

Involving students in managing their own learning

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Summary

The primary function of universities is to equip students with the knowledge and skills they need to prosper throughout their professional career. Today, to be successful, students will need to continually enhance their knowledge and skills, in order to address immediate problems and to participate in a process of continuing vocational and professional development. Involving students in managing their own learning in a variety of contexts, such as building their own personal learning environments (PLEs) according to their goals and interests, is one way of developing the skills and motivation that will serve as tools for lifelong learning beyond their formal education.

This paper tracks the process of PLE building by students studying for their bachelor degree in Computer Science and Electronics. It looks at their learning experiences of using the Netvibes home page and discusses the advantages of using Netvibes in the context of instructional strategies and technical solution forming. In addition, it proposes and implements a model for effective communication between the university Learning Management System (LMS) and PLEs. Finally, students' opinions about the learning done in their PLE are examined through inquiry and discussed. Most students consider PLE building to be a very useful process for learning and personal development.

Keywords: personal learning environment, Netvibes, web 2.0, learning experiences

Introduction

The primary function of the universities is to equip students with the knowledge and skills they need to prosper throughout their future professional career. The situations and problems in real life are in many cases more complex than those studied and practiced during their education. Also, every student has an individual approach to the concrete situation harnessing preferred learning and researching methods, using favorite tools, applications and technologies.

Therefore, our students will need to continually enhance their knowledge and skills, in order to address immediate problems and to participate in a process of continuing vocational and professional development. The new educational imperative is to involve students to manage their own learning in a variety of contexts building their own personal learning environments (PLE) according to recent goals and interests.

One PLE has to provide students with the tools needed for the establishment of self-organized learning, for controlling, management and updating of their learning process supported from technologies and possibilities for social interactions.

There are a variety of solutions for PLE building. Several of them are not specially designed for educational purposes such as start pages, feed readers, weblogs, wikis and so on, but that are successfully used for learning (Report, 2008; Williams et al., 2004; Redecker et al., 2009). Others are precisely developed to facilitate a different degree of personalized learning like PLEF (Chatti, 2009), Elgg (Campbell, 2005), Collogia (Collogia, 2010), PLEX (PLEX, 2010).

PLE platforms differ on the principle of constructing and utilizing the possibilities for personalization of knowledge resources, learning activities and the opportunity for flexible management and extension of used technical tools.

The functional characteristics include suitable graphical user interface, content presentation layouts and templates, drag and drop function, functions for searching, embedding, socialization, sharing, communication, collaboration, online/offline usage, level of control on proposed learning resources.

From the technical aspect PLEs can be classified in several groups according to architecture solution, used device platform, and applied standards. The realized PLEs are with a distributed or integrated architecture, designed for laptop/PC or PDA devices, compatible (or not) with standards for data, students' profiles, learning activities, widgets integration.

A start page Netvibes is in the focus of this paper and it is chosen as a platform for students' PLE building after detailed exploration and analysis of Web 2.0 solutions (Ivanova, 2009). It is with distributed architecture allowing for a combination of user-selected tools and networks on one administration interface. Also, the distributed architecture gives possibilities for creating a relationship between students' PLEs and the university Learning Management System (LMS).

Nowadays, the distributed form of learning is the preferred instructional model that allows educators, students, and content to be located in different, non-centralized locations so that instruction and learning occur independently of time and place. In the context of PLE building it is the most complex issue for continuing life-long learning. The distributed learning model can be used in combination with traditional classroom based courses, with traditional distance learning courses, or it can be used to create completely virtual classrooms.

In this paper the process of PLE building by students in bachelor degree in Computer Science and Electronics and experience gained from learning in the start page Netvibes is analyzed. The advantages at utilizing Netvibes in the context of instructional strategies and technical solutions forming are discussed. The students' opinion about the occurred leaning and PLE vision is gathered, analyzed and summarized with aim of supporting the optimization of their self-organized continuing learning process.

