PL PLATFORM FOR GENERAL EDUCATION USING THE EXAMPLE E-BOOK “WORLD THROUGH THE MAGNIFYING GLASS. CHEMISTRY”

Malgorzata Bartoszewicz, Hanna Gulińska
Faculty of Chemistry, Adam Mickiewicz University
Umultowska89b, 61-614 Poznan, Poland
goskab@amu.edu.pl, gulinska@amu.edu.pl

***Abstract:** The article presents the opportunities and resources of the epodreczniki.pl platform in 2012-2015, 18 free e-books and 2,500 open educational resources have been prepared and made available under the Digital school project, as part of the free Creative Commons license, accessible through the open public education portal for students and teachers.*

Keywords: e-learning, platform, eBooks, chemistry

INTRODUCTION

The number of students and teachers using e-textbooks is growing rapidly. Interest in the portal is more than 100 times higher than in the previous school year, when only sample content was presented (MEN).

On 18 January 2016 the epodreczniki.pl Internet platform already had 37 364 671 page views. This figure represents the number of visits on the e-textbooks site. The data collected by the regional education authority indicate that the e-text books have so far been used by 58 percent of students and 48 percent of teachers in Poland. Polish Community Abroad has also been using them. (Wałęcka 2016).

The www.epodreczniki.pl technological platform is a complex information system consisting of a set of tools and services that provide functions supporting the collection, management, editing and distribution of open educational content compatible with the current core curriculum. The platform provides users in the operational mode, with constant access to the Internet connection, and enables them to download and access selected digital educational content without the need to maintain the Internet connection, using a mobile application. In addition, the

platform provides an intuitive and easy-to-use portal interface, to automatically adjust the user interface and scale the digital content according to the type, screen resolution, multimedia formats and standards supported by various students and teachers tools.

The technology platform also meets the key requirements regarding the security level of software and calculation-network infrastructure. Using the latest cloud technology, the platform provides dynamically scalable number of end users and supports continuous integration with external IT systems implemented in schools, e.g. e-journals and e-learning systems (Kurowski 2015).

E-textbook can be activated and is fully supported by a web browser, on any operating system, e.g. Microsoft Windows, Linux, Mac OS and it does not require any additional software installation by the user. In order to start using the e-textbook simply type in the browser address: www.epodreczniki.pl.

1. HOME PAGE OF EPODRECZNIKI PLATFORM

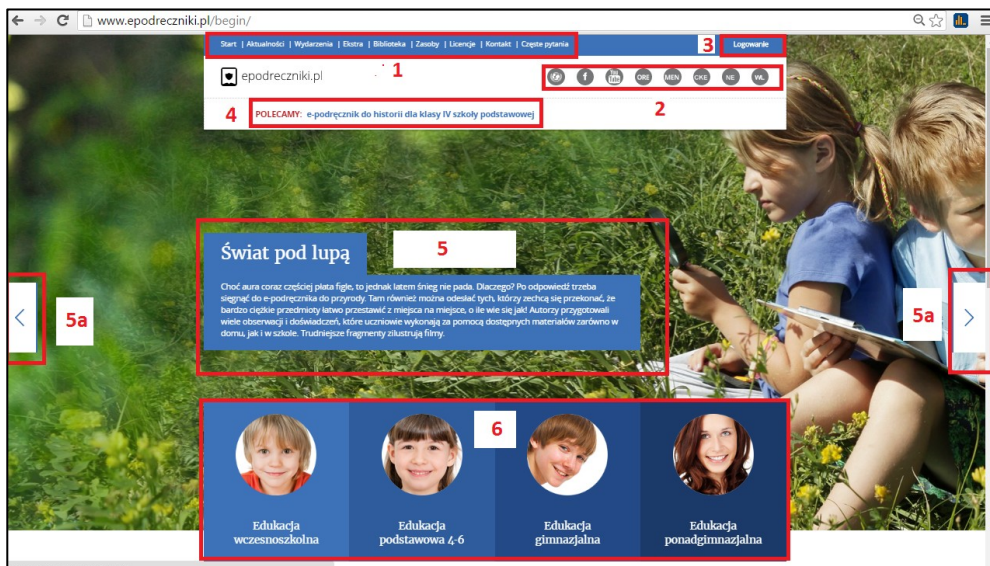


Figure 1. Home page of the epodreczniki.pl platform

(Source: Author's archive)

At the top there is a bar comprising:

- navigation bar allowing the user to navigate to different parts of the portal (1)
- links to websites, among others, ORE, MEN, CKE (2)
- login and registration of a new user (3)

- recommended resources and the content of e-textbook (4)
- excerpts of selected articles from the news section (5), which automatically change from time to time, or can be navigated using the arrow keys on the keyboard or on the sides of the screen (5a)
- tiles with the teaching levels leading to the e- textbook set appropriate for the selected (6).

