

HEUTAGOGY – AN APPROPRIATE FRAMEWORK FOR COMPUTER AIDED LEARNING COURSE WITH POST-GRADUATE TEACHER STUDENTS

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Abstract: *This study is a practical action research. Its purpose is to explore the practicality and applicability of heutagogy for post-graduate students who are preparing to become teachers. The necessity to use a heutagogical framework derives from the fact that students are very different as specialization and level of abilities in using computer and mobile devices. At the same time, they are mature learners, with a bachelor's degree in diverse fields. The pedagogical research comprises three principal stages: the preliminary stage, to determine the degree of diversity in the students' group; the pedagogical intervention, and the research evaluation. Computer aided learning is a course whose main outcome is to enable future teachers to use computer and mobile devices in the classroom. Technology has now a spectacular evolution and, to be able to manipulate it in the future, the teachers have to become lifelong learners. Heutagogy can empower them with capabilities like self-efficacy, communication and teamwork skills, creativity, positive values and self-determined learning. The results of the research confirm that the heutagogy is an appropriate framework for the teachers' education in academic post-graduate studies.*

Keywords: *heutagogy; self-determined learning; computer aided learning; student-centered learning;*

1. Introduction

Heutagogy is a challenge for teachers, especially if they are working with post-graduate students who want to become teachers themselves. The students are prepared to become engineers, economists, philologists, philosophers, actors, mathematicians, journalists, doctors, psychologists, geographers, lawyers and so on. They have decided, as a second chance, to teach at different levels: in lower secondary education, upper secondary education, short term or long-term higher education, as a second chance. The reasons why more and more adults choose post-graduate studies is the aging of the population on the one hand, but also the frequent change of workplace and the rapid evolution of technology (Ross-Gordon, 2011).

The future teachers will be able to teach different subjects, in accordance with their studies. They have a bachelor degree in different specializations, but they did not attend the courses of the psychology-pedagogy module during their university years.

The heutagogical principles will be used in the course of computer aided learning, so, the level of computer skills is important, too. Usually, the students of this kind are very different from this point of view: some of them are at the basic level; others are using the computer in a professional way, depending on their skills in the domain. All of them are using mobile devices, but especially for communication or socialization, not for learning.

For this heterogeneous group of students, a general, common curriculum is not appropriate and it is obligatory to find other educational strategies.

2 Theoretical frameworks

2.1 Adult learners

The post-graduate teacher students are adult learners, with learning experience. This group of students can be characterized as “non-traditional” because of the age first of all, they are older than 22 (Horn, 1996), they attend the classes part-time and they are not living on campus (Stokes, 2006), they are working full-time, are financially independent from the parents, are married or have children (Choy 2002). The post-graduate teacher students have their strengths but at the same time the weaknesses that differentiate them from traditional ones (Jameson & Fusco, 2014).

Adult learners prefer self-direction, they are accustomed to learning, have a high degree of motivation, and have experience from previous studies (Lieb, 1999), engage in transformative learning (Mezirow, 2000). Their relationship with teachers is different from that of regular students (Lynch & Bishop-Clark, 1994) and they are more strongly motivated (Delahaye & Ehrich, 2008; Sachs, 2001; Silverstein, Choi & Bulot, 2001).

The adult learners are faced with personal, professional or institutional obstacles (Ritt, 2008) that often lead them to abandon (Kerka, 1995). Regarding these obstacles, the group of the students is homogenous. They are influenced by psychological factors which determine their goals, attitudes and behaviour (Bandura, 1994; Usher & Pajares, 2008) and they should be in the main focus of the teachers (Jameson & Fusco, 2014).

The university education focus on teaching rather than on student learning and the teacher seeks to control and determine the learning of the student (Dyson, 2010). The teaching based on lecture can demote and disable the students and create a gap between content and its practical applicability (Haber-Curran & Tillapaugh, 2015).

2.2 Heutagogy

The concept of heutagogy (based on the Greek word for “self”) was defined by Hase and Kenyon in 2000 as “the study of *self-determined learning*”. In heutagogy, a holistic way is applied to develop the learner capabilities. The learning is an active and proactive process and learners are “the major agent in their own learning, which occurs as a result of personal experiences” (Kenyon & Hase, 2010).