Needs Analysis and Problem Definition

For a second year the students from College of Energetics and Electronics at Technical University – Sofia have used LMS, based on Web 2.0 technologies, but the functional characteristics of proposed personal learning space is not too flexible and extendible. So, a PLE platform as extension of LMS with the following specification is needed:

- *Mashable framework* – plurality of software components (widgets, API) which can be organized or combined;
- *Online accessible and free-hosted application*;
- *High degree of personalization* – freedom in students' activities to aggregate and manage components according to different learning scenarios;
- *Social-oriented* – connecting and communicating with peers, educators or followers;
- *Localized* – graphical user interface translated in Bulgarian.

The start page (Wikipedia, 2010) approach is selected, because it proposes a personalized space and gives students and educators access to a wide range of information and knowledge. Personalized gadgets can be added to this self-designed space, including news reader, activities planner, a personal calendar, search engines, media in different format. There are educational gadgets from wide web distributed banks that can be easily integrated. Collected gadgets and tabs that are specific to a unit of learning or personal interest can be shared, provoking course discussion and interactions. The designed space can be rearranged and updated through panels and gadgets during the course according to the changeable learning/teaching conditions. The Web 2.0 application Netvibes (defined as a start page) is chosen for PLE forming after experiments, features exploration and analysis (Ivanova, 2009).

PLE Building in Netvibes

When building a PLE the students have followed the proposed by authors' methodology including the steps: (A) understanding the term "PLE", (B) forming of motivation, goals and needs, (C) introducing with the functional characteristics of Netvibes, (D) exploring the technical possibilities of Netvibes, (E) examination of the opportunity for an one-sided/bilateral relationship between LMS and PLE, (F) understanding the possible learning scenarios.

A. Understanding the Term PLE

The definition of this term is still forming as well as the solutions behind it. The most exploited definition is from (Wikipedia 2010):

"Personal Learning Environments are systems that help learners take control of and manage their own learning. This includes providing support for learners to: set their own learning goals, manage their learning; managing both content and process, communicate with others in the and thereby achieve learning goals. A PLE may be composed of one or more subsystems: as such it may be a desktop application, or composed of one or more web-based services.

Another definition given by (Lubensky, 2006) points a "PLE as a facility for an individual to access, aggregate, configure and manipulate digital artifacts of their ongoing learning experiences."

The idea behind a PLE is discussed in (Attwell, 2007): a PLE comes to recognize that learning is ongoing and seeks to provide tools to support that learning, to recognize the role of the individual in organizing his or her own learning, to point that learning will take place in different contexts and situations and provided by multiple learning providers.

Our conceptual view about PLE is summarized via the following definition: Virtual Personal Learning Environment (VPLE) has possibilities to integrate information and knowledge sources, social contacts and communication channels, authoring functions and components and it is easy for technical configuration and for learning scenarios management according to present students' interests and goals.

The students are also provided with conceptual and improved in practice models of PLEs (Wilson et al., 2006; EduTech; PLE diagrams, 2010).

B. Forming the Motivation, Goals and Needs

During the time in university the students have to develop skills like: analytical thinking, creatively thinking, problems solving, prioritizing, planning, project managing, decision making, individual and group collaboration, effective communication. In parallel they have to prepare themselves to become self-organized learners that are able to analyze new conditions as they arise, identifying the new knowledge and skills that they will be required to deal with these conditions and independently chart a course that responds to these changes.

To do this they have to be able to self-motivate. Student motivation has to do with students' desire to participate in the learning process. But it also concerns the reasons or goals that underline their involvement or non-involvement in academic activities. Although students may be equally motivated to perform an activity, the sources of their motivation may differ.

Motivation for learning can be regarded as a willingness to apply high levels of effort to reach learning goals and to satisfy the current personal needs. There are several questions contributing to the motivation: "What are my learning/professional goals?", "Do I possess the needed knowledge and skills to achieve them?", "What is my strategy and what kind of tools will I use to reach my goals?" If students have approximate answers of such questions they can form their motivation for learning and personal development.