2. E-BOOKS – CHEMISTRY. WORLD THROUGH THE MAGNIFYING GLASS (E-PODRECZNIKI – CHEMIA. ŚWIAT POD LUPĄ)

2.1. Content

Chemistry is surrounding us everywhere. We come across it not only in the chemical laboratory, but in the bathroom and even in the kitchen. Many phenomena which can be observed everyday cannot be understood without the basic chemistry knowledge. Therefore, it is important to get to know the surrounding phenomena and processes on their macro and micro scale, taking into account the relationship between the properties of substances and their practical significance. Chemistry e-textbook teaches us how to formulate research problems, how to state a hypothesis and verify it. Numerous experiments will help you gain correct research habits and develop problem-solving skills. The proposed research and observations are illustrated with a rich selection of photographs, diagrams, animations and videos to facilitate independent work. Interactive tasks will help you acquire knowledge and skills in an attractive, yet effective way. Some lessons have a "think and act" top bar link. It leads to additional interesting experiments, tasks and questions, which can be resolved using your knowledge, logical thinking, and intuition. "Think and act" tool facilitates the assimilation of these issues with a particular lesson. To revisit it, just select the "read" link on the top bar.

2.2. Home page – chemistry. World through the magnifying glass

After selecting one of the available e-textbooks you can work in two variants:

- a student (1)
- teacher (2).

Additional content (3) beyond the core curriculum for general education is marked in the platform resources with a star icon, and the methodical elements (4) dedicated to the teacher are marked with the biretta icon



Figure 2. Home page of the epodreczniki platform World through the magnifying glass Chemistry class 1. Middle school–left screen menu
(Source: Author's archive)

2.3. Chemistry world through the magnifying glass – user's options

The textbook allows you to choose several options of use:

- *Read* - Select this option to switch to the content of e-textbook (1)
- *Download and print* - this option allows you to generate a PDF file and print the content of the e-textbook (2)
- *QR code* - this option is dedicated to mobile devices and allows you to open an e-manual with a QR code (3)

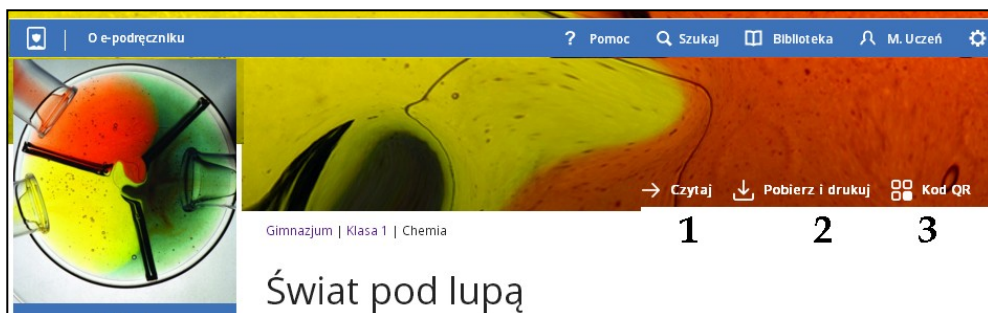



Figure 3. Home page of the epodreczniki platform World through the magnifying glass Chemistry class 1. Middle school–right screen menu
(Source: Author's archive)


Use of the printed version of the e-textbook should be supported by mobile devices in order to use all prepared resources, which is why the videos, animations, and interactive task and tests sides have QR codes to grant access to the relevant page

of the e-textbook to view materials or do exercises and tasks from any mobile device, e.g. notebook or a phone.

