DISTANCE LEARNING IN EDUCATION – HOW TO DESIGN A FRONTER CHEMISTRY COURSE

Małgorzata Bartoszewicz, Grzegorz Krzyśko
Adam Mickiewicz University, Faculty of Chemistry, Department of Chemical Education, Poznań, Poland
goskab@amu.edu.pl, krzysko@amu.du.pl

Abstract: *Many educational institutions introduce platforms as a tool for learning and perfecting the educational processes. On the Polish market, Fronter platform has become popular owing to 'Dolnośląska e-szkoła' ['Lower-Silesia e-school']. Pearson undertook development of Fronter platform and constructed exemplary learning rooms in accordance with the Polish core curriculum. The paper presents the developed teaching materials for the course on the Fronter platform.*

Keywords: platform, Fronter, chemistry, education, LMS

INTRODUCTION

Fronter was created in 1998 in Norway by Roger Larsen and Bjarne Hadlandplatform as an educational LMS (Learning Management System). From 2008 to 2015 the company belonged to Pearson Group and in 2015 it was acquired by a Norwegian competitor, It's learning. Fronter is a virtual learning environment that can be used depending on your needs. Fronter supports the preparation, conduct and analysis of lessons. It also provides tools that allow for documenting the results of teaching and communication between school, teachers, students and parents.

Fronter is designed to support good teaching by creating educational platform that is user-friendly for teachers. It is a website facilitating teachers to get children involved in learning, by supporting their self-active stance in this regard (Figure 1).

Working environment at Fronter takes the structure of a virtual building, consisting of corridors (is the unit used to group the rooms in which we define the right to create and supervise the halls on the platform) and rooms (is the basic unit in Fronter, in which the teacher delivers or carries out the subject/ course/ project or exercise, etc.) equipped with educational tools. Using the right corridors, lecturers and students can access rooms designed for them (usually corresponding to specific subjects). A powerful tool for viewing statistics allows the creator of the course to

check the activity of its users (persons with authorised to log into Fronter and to access the groups (and rooms)), (number of visits in the hall, the execution time of each course modules).
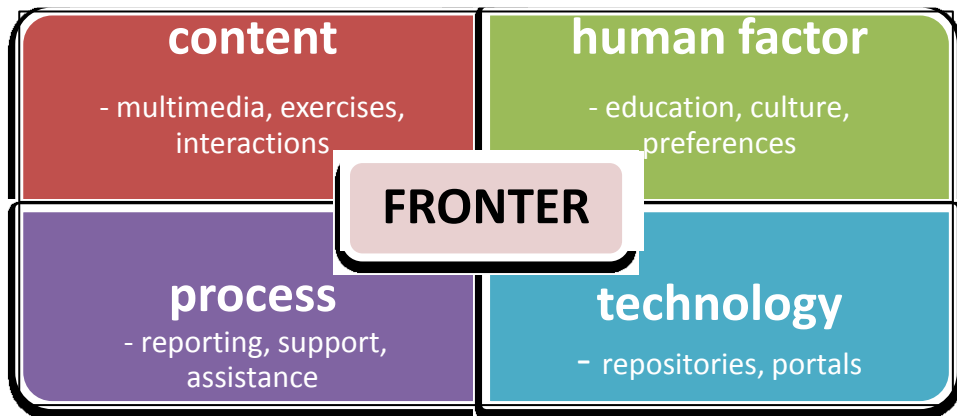

Figure 1. Fronter – learning environment.
Source: Own work based on Fronter, 2016

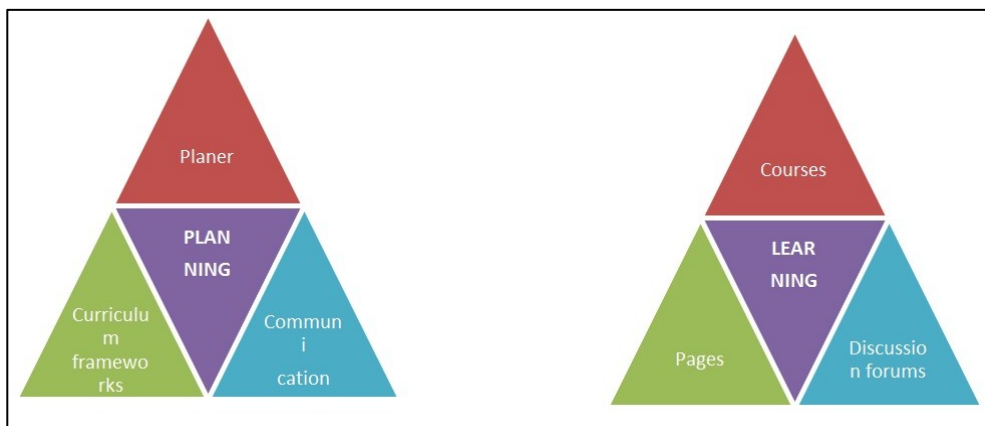When designing a course eLearning platform should begin planning (Figure 2).