The educators can support students' motivation for learning in mental, social and physical aspects using different technologies, including Web 2.0. Among the characteristics of Web 2.0 are: possibilities for networking, socialization, personalization, collective intelligence, many information channels, openness. Different applications based on Web 2.0 technologies are exploited for educational purposes, because of their everyday uses by students like Wikipedia, YouTube and because of their advantages in characteristics. Start pages come under this category application and might be used for launching a learning process as well as for managing of self-organized learning activities.

C. Netvibes Functional Characteristics

The main functional characteristics of Netvibes as PLE are depicted on Figure 1 and they are arranged in several groups: activities management, socialization/communication, sharing, feel and look, embed code/create educational widgets. Such functions allow wide variations of learning scenarios for students and their work with preferred types of media content.

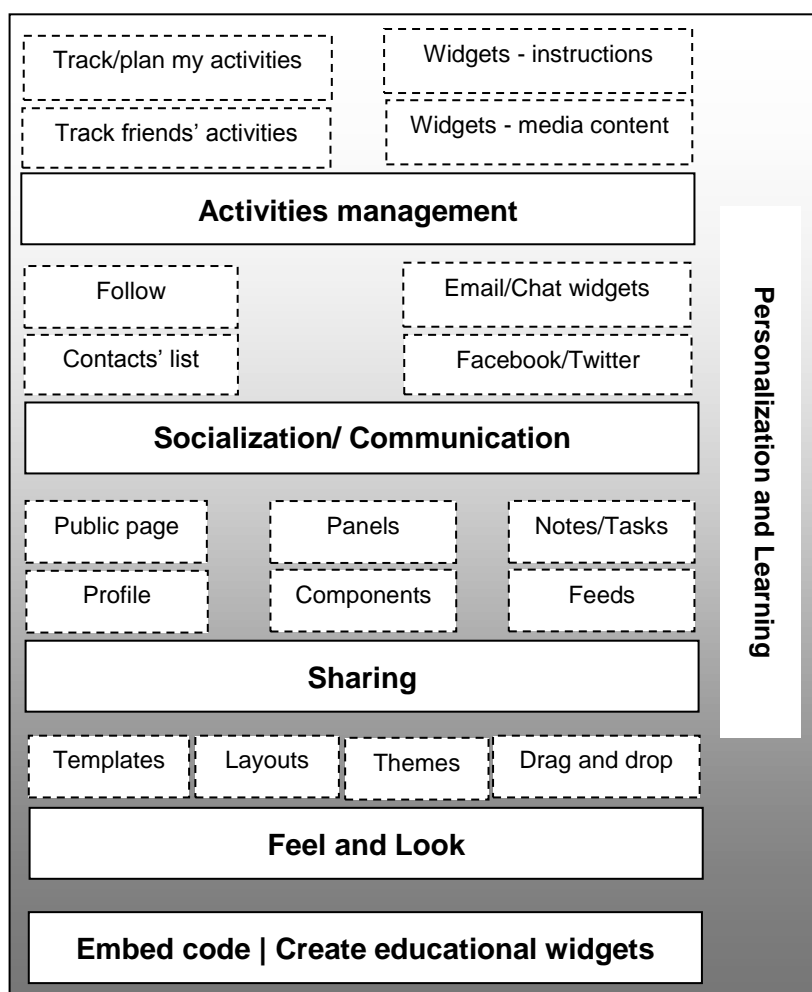


Figure 1. Functional Characteristics of a PLE in Netvibes

Activities management

Activities tracking supports the educator to analyze the students' activities performance and also students to learn from shared learning resources by their peers, friends or others. With data updates coming from different students/educators the need to be able to go back to view or even revert the older activities of the history sometimes becomes more important for repeating, remembering and assimilation of knowledge.

The function for notification when content or students' status is changed is important for further activities arrangement and for the future students' behavior. In other words, the state changes in shared objects are important to be propagated to all students and educators engaged in the concrete learning process from the collaborative aspect and from the point of view of better communication.