Nagranie wideo 4. Etapy eksperymentu na przykładzie badania właściwości wybranych substancji




Film na epodreczniki.pl



Zadanie 1.4.3

Podziel substancje (ocet jest mieszaniną substancji) ze względu na stan skupienia na: stałe, ciekłe i gazowe, wstawiając elementy w właściwe miejsca schematu.

stan skupienia



Aplikacja na epodreczniki.pl




Figure 4. Chemistry textbook in PDF version – screenshot of a video recording with a QR code, interactive task – screenshot of a figure with a QR code

(Source: Author's archive)

2.4. Login – user profile

It is necessary to log in the www.epodreczniki.pl platform to access all available options. To do so, a registration form has to be filled in and sent to the server. The user is successfully registered once the activation link sent to the e-mail address given in the registration process is clicked. The epodreczniki portal may also be accessed via Librus, Office 365, Microsoft account or Google + account.

The image shows a web interface for logging into the 'e-podreczniki' platform. At the top, there is a blue header with the text 'e-podreczniki'. Below it, the main heading reads 'Zaloguj się do swojego konta'. There are two input fields: 'Nazwa użytkownika lub adres e-mail' and 'Hasło'. A 'Logowanie' button is positioned below these fields. Underneath the button, there are three links: 'Nie posiadasz jeszcze konta? [Zarejestruj się](#)', 'Zapomniałeś hasła? [Wyślij nowe](#)', and 'Nie dostałeś e-maila aktywacyjnego? [Wyślij ponownie](#)'. Below the login section, there are four colored buttons for social login: 'Loguj z LIBRUS' (purple), 'Zaloguj przez Office 365' (orange), 'Zaloguj przez konto Microsoft' (blue), and 'Zaloguj przez Google+' (red). The registration section is titled 'Zarejestruj się w e-podrecznikach' and contains five input fields: 'Imię', 'Nazwisko', 'Adres e-mail', 'Hasło', and 'Powtórz hasło'.

Figure 5. Login and registration to the epodreczniki platform
(Source: Author's archive)

Following a successful registration, every user may fill in account information: nick (username), residence, attended school, as well as select an avatar or add their own picture. Account information including first name, last name, gender and account type (student or teacher) are given below.

Anuluj Zapisz

O mnie

NAZWA UŻYTKOWNIKA

SKĄD JESTEM

NAZWA SZKOŁY

BIO

Dane konta edytuj

IMIĘ

NAZWISKO

PLEĆ

Męska

Żeńska

TYP KONTA

Uczniowskie

Nauczycielskie

Figure 6. Epodreczniki – user profile

(Source: Author's archive)

2.5. Lesson modules

Once a specific module (lesson) is selected, the following bookmarks become available from the top bar:

- Core curriculum (1) – once this function is active, it enables the display of information pertaining the presented educational content with regard to the current core curriculum. The description includes the e-textbook title, education stage, and a detailed description of skills as defined by the core curriculum with regard to the currently viewed part of the e-textbook.
- licences (2) – once this function is active, it enables the display of detailed information with regard to license for the presented e-textbook content and its authors.
- licences for objects (3) – enabling/disabling display options for large-format multimedia and interactive objects licence (WOMI) details

- supplementary descriptions (4) – once this function is active, it enables the display of multimedia content descriptions, e.g.: detailed description of what is seen in a video material. This function might be especially useful for the visually impaired.
- contact (5) – contact form which enables all users to submit an error, express an opinion, or submit a new idea with regard to the functionality of the platform.



Figure 7. Home page for lesson 1.2. Everyday chemistry in the e-Book World through the magnifying glass Chemistry class 1
(Source: Author's archive)

Following login, the user may:

- highlight text with colour (1),
- make notes within the e-textbook (2).

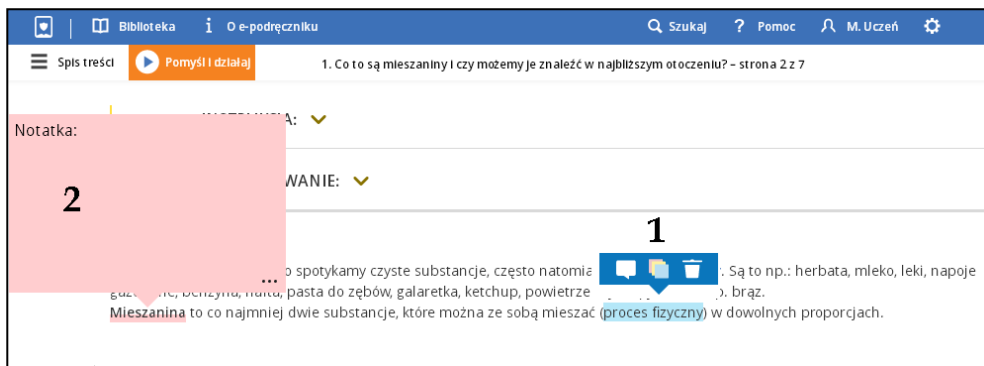


Figure 8. User options: highlighting, making notes
(Source: Author's archive)

2.6. Lesson module structure

2.6.1. What you know and Soon you'll learn

Lessons in natural sciences e-textbooks begin with recurrent elements *What you know* and *Soon you'll learn*.