The focus of heutagogy is to create capable learners. The learners develop their capability and capacity to learn (Ashton & Newman, 2006; Bhoryrub et al, 2010; Hase & Kenyon, 2000; Blaschke, 2012). Heutagogy is a “net-centric” theory because it uses the power of the Internet and the new technologies with applications in distance education, as well as it serves as “a framework for digital age teaching and learning” (Anderson, 2010; Blaschke, 2012).

2.3 Self-determined learning

Self-determined learning is characterized by competencies *and* capabilities acquired by learners (Hase & Kenyon, 2000, 2007). The ability to acquire knowledge and skills is defined by competency and the confidence of the learner in his competency is capability, the ability “to take appropriate and effective action to formulate and solve problems in both familiar and unfamiliar and changing settings” (Gardner et al, 2008; Blaschke, 2012). Capable learners are characterized by the following features:

- *self-efficacy*, they how to learn and usually reflect on the learning process;

- *communication and teamwork skills*, they communicate well with the colleagues and work together;
- *creativity*, they apply their competencies to new and unfamiliar situations and are adaptable and flexible;
- *positive values*, they have an open attitude and promote the positive values (Kenyon & Hase, 2010; Gardner et al, 2008).

The competent learners acquire knowledge and abilities; knowledge which can be retrieved and abilities which can be proven. The capable learners can use the abilities and knowledge in new situations. Capability is the extension of competence, and without competency there cannot be capability. In the heutagogical framework, the learning is provided through the process of double-looping, which allows students to be aware of their learning style and to adapt the new situations to their own learning style, increasing their capability. Heutagogy is the appropriate framework for the adult learners needs, in complex and changing conditions because of the dual focus on competencies and capability (Bhoryrub et al, 2010; Blaschke, 2012).

2.4 The heutagogical approach

The underlying principles of the heutagogical approach (Narayan & Herrington, 2014) are provided below:

- (1) “An open or flexible curriculum that recognizes the fluid nature of learning.
- (2) The learner as the driver in determining his/her learning path, context, activities.
- (3) The learner is involved in the design of the assessment or ensures flexibility for the learner to be able to apply it within their context.
- (4) Learning is collaborative.
- (5) Coaching and scaffolding are provided to the learner when needed.
- (6) Questions are learner directed; this provides an opportunity for true collaboration between the teacher and the learner with regard to the content and the process. The questions also provide clarity on what guidance, scaffold, and support are needed by the learner.
- (7) The learner creates contextually relevant content according to their knowledge and learning needs.
- (8) Reflective practice for deep learning is encouraged.”

These principles are a practical guide for a learning design that could be applied in post-graduate studies for teacher education.

2.5 Applications

In a review of heutagogical practice and literature, Blaschke (2012) stipulates that heutagogy is most appropriate for post-graduate studies. She provides examples of its application in education, engineering, and nursing. However, there are examples of heutagogy successfully implementation in undergraduate courses: “a vocational foundation degree, landscape architecture, product design, contemporary music, performing and screen arts, and architecture” (Cochrane & Bateman, 2010).

The University of Western Sydney in New South Wales, Australia has implemented a heutagogical approach to its *teacher education program*. They designed programs to integrate self-determined learning through blended learning and applied this approach to the course design, development, and delivery, but not in the summative evaluation. The university has identified the following benefits: “improved teacher outcomes, more capable teachers (learners) who are better-prepared for the complexities of the learning environment, increased

learner confidence in perceptions, engaged learners in communities of practice, learner scaffolding of peer learning processes, improved ability of the learner to investigate ideas, and further development of the learner's ability to question interpretations of reality from their position of competence" (Ashton & Newman, 2006; Ashton & Elliott, 2007; Blaschke, 2012).

3 Research Methodology

The purpose of this study is to explore the practicality and applicability of the heutagogical framework to the post-graduate group of students who are preparing to become teachers.

