An assignment-based e-learning course on the use of KeyToNature e-keys

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Abstract — This article conceptualises a common approach to train teachers and university lecturers in integrating the use of e-keys produced by the EU-funded project KeyToNature in the design, development, and delivery of e-learning modules within their school practice. The approach is based on setting and administering learning scenarios developed around real practice assignments that have at their core the identification of organisms and end up with the creation of meaningful biodiversity information products, rooted in concrete environmental contexts. The learning products may even include the creation of specific sub-keys from the initially used e-keys. The paper briefly describes the application and the real testing of the approach in an experimental teacher training course conducted in Bulgaria within the KeyToNature project.

Index Terms — active learning, assignment, biodiversity, e-keys, e-learning course, identification tools, learning design, teacher training.

1 Introduction

The KeyToNature project shares a big variety of electronic identification tools and instruments for their handling in different modes and on different hardware and software platforms. Using and integrating these tools within different learning scenarios and contexts is a concrete task of the teachers. Some or all stages of the applied learning scenarios and the resulting final products are often not digitised, which has obvious negative effects. Another consideration related to the digitisation is the use of different e-tools not pertaining to a united system. This complicates the organisation of learning, leads to efficiency issues, and may lower the re-usage potential of the achieved results.

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2 THE USE OF A LEARNING MANAGEMENT SYSTEM AS A LEARNING PLATFORM FOR THE CREATION OF EFFECTIVE SCENARIOS

The identification process is “a means to an end”, not “the end” itself. An implication about learning by using identification tools is that the identification needs to be integrated in wider contexts of meaningful learning scenarios.

Designing good scenarios requires good pedagogical skills, knowledge of the subject matter, adequate technological skills, and the availability of technological facilities for implementation. A scenario should also reflect the active learning and motivational findings researched and described by learning and motivation theories, e.g. [1], [2], and [3].

The identification process is per se an active learning. The keys themselves become more complex, integrating add-ons that facilitate re-usage and complex learning activities.

In order to maximise the positive effects of the e-keys, one can use the support of e-learning platforms. A newer and richer concept about the use of e-learning platforms is that activities and not the content are in the core of an e-learning platform.

This concept directly corresponds both to the active learning methods and to the creation of contexts which exploit positive motivation factors.

Another feature of all widespread e-learning platforms is the inter-linkage of all resources, activities, communication, organisation, and assessment tools within the platform. This enables more complex learning events and activities to be organised and conducted as a “learning whole”.

The authors have designed an experimental curriculum for teacher training to develop and use e-learning modules for students having as their core activity identification processes based on the use of e-keys. The Moodle learning management system (e-learning platform) was chosen for the concrete course design.

The main teacher training target group consisted of biology teachers that have average ICT-skills, are able to work with e-keys, but are not trained to work with any e-learning platform.

We have chosen to use only a few, but very important and powerful e-tools of the platform (resources and activities) that can add real value in the implementation of meaningful learning scenarios for the use of e-keys.

3 THE TEACHER TRAINING CURRICULUM – THE COURSE STUDY PROGRAMME

The teacher training course curriculum consisted of two main parts: the first part puts the teacher in a student role to alter her/his viewpoint in experiencing learning. The second part trains teachers on how to construct and conduct an e-Learning course.

The first part is based on Assignment 1:

“As a trainee in the first part of this course you - preferably in a team of 2 to 3 persons - should:
• Produce an electronic “Profile of a tree”, following a predefined structure, by using the information previously entered for that purpose by your team in the e-learning platform.
• Publish and present in an attractive and appealing way your electronic “Profile of a tree” by using the tools and instruments of the e-learning platform.
• Edit and complement the identification key with collected and/or personally developed material.

This assignment consists of activities in two different environments: in the field and in the classroom.

Activities in the filed include tree identification with the e-key and observation of the characteristics that are used to identify it. Activities in the classroom include working on the structure of a tree profile and editing a e-key. The tree profile describes the following information:

1. Name of the tree: Latin, Bulgarian; 2. Classification (levels of detail: on learner’s own judgment); 3. Photos (minimum 3 taken by the learner, and 2 from the e-key) - they should present a natural view of tree, leaf - margin, upper and lower surface, flower and fruit; 4. Description (following a worksheet); 5. Importance for mankind; 6. Do you know that… (interesting facts/information about the species); 7. Additional information – personal comments (personal opinion); 8. References and resources used.

The second part is based on the Assignment: “Develop your own e-module on identification for your specific case (subject, grade, and students)”. The curriculum, structured in chapters and activities, can be reviewed in the folder “Materials” of [4].

4 THE COURSE

An experimental course was conducted on July 8th and 9th 2010 at the Department of Information and In-Service Teacher Training of the Sofia University. The Department campus includes a small park in front of the buildings where the field work was carried out.