1. *What you know* – once this bar is selected, it displays information on what the user should know prior to the lesson
2. *Soon you'll learn* – once this bar is selected, it displays information regarding the content of the next section of the e-textbook.

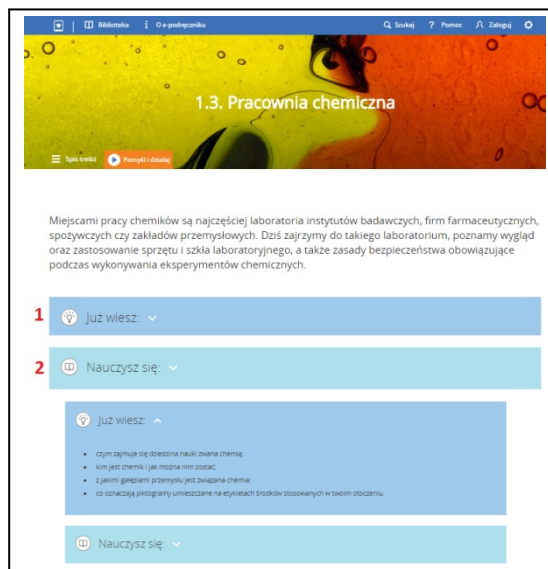


Figure 8. Home page elements for Lesson 1.3. Chemistry lab
(Source: Author's archive)

2.6.2. Text

Aside from the text of the e-textbook, certain significant elements have been highlighted. These are, among others:

- **commands** marked by a hand with index finger outstretched, on a blue circle

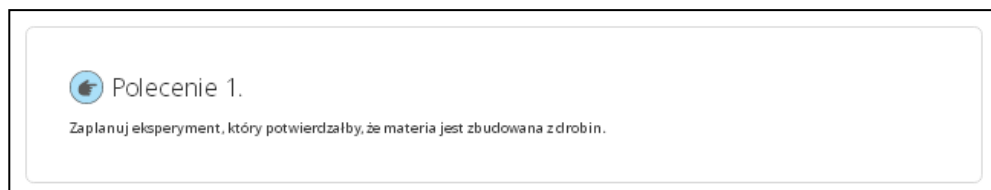


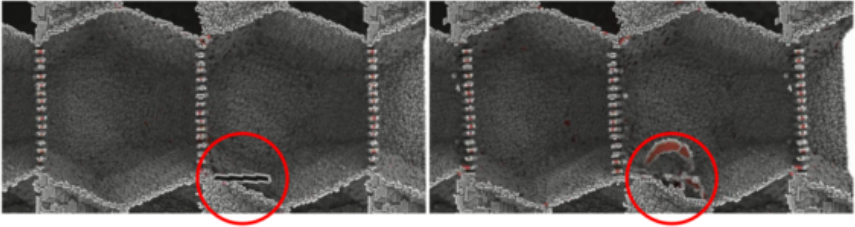
Figure 9. Commands
(Source: Author's archive)

- **trivia** marked by an exclamation mark on a pink circle supplementary information that might interest the user – usually only the first sentence is displayed, while the rest is revealed once selected.