The focus is to find out if a self-determined learning model can be used as a workable learning and teaching means for the academic disciplines in the psychology-pedagogy module, particularly for computer aided learning.

Research question: Is heutagogy an appropriate framework for the teachers' education in academic post-graduate studies?

The principal stages of the research were (Cretu, 2015):

- Preliminary stage: with the purpose to characterize the group of students;
- Pedagogical intervention;
- Research evaluation.

This study has used a mixed-method design, which is "the procedure for collecting, analyzing, and combining both quantitative and qualitative data" (Creswell, 2012).

The target population of the study consists of 59 students, graduates in different specializations, who attend the psychology-pedagogy module courses to be able to work in education. The method to select the sample was in function of the students' availability and willingness (Cretu, 2015).

4 Research Design

4.1 Preliminary stage

4.1.1 Sub-questions

The first group of sub-questions was formulated with the purpose to characterize the group of students.

The quantitative sub-questions refer to the heterogeneousness of the student group:

- Which specialization have they graduated?
- Did they learn information technology or computer science or informatics during the university studies?
- Which subjects will they teach?
- At which level (lower or upper secondary education, short term or long term higher education) will they work in the future?

The qualitative sub-questions refer to the use of computer or mobile devices, to the students' experience in teaching and using computers and mobile devices in school, to their opinions about computer aided learning and m-learning:

- How often and for what purposes are they using the computer or mobile devices?
- What is their experience in using IT in school?
- Do they consider that computers can help the teacher in the classroom and how?

4.1.2 Instruments

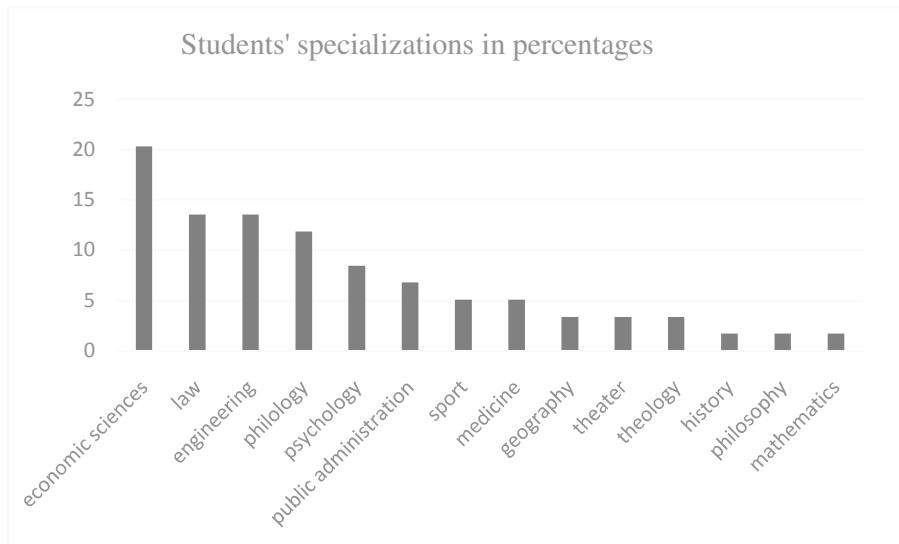
The primary data sources were the official documents from the department of university. They provided the answers to the first quantitative sub-questions: the qualification, the study of computer science, and the subjects to teach (according to the students' specialization).

To determine the level and the purposes of using computer or mobile devices, a questionnaire was given to the students.