Instructional widgets and media content widgets involve students in series of interactions and learning activities. In practice widget-based education allows building of special widgets around particular learning tasks targeting different learning styles (text, video, interactivity). In this way the students can copy, cut, or change whatever doesn't work for them. Each student and faculty member can create his or her own lesson plan based on the tools they find most useful and to create a set of learning objects that students/educators can add to their own pages or rework to suit their needs.

Socialization/Communication

Netvibes supports a list with contacts of friends and followers. It provides a direct access to their profiles and shared activities/learning resources. Manually added widgets for email/chat/conferencing and for connection with social applications like Facebook and Twitter can form several communication channels among students and educators and contribute to the socialization process – to speak to each another analyzing concrete learning problem, to share ideas and information and to confirm the connections and relationships.

Sharing

One of the most important variables describing learning activities in a social-oriented environment like Netvibes is information, knowledge and ideas sharing. Sharing contributes to understanding, assimilation, analyzing and reflection on studied facts and theories or achieved results after practical experiments. Sharing is used by educators to map the students' outcomes. Netvibes proposes different levels of sharing – sharing of public pages, panels, components, feeds.

Feel and Look

Netvibes allows the students to customize the background of their start pages using themes or just create new ones. Several layout templates are designed to facilitate arrangement of components according to the chosen learning scenario. Drag and drop function leads to a flexible position of the panels and components, every time when a student decides to make changes.

Embed code/Create educational widgets

The students and educators do not need to possess any programming skills to integrate <iframe>, <object>, <embed> or <div> code in one html component for example from other social sites like YouTube, Slideshare and so on. Universal Widget API (UWA) allows students to create a widget that runs on Netvibes, but it also lets them run on the major widget platforms (Google/OpenSocial, Apple, Microsoft). Furthermore, widgets can be created through other applications and embed in a Netvibes component.

D. Netvibes Technical Specification

This start page is a distributed solution with possibilities for PLE building through mashup technology- aggregating information and knowledge from different sources using widgets and feeds. The students do not need any programming skills. Advanced students with more complex programming skills prepare mashup approaches integrating data from different sources using APIs.

The most essential idea behind the distributed PLE solutions is that students can fast launch and build their own PLE from the tools they have already known and used for different purposes like RSS readers, resource storage, social bookmarks applications, A/V files management and so on.

Such architecture is open and extendible – the application start page communicates with various web servers and utilizes a wide massive of services proposed from different web sites (Figure 2). Other characteristic is related to only online usage of PLE and availability of functions from the mobile devices.

About standards, Netvibes works on UWA specification, a combination of a XHTML-based file format and a JavaScript framework. In this way students/developers can use existing Web standards: XHTML, CSS and JavaScript to build educational Web widgets.