! Ciekawostka ^

Samonaprawiający się metal

Naukowcom z *Massachusetts Institute of Technology* udało się odkryć materiał, który przez swe właściwości przypomina słynny samonaprawiający się metal T-1000, znany z filmu *Terminator* w reżyserii (1984 r.) Jamesa Camerona (czyt. dzejmsa kamerona). Odkrycia tego dokonali prof. Michael Demkowicz (czyt. majkel dimkowicz) i jego student Guoqiang Xu (czyt. glockjang zu). Prowadząc badania, zauważyli, że pęknięty kawałek stopu niklu pod wpływem rozciągania scala się zamiast ulegać dalszemu uszkodzeniu. Początkowo uważali obserwowane zjawisko za błąd laboratoryjny, jednak kolejne testy wykazały, iż badany przez nich stop potrafi sam się naprawić.



komputerowa symulacja zjawiska „samoleczenia”

Figure 10. Trivia

(Source: Author's archive)

- **Learn more** – content exceeding the core curriculum

Dowiedz się więcej

[Guziki Napoleona – jak 17 cząsteczek zmieniło historię](#)

Figure 11. Learn more

(Source: Author's archive)

2.6.3. Experiments

Experiment descriptions are marked by a test tube on a yellow circle and yellow bars. The descriptions include:

- warnings regarding the necessity of using safety goggles, gloves, or adult supervision,
- hypotheses – once students suggest a hypothesis – once selected, one or several hypotheses suggested by the authors is displayed to choose from
- what is necessary – once selected, if students do not design the experiment, displays the equipment and the reagents necessary to conduct the experiment
- instructions – detailed information on how to conduct the *experiment*
- summary – observations description and experiment summary, optionally: pictures or video of the process.

2.2. Dyfuzja w cieczach



Doświadczenie 5.

Badanie zachowania się barwnika w cieczy

PROBLEM BADAWCZY:

Czy dyfuzja zachodzi w cieczach?

HIPOTEZA: ▾

CO BĘDZIE POTRZEBNE: ▾

INSTRUKCJA: ▾

PODSUMOWANIE:

2.2. Dyfuzja w cieczach



Doświadczenie 5.

Badanie zachowania się barwnika w cieczy

PROBLEM BADAWCZY:

Czy dyfuzja zachodzi w cieczach?

HIPOTEZA: ▲

Wybierz jedną z przedstawionych hipotez, a następnie zweryfikuj ją.

Dyfuzja nie zachodzi w cieczach.

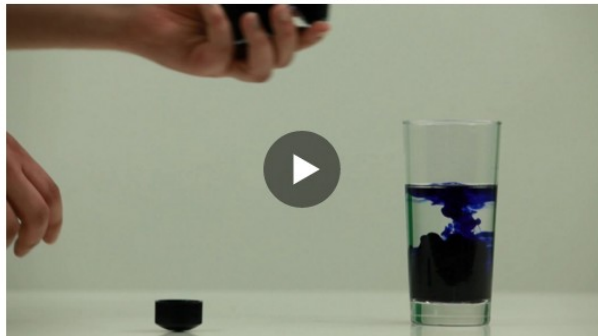
CO BĘDZIE POTRZEBNE: ▾

INSTRUKCJA: ▾

PODSUMOWANIE:

Po dodaniu atramentu do wody powstają smugi, a po chwili zawartość szklki zabarwia się na niebiesko. Drobinę barwnika (cieczy) i wody samorzutnie się wymieszają. Zaszło zjawisko dyfuzji.

NAGRANIE WIDEO 4. DYFUZJA

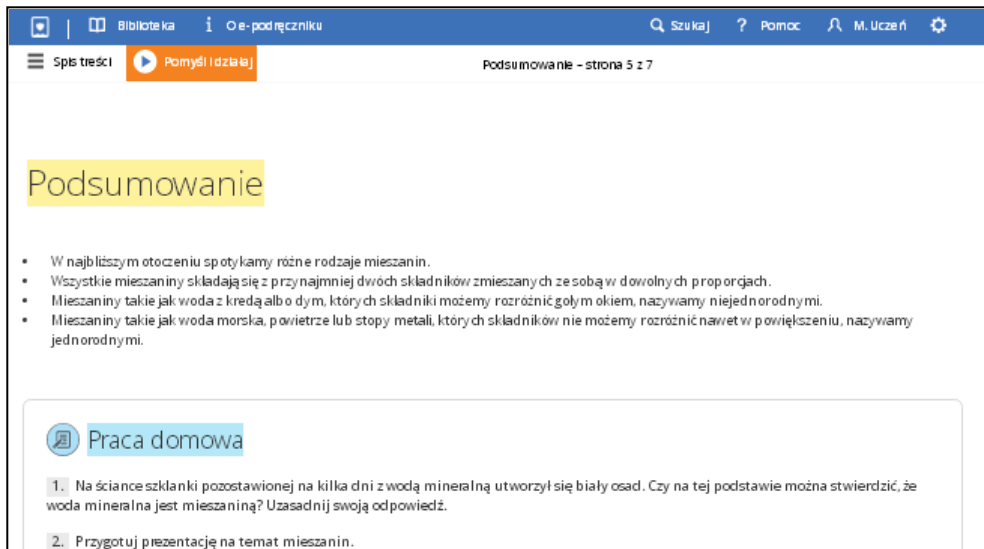


Dyfuzja w gazach i cieczach

Figure 12. Experiment
(Source: Author's archive)