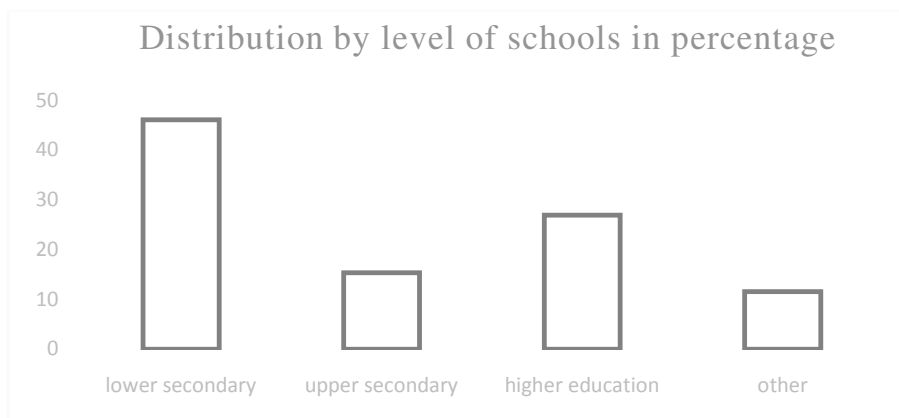
An interview was organized with a part of the students (26 volunteers) to speak freely about their experiences of using IT in the classroom and their opinion about computer aided learning and m-Learning.

4.1.3 Initial data analysis

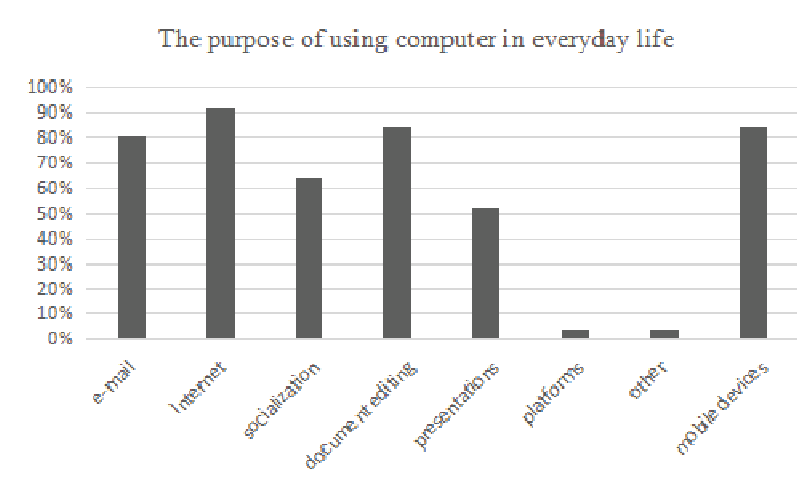
The students have graduated in different specializations:



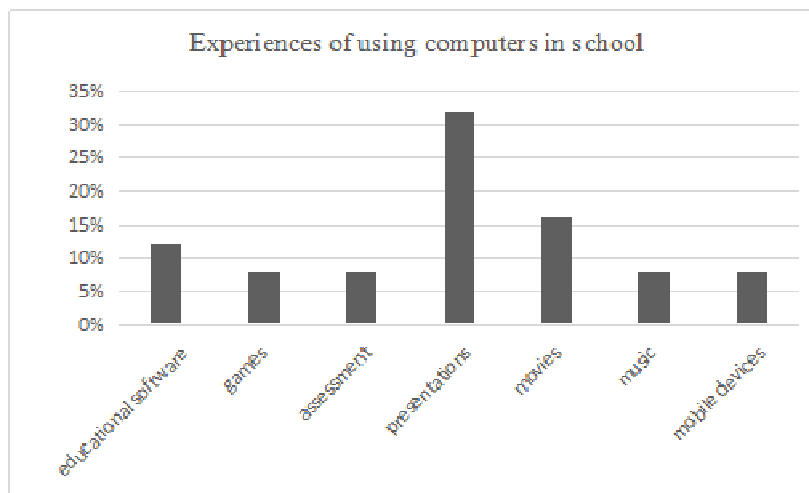
Only 61.54% of the students attended computer science courses in university. The students intend to teach at different school levels:



The students use the computer or mobile devices for personal purposes:

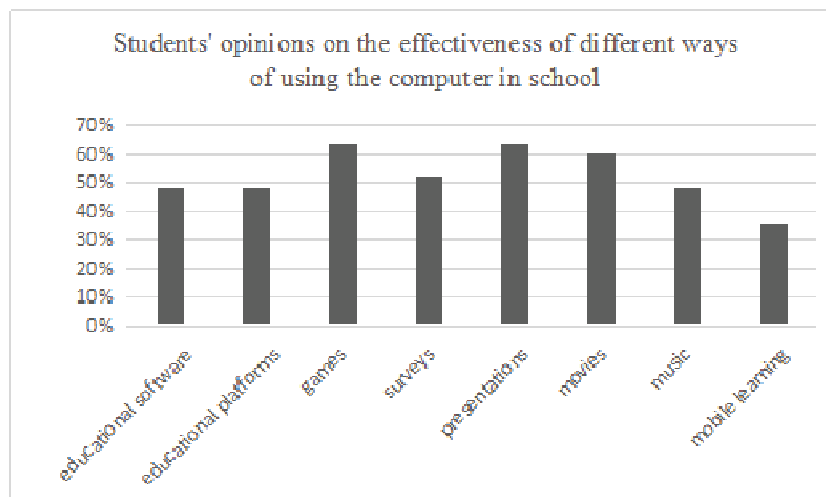


Only 32% of students report experiences of using computers in school in different ways:



The students consider the following to be efficient to use in the learning process:

The students are motivated and show a positive attitude towards introducing new technologies in the teaching and learning process.



4.1.4 Identification of the problem: needs to develop a heutagogic framework

From the data analysis, the following answers to the first group of sub-questions have resulted:

- The students from this study program hold different bachelor degree specializations.
- Their experience in using computer or mobile devices differs a lot.
- The subjects that they will be able to teach are in accordance with their specialization.
- They want to work at different levels of the education system.
- The students show interest to the introduction of new technologies in education and they consider using computer and mobile devices in learning useful.

In this case, a general curriculum for computer aided learning is not a solution. The main outcome of this course is to enable students to use computers and mobile devices in education when they become teachers. The content of the course can be flexible, in accordance with the students' knowledge and abilities, in relation to the subjects which will be taught, depending on the class level.

They have to become capable teachers, adaptable to the changes in using computers and mobile devices. They will be obliged to keep up with the evolution of new technologies, so they will need to learn all along their life.

A heutagogical framework is appropriate for the preparation of the future teachers in post-graduate academic studies.

4.2 Pedagogical intervention

4.2.1 The design process

The heutagogical design process starts by defining the learning contract (Blaschke & Hase, 2016). The student and teacher identify together the learning needs, depending on the course outcomes. We have to negotiate the assessment process too, and a contract is created and agreed on.

The process continues with the development of the learning activities (Blaschke & Hase, 2016). We need to motivate the student to engage in this process by proposing challenging tasks. They have to find their resources, to select what they need, to be creative, and realize step by step the final product which will be assessed. All this time, the teacher provides support and feedback in function of the student's needs.

The last part of the heutagogical design process is the evaluation of the learning, in order to determine whether the aims stipulated in the contract have been achieved (Blaschke & Hase, 2016). The student must be the first assessor of his work.

4.2.2 Design elements

In the heutagogical design, the elements are: exploration, creation, collaboration, connection, sharing and reflection (Blaschke & Hase, 2016).

Exploration. During the learning activities, the students were encouraged to explore different resources, to find teaching-learning materials in accordance to their specialization: educational software, games, movies, different sites with information etc. The teacher offered support if necessary. The Internet provides the ideal environment for self-determined exploration. Google, Wikipedia, digital libraries, magazines are practically unlimited sources of information. Some students needed help at the beginning to evaluate the resources and to choose the most useful ones.

Creation. In the heutagogical approach it is important to cultivate the student's creativity. The practical tasks for students are to design some classroom activities or only parts of them, including computer facilities or on-line resources. They can create teaching-learning interactive materials or find them on Internet and integrate them in lessons, use the web opportunities in projects like WebQuest etc. The students are free to design their projects, but, at the same time, they make serious research. The majority did this work with pleasure.

Collaboration. Collaboration is another key element of heutagogy, based on the idea that learners can learn from each other. A virtual platform was used for discussions, messages, questions, scheduling etc. It was, at the same time, an example which the students can follow in their future activity, to manage the group of pupils.