Figure 2. Fronter – planning and learning.

Source: Own work based on Fronter, 2016

Pages are a practical tool in Fronter, which allows to create entire lessons, develop individual concepts or organize items in the network.

Finally, let us mention the unconventional tool in the context of learning: discussion forums. On our platform you will find five types of forums, ranging from a simple conversation or multithreaded discussion through the debate with the positions and moderated discussion, and ending with "brainstorming". In practice, it is a tool to encourage students to work together, to exchange views, to be

supported by a teacher or even to creatively master or develop lesson topic (Figure 2-3).
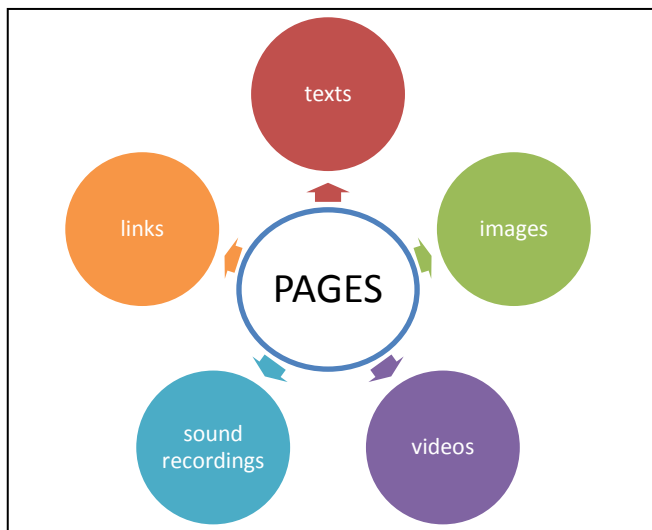
Figure 3. Fronter – pages.
Source: Own work based on Fronter, 2016

Evaluation of the student's work is not only important for the teacher and for the official "statistics", but also for themselves and for their parents - because next to the possibility of giving grades, we develop functions to facilitate the exchange of views on the work of the child or his/ her own self-assessment (Figure 4).
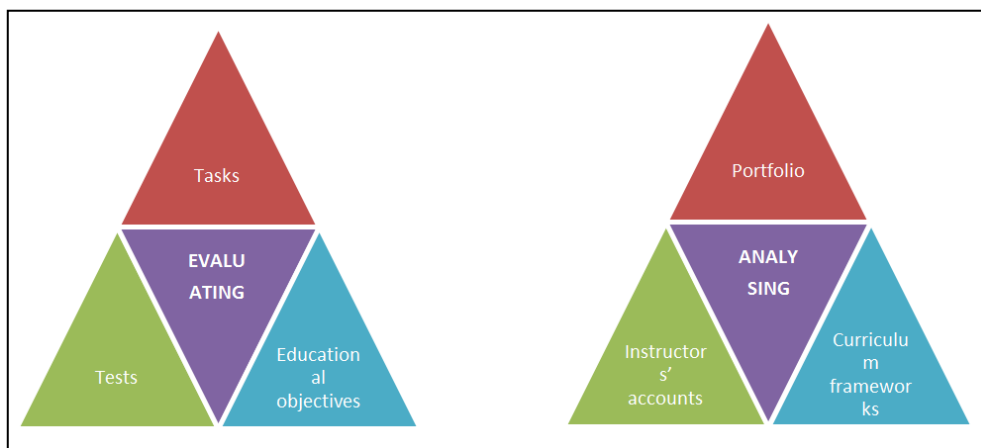
Figure 4. Fronter – evaluating and analysing.
Source: Own work based on Fronter, 2016

The final interesting example of "evaluation on Fronter" can be the *objectives of education*. They can be imported in the form of a core curriculum for Fronter, but they also can be defined at the level of the subject and the class, or individually for

each student. Then we can assign them to individual resources, tasks or tests on Fronter and evaluate the progress against such objectives for each student.