2.6.4. Summary and homework

Every lesson module ends with a short summary: a repetition of the most important information from the lesson and a suggestion for homework. Homework marked with a star exceeds the core curriculum.



The screenshot shows a digital learning interface. At the top, there is a navigation bar with a search icon, a question mark, and a user profile icon labeled 'M. Uczeń'. Below the navigation bar, there is a header area with a menu icon, 'Spis treści', and a highlighted 'Pomyśl i działaj' button. The main content area is titled 'Podsumowanie' (Summary) and contains a list of bullet points. Below the summary, there is a section titled 'Praca domowa' (Homework) with two numbered tasks.

Podsumowanie

- W najbliższym otoczeniu spotykamy różne rodzaje mieszanin.
- Wszystkie mieszaniny składają się z przynajmniej dwóch składników zmieszanych ze sobą w dowolnych proporcjach.
- Mieszaniny takie jak woda z kredą albo dym, których składniki możemy rozróżnić gołym okiem, nazywamy niejednorodnymi.
- Mieszaniny takie jak woda morska, powietrze lub stopy metali, których składników nie możemy rozróżnić nawet w powiększeniu, nazywamy jednorodnymi.

Praca domowa

1. Na szklance szklanki pozostawionej na kilka dni z wodą mineralną utworzył się biały osad. Czy na tej podstawie można stwierdzić, że woda mineralna jest mieszaniną? Uzasadnij swoją odpowiedź.
2. Przygotuj prezentację na temat mieszanin.


Figure 13. Summary and homework

(Source: Author's archive)











2.6.5. Tasks

There are numerous types of tasks which facilitate consolidation of information and encourage students to work. These are, among others:

- single choice
- multiple choice
- fill in the blanks
- true/false
- arrange in pairs
- arrange in order
- crossword puzzle

 Zadanie 4.

Połącz portrety chemików i nazwy skonstruowanych przez tych uczonych sprzętów.

	 Louis Pasteur
	 Julius Richard Petri
	 Richard Erlenmeyer
	 Ernst Buchner
	 Robert Bunsen

[Sprawdź](#)

Figure 14. Arrange in pairs tasks

(Source: Author's archive)

2.4. Information saved in user profile

In the user profile in the upper menu information is divided into four categories:

- **My shelf** – contains recently selected e-textbooks used by the user

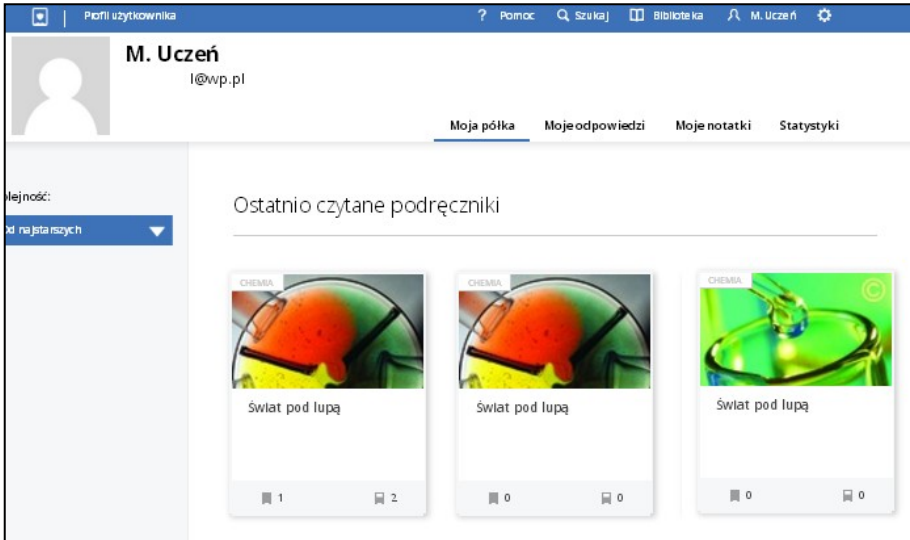


Figure 15. User profile – My shelf

(Source: Author's archive)