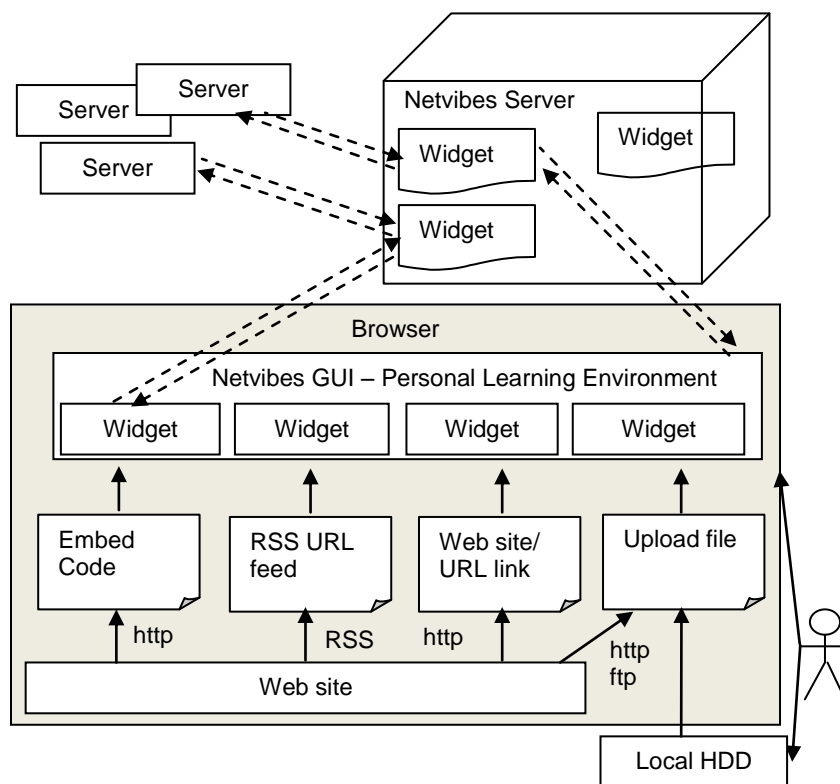


Figure 2. Technical Architecture of PLE

E. Relationship PLE-LMS

Our primary task is the personal learning space in LMS to be extended giving the students possibilities for realizing an open, flexible and self-organized learning process. Because of LMS and the start page are Web 2.0 applications working separately, we are looking for methods for one-sided or bilateral connection between them.

We are realized bilateral connection (Figure 3) because of two reasons:

(1) To engage students to participate in the courses and to provide access to the selected sections of the learning space in LMS after the course ending two types UWA widgets are created: the first one serves the blog posts and announcement news to students' PLE in Netvibes and second sends the updated learning content (connection LMS-PLEs).

(2) To accelerate the students' progress and their learning problems and also students like to share information and to see the achievements of their classmates. The connection PLEs-LMS is realized in two ways: through posting a Netvibes address of PLE as a link on a student profile and through a widget with student Netvibes profile integrated in a wiki page which is a part of collaborative course space in LMS.

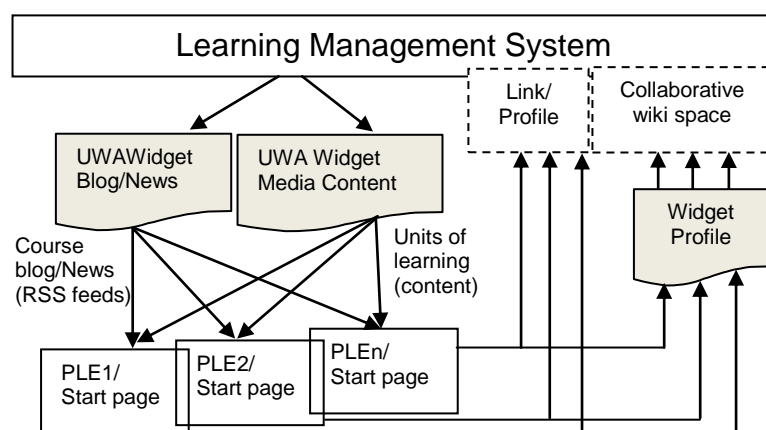


Figure 3. PLE-LMS Connection

F. Understanding the possible learning scenarios

In this section two typical scenarios often used for learning by students from Computer science utilizing their PLE are discussed. The first one concerns project-based learning (PBL) as a model that organizes learning around projects. PBL involve students in design, problem-solving, decision making, and investigative activities. It gives them the opportunity to work relatively autonomously during one semester, finishing with concrete artifacts and conclusions. The second one is concept-based learning (CBL) in which students try to simplify the proposed learning material into objects (concepts) and to classify these objects in conceptual maps. CBL leads to clearing of new acquired knowledge, analyzing theory or practice and revising old knowledge. Concept maps offer a method for visualizing and structuring knowledge and involve students in a creative and brainstorming process. Also, CBL is a powerful method for exploration and research of a concrete problem. Concept maps can be created by single student, by two students working in collaboration or by a group from 3-4 students.