Twelve participants took part in the course – 8 Biology school teachers, 2 Biology trainers from a training centre, 1 university lecturer in Botany, 1 Science expert from a Regional Educational Inspectorate. The course was held by the authors of this article.

The entry level of the course participants with respect to their ICT knowledge and skills was as follows:

1. All participants were able to work with the e-keys of KeyToNature;
2. No participant worked previously with the Open Key Editor;
3. All participants had an “average” skill level for working with ICT, namely: Windows, e-mail, Internet, MS Word, MS PowerPoint;
4. Only one participant worked previously with an e-learning platform - Moodle

The Open Key Editor is a software developed within KeyToNature. It permits to edit already existing keys or sub-keys extracted from them, by changing the text, adding images, adding new species, changing the structure of the e-key, and even creating new e-keys from scratch.
The aim of the course was to test the developed curriculum and to receive feedback on effectiveness and efficiency of the course.

The twelve participants were grouped into 5 permanent groups; the work was conducted by each group as a whole.

In broad terms, the course time frame was set in the following way:

1. First half of the first day – work in the field: trees' identification, gathering additional information (taking photos, observing the environment, taking notes), and filling-in the “terrain” part of Worksheet 1 (profile of the tree);
2. Second half of the first day – work as an user of the Moodle platform and of the e-learning course: collecting the requested additional information from Internet and from the e-key, entering the collected data in the interactive geographic map of Moodle and in the prepared course multimedia database; working with the Open Key Editor and developing a sub-key.

   Homework: development of a short PowerPoint presentation about the profile of the identified tree.
3. First half of the second day – Design of e-learning modules in Moodle: e-Course setting, student enrollment, work with selected resources (labels, folders, hyperlinked text, access to different study materials); developing an e-course programme/syllabus.
4. Second half of the second day – work with selected activities in Moodle: setting up interactive geographic maps, developing a database, developing an assignment, setting up a glossary. Starting the design of each trainee’s own e-learning module.

   Homework: Full design and preparation of the e-learning module, ready for use by students.

It was very encouraging to see that all groups managed to perform well the required activities and to develop the products envisaged in the course.

The results of the work of each group from the course can be seen in the Bikam’s KeyToNature Moodle platform [4]. Photos from the teacher training course can be seen at the web-address provided in [5].

5 Evaluation of the Teacher Training Course

5.1 COLLES - Constructivist On-Line Learning Environment Survey

We used COLLES [6] as one of the two survey instruments to evaluate the course. COLLES comprises 24 statements grouped into six scales. The six groups are Relevance, Reflection, Interactivity, Tutor Support, Peer Support, and Interpretation. The concrete survey questions grouped by categories can be reviewed at [7]. Graph charts with all survey results can be viewed at [4].

Important feedback from the teachers’ answers was that:

1. In terms of the question categories the course scores higher than the middle value of occurrence in the scale ("Sometimes").
2. The highest, almost maximal, score in the survey is assigned to the course relevance category. According to J. Cole and H. Foster [8], p. 192, the Relevance
category is the most important with respect to the assessment of the course design.

5.2 Free-Form Opinion Survey

In the second, free-form opinion survey, participants were asked about the strong and weak sides of the course and its methodology.

The articulated strong sides were:
1. The power of the e-learning platform to offer electronic means that unite into a learning whole and serve the overall learning process.
2. The power of attractivity to students of the final products created within (or with the support of) the e-learning platform.

The most often mentioned weak sides were related to:
1. The eventual lack of sufficient hardware for the implementation of e-learning scenarios - laptops for field work, the availability of computer labs.
2. About the course delivery – the very short duration of the course – only 2 days. The participants didn’t know that the course was intentionally compressed to last only two days in order to test the possibility of achieving the main goals in such a short training time.

6 Summary and Conclusions

The e-course proved to be a success, especially having in mind the intentionally imposed extreme constraints (unskilled trainees to work with e-platform, and short duration of the course).

The use of an activity-based e-learning platform as Moodle maximises the learners' motivation, effectiveness, and efficiency of both students' learning and teacher preparation. The teachers have to be trained accordingly, preferably initially through a simple, not overwhelming training that utilises only some, yet powerful, learning activities in the e-learning platform.

Two other important implications are that our curriculum & learning design approach proved to be:
1. “e-key independent”. It can be used with any interactive identification key, irrespective of the organisms it identifies.
2. “e-learning platform independent”, providing that the corresponding platform has a set of functionalities/instruments that can realise appropriate learning activities.

Furthermore, the opportunity to mix/blend the course could be considered, to organise its delivery partly face-to-face, partly by distance.

The course was prepared in levels, in a modular way. This article has discussed only the first, initial level of the curriculum, which was also tested with teachers in the course. The next two course levels are meant to update and upgrade the knowledge and skills of the teachers, to fully employ the functionalities and instruments of the platform.

As a next step in learning design and delivery inquiries, it will be interesting to test the delivery of an entirely distance-online course, following the outlined curriculum.
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