- **My answers** – contains the users' answers to open question
- **Notes** – contains both additional information saved as notes and the content highlighted with colours which may be accessed by clicking the *READ* button (the button opens the specific page of the e-textbook where the note was added)

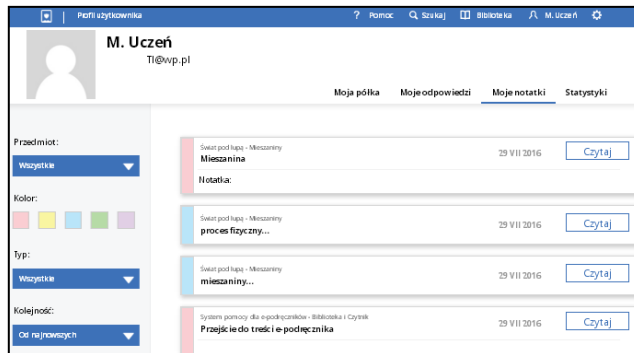


Figure 16. User profile - Notes

(Source: Author's archive)

- **Statistics** – contains the number of notes and the date they were made.

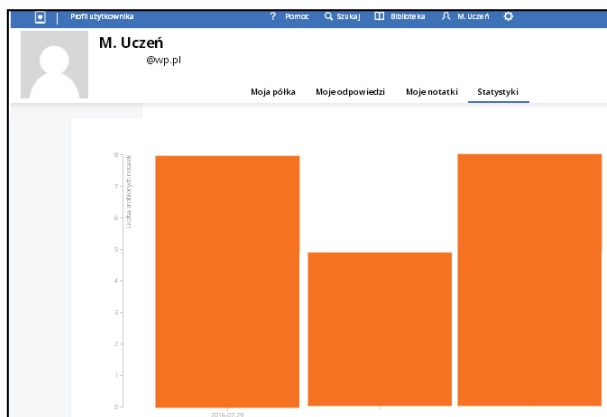


Figure 17. User profile - Notes
(Source: Author's archive)

CONCLUSION

The epodreczniki.pl platform is the largest collection of open educational resources in Poland. These resources may be accessed at any given time and place, both in Poland and abroad, via computers, laptops, mobile devices: tablets and phones, on all operating systems and Internet browsers.

The epodreczniki.pl platform assists an innovative teaching method, while the published multimedia such as: videos, animations and interactive tasks may be an attractive repository of content for both students and teachers.

REFERENCE

- Bartoszewicz M., Karawajczyk B. 2015: World through the magnifying glass Chemistry class 2. /Chemia. Świat pod lupą, klasa 2 gimnazjum/. ISBN 978-83-64915-67-3
- Bartoszewicz M., Karawajczyk B., Kamińska-Ostęp A. 2015: World through the magnifying glass Chemistry class 1 /Chemia. Świat pod lupą, klasa 1 gimnazjum/. ISBN 978-83-64915-66-6
- Bartoszewicz M., Szczepaniec H., Wojewoda A. 2015: World through the magnifying glass Chemistry class 2. /Chemia. Świat pod lupą, klasa 3 gimnazjum/. ISBN 978-83-64915-68-0
- Kurowski K. 2015: E-podręczniki założenia technologiczne. [On-line] at http://www.man.poznan.pl/files/e_podreczniki_zalozenia_tehnologiczne_1_1.pdf (accessed 24 July 2016)

MEN E-podręczniki coraz popularniejsze 2015 [On-line] at <https://men.gov.pl/ministerstwo/informacje/e-podreczniki-coraz-popularniejsze.html> (accessed 24 July 2016)

Wałęcka B. 2016: E-podręczniki do kształcenia ogólnego 2012 – 2015 PO KL, Priorytet III, Działanie 3.3, Poddziałanie 3.3.3. [On-line] at [https://www.ore.edu.pl/attachments/article/6692/E - podreczniki_do_ksztalcenia_ogolnego_29.01.2016.pdf](https://www.ore.edu.pl/attachments/article/6692/E_-_podreczniki_do_ksztalcenia_ogolnego_29.01.2016.pdf) (accessed 24 July 2016)