The first scenario is a scenario of PBL used by students to prepare their individual projects and it includes the following activities:

- Identifying a challenging problem among the potential projects' topics and gathering/storing information about this problem utilizing components of search engines, RSS feeds reader, video/images integration, links to learning resource, integration of social bookmarks.
- Planning the project development in the time and specifying the learning activities with components like calendar, to do list, web notes.
- Selecting the suitable units of learning that belong to the course and that are useful for the problem deciding and integrating UWA widget media content in PLE.
- Forming formal and informal channels for communication and discussion with peers/educators, using components for embed code – chat, email, my community component for status updating (also the students use the communication tools in LMS).
- Expanding social network through contacts of peers, followers and educators, adding social networks component for connection with Facebook, for example.
- Sharing panels, components, resources, replying to shared activities by peers and educators, favorite friends shared resources.
- Passing quizzes to evaluate the gathered knowledge via components with embed code.

- Collecting and exploring authoring tools for report preparing and publishing the results via suitable components – in many cases embed code from Scribd, Zoho, Slideshare or YouTube.
- Expanding and updating used components, learning resources and learning network during the project work.

The second scenario is an example of CBL that is shorter in time than PBL and it is used by students to organize and understand the important objects in a given problem. The following steps are passed for a concept map production:

- Additional data and information collecting about concrete objects using search components: search in the web, search in videos/pictures/podcasts, search in blogs, search in open resources.
- Selecting the suitable units of learning that belong to the course and that are useful for the mapped student problem and integration of UWA widget media content in PLE.
- Objects (concepts) identifying and outlining with the component like web notes.
- Information and the first conclusions sharing, discussing the map structure, the objects, their relationships and the bottleneck objects. The communication process is parallel with network forming process (in PLE and in LMS).
- Integrating links/web pages to useful concept mapping tools for visual presentation and organization of data; Sharing of these components.
- Creating final conclusions, sharing and publishing them and a concept map in form of components with embed code (Scribd, Zoho, or YouTube), and discussion the results.

In the first scenario of PBL the students are personally engaged in learning, grabbing their attention on a concrete problem. They are involved in an investigation and they are motivated to find the problem's solution. PLE building supports them to retain the information that they learn, to explore the new information and knowledge sources and to establish learning network performing activities like sharing, replying, following and favoriting.

In the second scenario CBL provides a powerful tool to help students understand theoretical or practical approaches by effectively organizing and analyzing data. As students visually examine objects (concepts) and their connections, they can easily perform sophisticated data analysis and develop solid conclusions. PLE contributes to this process with different tools for information and knowledge collecting according to personal needs, maps forming through communication and socialization, and results sharing.

In both cases PLE plays the role of a catalyst for solution finding at ascertainment of knowledge gaps, for activities planning to reach the required knowledge, for personal awareness of further learning enrichment in technology-rich and social-oriented context.

Analysis of Students' Opinion and Experience

The past two semesters during two courses Computer Graphics and Internet Technologies students BcS degree in Computer Science and Electronics, College of Energetic and Electronics, Technical University – Sofia have introduced with the PLE concepts, start pages functions and possible solutions for supporting of their learning in these courses and after

graduation building a PLE. The students have registered a domain space in Netvibes and have created their private and public versions of PLE.

Before courses starting the students are asked to describe their vision about PLE possibilities for their learning management. The results of students' answers of the question: "What functions would possess the virtual personal learning environment?" is presented in Table 1.

TABLE 1

Personal Learning Environment Functions	Female	Male
information gathering	100%	62,5%
information collection for my own activities	0	12,5%
show information in different media format	50%	62,5%
advice me interesting information related to my learning goals	50%	50%
authoring text and media	50%	37,5%
mashup information and services	50%	75%
publishing in Internet	25%	37,5%
plan and manage my own learning	50%	62,5%
receiving feedback about my achievements	62,5%	50%
to can learn from others	50%	37,5%
to can disseminate my knowledge to others	25%	37,5%
to can contact and socialize	50%	75%
receiving feedback from others	25%	25%
to help select the suitable for me learning resources	75%	62,5%
to test and evaluate my knowledge and skills	50%	25%
to save resources, activities, contacts	75%	75%

The answers of the question: "What are the important functions for your effective PLE organization?" are summarized in the Table 2.