To solve the tasks, the students will work in groups of two, three or four, depending on their specialization or affinity. They helped each other along the learning process, they shared information and experience. The teacher served as coach if needed, but the teams had complete autonomy to manage learning activities. For online collaboration, besides the virtual platform of the group and numerous other tools were accessed.

Connection. Students were encouraged to connect with others, using the media available. Social networking sites like Twitter, LinkedIn, Academia.edu, Facebook, WhatsApp and Google+ facilitate professional connections which are important for their career. Through these connections new ways of learning can be created.

In the same time, to design interdisciplinary projects, the students had to make connections with other domains and to solicit the expertise of their colleagues, to share information with them.

Sharing. By sharing information, the students were able to learn from their discoveries and experience. In the group they could use the platform, but there are numerous other available tools for this purpose, like SlideShare, ResearchGate, Twitter, Facebook. The students shared their work on the platform and they received a first assessment from the colleagues. At the same time, they could see other ideas and they could improve their own projects.

Reflection. In many cases, reflection after the learning process is neglected. It is important that the learners have opportunities to reflect on the new knowledge acquired, new abilities, and on the learning process as a whole. At the end of the course, the students shared their opinions on the experience and the discoveries made during the learning process, which they will be able to apply in their future work in education.

The final questionnaire, as a feed-back of the course, was another opportunity for reflection.

4.3 Research evaluation

4.3.1 Sub-questions

The second group of sub-questions investigates the efficacy of the heutagogic framework during the learning process:

- How often the students explored the virtual environment to find resources?
- How much the tasks solicited their creativity?
- Did they frequently collaborate with the colleagues during the learning process?
- Did they make connections with other domains to accomplish the tasks?
- Did they share experience or learned from the colleagues' experience?
- Did they reflect later on the assimilated competences or the learning process?
- How much did they applied or are going to apply in their didactic activity the appropriated skills?

- How much the new abilities will be useful in other domains or in their daily life?

4.3.2 Instruments

To evaluate the efficacy of the heutagogic framework, a questionnaire was elaborated. We asked students to give a feed-back at the end of the computer aided learning course, after two weeks of the final assessment. The questionnaire consisted of 8 items, on a Likert scale with five levels, varying from very frequently, frequently, occasionally, rarely, never.

- (1) How often did you explore the virtual environment to find resources?
- (2) How much the tasks solicited your creativity?
- (3) Did you frequently collaborate with the colleagues during the learning process?
- (4) Did you make connections with other domains to accomplish the tasks?
- (5) How much did you share experience or did you learn from the colleagues' experience?
- (6) Did you reflect later on the assimilated competences or the learning process?
- (7) How much did you apply or intend to apply in the didactic activity the appropriated skills?
- (8) How much the new abilities will be useful in other domains or in your daily life?

In addition, a comment could be added at the end if the students wanted. It was administrated by Internet, respecting the anonymity of the answers.

4.3.3 Final data analysis

We received 57 answers to the final questionnaire with all items complete. To estimate the reliability of the test scores, we calculated Cronbach's alpha, using ANOVA two factors without replication and the value was acceptable, 0.746113.

The results of the questionnaire are described in the table 1:

Table 1. Final questionnaire - students' answers

Questions	Very frequent ly	Frequent ly	Occasiona lly	Rarely	Never
1. How often did you explore the virtual environment to find resources?	30 52.6%	24 42.1%	3 5.3%	0	0
2. How much the tasks solicited your creativity?	33 57.9%	22 38.6%	2 3.5%	0	0
3. Did you frequently collaborate with the colleagues during the learning process?	18 31.6%	29 50.9%	4 7%	6 10.5%	0
4. Did you make connections with other domains to accomplish the tasks?	28 49.1%	17 29.8%	9 15.8%	1 1.7%	2 3.5%
5. How much did you share experience or did you learn from the colleagues' experience?	18 31.6%	24 42.1%	6 10.5%	9 15.8%	0
6. Did you reflect later on the assimilated competences or the learning process?	28 49.1%	18 31.6%	8 14%	3 5.3%	0
7. How much did you apply or intend to apply in the didactic activity the appropriated skills?	30 52.6%	22 38.6%	5 8.8%	0	0

8. How much the new abilities will be useful in other domains or in your daily life?	28 49.1%	26 45.6%	3 5.3%	0	0
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The majority of the answers are very frequently and frequently, although we have to pay attention to the heutagogic design elements where there are some students who answered with never or rarely.