1. FRONTER PLATFORM – SUBJECT ROOMS

Free patterns of subject rooms, which can be used by teachers in any way in the work with students. This project was initiated, conducted and supervised by Pearson, and the content development process was managed by a team of dedicated and creative teachers. This way, 17 template rooms on several different educational levels were created, each of them with the ability to be downloaded to Fronter (Table 1-3).

Table 1.

Fronter - template rooms for Primary school (classes 4-6)

Room	Course
1	English (part 1)
2	English (part 2)
3	English (part 3)

Table 2.

Fronter - template rooms for Secondary school (classes 1-3)

Room	**Course**
4	Chemistry
5	Physics
6	Biology
7	Computer science
8	Mathematics
9	Polish language
10	History

Figure 5. Home page of Chemistry Room dedicated to secondary school students.
Source: Own work based on Fronter, 2016

Chemistry subjects on Fronter for secondary schools:

- In the chemical laboratory

- Mixtures and their separation

- Metals and their alloys

- Periodic table of elements

- Oxygen

- Water

- Hydroxides

- Acids

- Salts

- Hydrocarbons (Figure 5)

Table 3.

Fronter - template rooms for Post-secondary schools (classes 1-3)

Room	Course
11	Chemistry
12	Physics
13	Biology

14	Computer science
15	Mathematics
16	Polish language
17	History

Figure 6. Home page of Chemistry Room dedicated to post-secondary school students.

Source: Own work based on Fronter, 2016

Chemistry subjects on Fronter for Post-secondary schools:

- Glass
- Soil
- Petrochemistry
- Fermentation
- Food
- Beverages
- Medicines
- Addictive substances
- Cleaning supplies
- Chemical packaging (Figure 6)

2. RECOMMENDED FRONTER PLATFORM CHEMISTRY MATERIALS FOR STUDENTS OF SECONDARY AND POST-SECONDARY SCHOOLS

The presented recommendations for chemistry lessons on Fronter platform were prepared based on e-textbook (www.epodreczniki.pl).

Topics were selected from the available contents (in accordance with the chemistry core curriculum for post-secondary schools – educational stages III and IV).

The following was recommended for each of the ten selected units:

- experiment that students can independently perform at home – *Home chemical laboratory* - and then present the results on the platform in the form of photographs or a video of the course of such experiment. This work can be done as an introduction to a lesson - in the case of pre-teaching ("reverse class" work method) or traditionally after the lesson;

- multimedia content, the purpose of which is only to supplement the traditional method of teaching and the experiments carried out during lessons. At any time, the teacher can enrich lessons with multimedia content: educational videos, photo and image galleries, illustrations, simulations, diagrams, tables and presentations. They not only provide educational material, but above all become an inspiration for students and teachers to create new resources.

- tasks for independent work of students.

An important argument in favour of recommending work with Fronter platform is the fact that it activates all students whose actions can be designed and monitored by a teacher who is able to diagnose and report student progress on an ongoing basis.

Figure 7. Home page of page dedicated to secondary school students.
Source: Own work based on Fronter, 2016

Figure 8. Home page of page dedicated to post-secondary school students.
Source: Own work based on Fronter, 2016

Each unit includes:
- experiment to be carried out independently – home chemical laboratory (fig. 9)

Figure 9. Home chemical laboratory – experiment to be carried out independently at home.
Source: Own work based on Fronter, 2016

Student homework can be evaluated using *task* tool by way of keying in notes and grades for each student's work. These works may be in the form of e.g. *Word* file - which is convenient because of the possibility of checking and adding online notes by the teacher. But it can be also a document on the platform or sound recording. A student can also add the self-assessment of the completed task.

- Educational materials, including:
  - references to lessons in e-textbook,
  - films,
  - animations,
  - presentations

Figure 10. Contents of e-textbook and other Scholaris type portals for post-secondary school students.
Source: Own work based on Fronter, 2016

- Practice materials, including:
  - interactive tests,
  - tasks,
  - exercises,
  - exemplary forum discussion topics;