TABLE 2

Personal Learning Environment Functions	Female	Male
easy navigation and graphical user interface	75%	62,5%
easy customization of look and feel	25%	50%
possibility for choosing suitable tools	50%	75%
interactivity	75%	75%
possibility for storing and updating cv	25%	12,5%
for encouraging my personal development	75%	50%
for supporting my career development	50%	37,5%
for sharing and collaboration	75%	85,5%

At the end of the courses the students are asked several questions about Netvibes functional and technical characteristics related to PLE building and how it supports their learning. The results are summarized in several tables.

One question is "If the panels/components structure of Netvibes is a good strategy for learning spaces building?". 75% of male and female students are categorical that panels/components structure is a good solution to satisfy their learning interests. 25% of them answered "it depends" that means their conceptual view is a little bit different than this.

Another question is “If the proposed functionality is enough for organizing self-learning?”. Both male/female students are agree that possibilities for links, RSS feeds, text, images, media files adding, and also HTML/JavaScript embedding give huge opportunities for the PLE organization based on different learning styles.

The next question is focused on structural organization of PLE: “The PLE has to consist of how many panels and how many components on each panel to satisfy an effective information perception?” (Table 3).

TABLE 3

Personal Learning Environment Structure	Female	Male
3 panels/2 components on each panel	0	12,5%
3 panels/6 and more components on each panel	25%	0%
4-7 panels/2 components on each panel	50%	75%
4-7 panels/6 and more components on each panel	50%	75%
more than 8 panels/2 components on each panel	0	12,5%
more than 8 panels/6 and more components on each panel	25%	13%

The results show that 3 panels and 2-3 components in a panel are not sufficient for three-quarters of students. More than half of the students prefer to use 4-7 panels with from 4 to 7 components. Using more than 8 panels with 6 and more components in the panel are preferred by less than a quarter of the students. It is clear that suitable solution for effective management of the virtual PLE is based on 4-7 panels.

The students are asked about “How their information is structured on each panel?”. Most students m/f (87,5% m and 75% f) have structured information on the thematic principle (the rest of the students have arranged their PLE by most used tools, by classification of tools in different categories, or by combination of content thematic and tools arrangement).

Another question is about functions related to customization of look and feel, about settings customization and about graphical user interface. The students both male/female are satisfied and they are agreeing that GUI is easy for usage and resources organization with available drag and drop possibility. There are several options for look and feel customization: choice of color scheme, choice of number of columns and title writing on each panel. Also, every component and panel can be private, for achievement of personal learning experience only for given student. The components and panels can be in public statement and can be shared with other users of Netvibes for collaborative strategies realization. So, the students are asked: “What part of their private PLE is shared with others”? 87,5% of male/female students said that about 90% of their work during the courses is shared with their co-students and educators.

The last question is focused on overall evaluation of their PLE building as a framework for personal learning organization and possibilities of this framework for future students’ usage in the context of personal and career development. 87,5% male students and 100% female students answered that such framework offers considerable potential for: (1) personal learning, sharing and collaboration of information and knowledge; (2) good opportunity to study and experiment with new technologies. Most of them said that they will continue with their PLE building and development in this or other platform.

Conclusion

The PLE building involves students in an active and engaging learning process during the courses giving them interesting technical and educational solutions for self-organization and continuing learning according to the authors' proposed methodology on one hand. On the other hand the students' creativity contributes to the forming of original learning scenarios and technical approaches. The bilateral connection between LMS and the students' PLE supports the symbiosis between students' informal learning and the obligatory formal learning process. The above discussed students' opinion survey and reported at the end of the semester better learning outcomes indicate that PLE is a very useful tool for improving education quality.

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