Figure 11. Learning Apps exercises for secondary school students.
Source: Own work based on Fronter, 2016
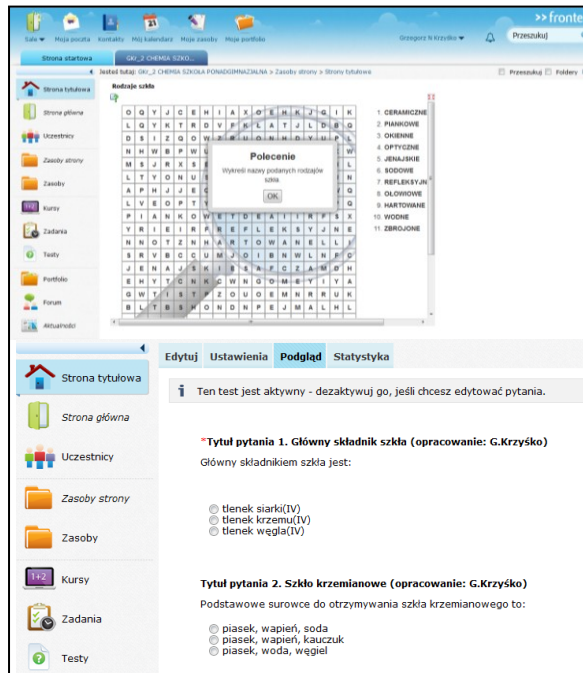
Figure 12. Learning Apps exercises and exemplary test for post-secondary school students.
Source: Own work based on Fronter, 2016

Tests include several different types of questions, both closed and open. In both cases - although it will be most convenient with the closed questions – we can define the correct answer and ask the system for automatic calculation of the result, as well as see detailed statistics of the test.

Tests include questions of the following type:

- single selection

- scroll-down list

- yes/ no

- multiple choice

- brief answer

- elaborated answer

- match the answer

Tytuł pytania 1. Pojedynczy wybór	Tytuł pytania 2. Dopasuj odpowiedzi

Figure 13. Exemplary test for post-secondary school students.
Source: Own work based on Fronter, 2016

3. FRONTER PLATFORM FOR HIGHER EDUCATION – CASE STUDIES

Most of the Norwegian academic institutions have been involved in the development and deployment of Learning Management Systems (LMS) such as Fronter, Blackboard Moodle, and WebCT. The dominant LMS-system is Fronter, an online learning platform. In this chapter we present the benefits and learning capabilities from the studies of Fronter usage at two universities in Norway: Buskerud College University (HiBu) and university of Agder (UiA) (Figure 14,15).
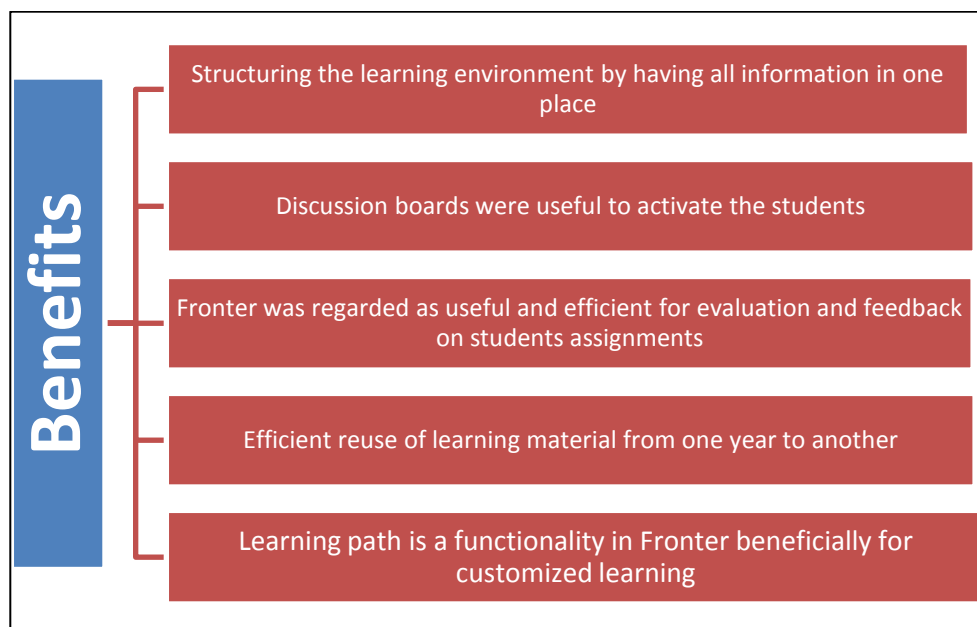

Figure 14. Fronter – benefits.
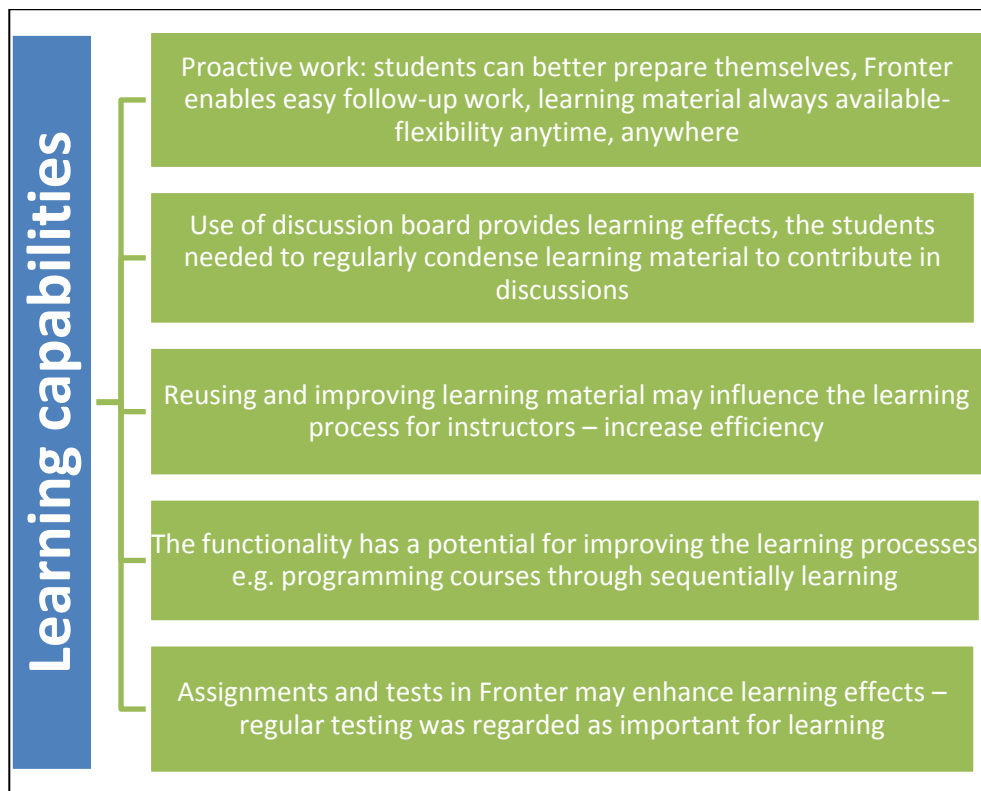*Source: Own work based on Bechina, Hustad, 2010*

Learning capabilities

Proactive work: students can better prepare themselves, Fronter enables easy follow-up work, learning material always available-flexibility anytime, anywhere

Use of discussion board provides learning effects, the students needed to regularly condense learning material to contribute in discussions

Reusing and improving learning material may influence the learning process for instructors – increase efficiency

The functionality has a potential for improving the learning processes e.g. programming courses through sequentially learning

Assignments and tests in Fronter may enhance learning effects – regular testing was regarded as important for learning

Figure 15. Fronter – learning capabilities.
Source: Own work based on Bechina, Hustad, 2010

CONCLUSION

Fronter platform have been adopted by several educational institutions in order to cope with stringent requirements for faster and more flexible education and higher pedagogical quality. In Poland, Fronter platform creates tremendous opportunities for supporting, preparing, conducting and analyzing lessons. It also provides tools that allow documenting the results of teaching and communication between the school, teachers, students and parents at each stage of education. This paper has discussed the factors hampering or fostering the learning capability by investigating the deployment and the use of a learning management system Fronter that is used by two Norwegian educational institutions participating to the evaluation. In Poland, the Fronter platform can support teachers in creating new, original courses and chemistry lessons that develop skill sets using the technology for distance learning.

REFERENCES

Bartoszewicz M., 2015: Chemia – gimnazjum, [on-line] at https://fronter.com/pce (accessed 24 July 2016)

Bechina A.A., Hustad E., 2010: *A Framework to Understand Enablers and Inhibitors in a Learning Management System: Experiences from Fronter,* Special Issue of the International Journal of the Computer, the Internet and Management, Vol.18 No. SP1, http://www.ijcim.th.org/SpecialEditions/v18nSP1/v18nSP1.htm (accessed 24 July 2016)

Fronter 2016 [on-line] at https://fronter.com/pce (accessed 24 July 2016)

Fronter[on-line] at https://pol.fronter.com/ (accessed 24 July 2016)

Fronter [on-line] at www.fronter.com (accessed 24 July 2016)

Kopciał P., Plebańska M., 2013: *Platforma Fronter jako system zarządzania wiedzą* e-mentor, 3 (50), ISSN 1731-6758

Krzyśko G., 2015: Chemia – szkoła ponadgimnazjalna, [on-line] at https://fronter.com/pce (accessed 24 July 2016)