During the activities, the exploration of the virtual environment to find resources was appreciated by 94.7% of students as very frequently or frequently, only 5.3% explored it occasionally.

Concerning the creativity, the majority (96.5%) recognized that they needed a lot of creativity to design the learning materials for the pupils.

Some students did not collaborate with the colleagues, 7% occasionally and 10.5% rarely. In the future, the tasks should oblige to cooperation for solving, because the teamwork skills are very important for a teacher.

A lot of students (78.9%) responded that they made connections with other domains to design the learning materials frequently or very frequently, but 15.8% only occasionally and 5.2% rarely or never.

The sharing experience is strongly dependent on collaboration. This item reflected that for 15.8% of students the knowledge or experience were shared only rarely and for 10.5% occasionally. 73.7% of students declared that they shared experience with colleagues very frequently or frequently. The collaboration and sharing experience could be stimulated by organizing heterogeneous groups and establishing interdisciplinary tasks.

The reflection should be encouraged too, because 5.3% of students consider that they reflected only rarely on their new competences achieved.

The practical applicability of the acquisitions was positively appreciated by students. Even better results were obtained at the item asking about the skills' transfer in other domain or their usefulness in daily life.

Some students added comments, like:

“Thank you very much! It was the most useful course!”

“Thank you for everything what we learned!”

“The practical activity was very useful.”

“This course helps me a lot to prepare interactive materials for the school.”

The results confirmed that heutagogy is an appropriate framework for the teachers' education in academic post-graduate studies.

5 Discussion

To manage the course of computer aided learning is not so easy in our days. Until the course is elaborated, it is outdated, because the technology evolves in a very rapid way. We must prepare teachers for the next thirty-forty years, so, the most important thing for them is to become capable people, trained for lifelong learning. Teacher education has to improve and stimulate attribute like self-efficacy in learning, communication and teamwork skills, creativity, and spirit of investigation, to keep pace with the new technologies' facilities.

In the same time, our students differ a lot by comparison with the ten years ago students, they have no more patience to follow a theoretical course, and they prefer to be actively involved in the learning process.

In this study we changed fundamentally the framework of learning and the results were gladdening.

The reason to adopt a heutagogic framework was strengthened by the heterogeneity of the group of students and by their experience of learning, all of them being graduated, with a bachelor in different specializations. We considered important their experience in using computer and different devices, as was stressed in the first part of the study.

The heutagogy is a strong motivational approach and the students appreciated a lot this non-traditional way of learning.

The tasks were negotiated at the beginning, relevant for the students' future activity, integrating the technologies in the lessons. They were asked to design different materials, for a real context, with immediate application in the classroom. To elaborate these materials, the students needed to explore the Internet, to find useful resources with the minimum of guidance from the teacher.

The collaborative learning was encouraged and the sharing of experience and knowledge. The learning activities' products proved a lot of creativity, connections between different domains. The students were able to imagine didactic situations and to exploit the computer's facilities. They elaborated interactive materials for pupils like tests or questionnaires. The WebQuest projects stimulated the collaborative activity, exploration, connections, sharing and, finally, reflection.

The evaluation developed in two stages: the students asked first the opinion of some colleagues, by uploading the learning products on the platform and inviting the others to assess their work. After this stage, they reflected on the observations of the colleagues and improved their work. In the final stage, the students had to present their materials, to justify the chosen methods, to describe the elaboration process, to reflect on what new skills they acquired.

The questionnaire was sent after two weeks. It was a new moment to reflect on the activities and the answers proved a very good appreciation of the heutagogic design elements.

6 Conclusion

Nowadays, more and more adults have to change the workplace, need a re-qualification to find another job, even in a different domain. The teacher education departments prepare teachers and the number of post-graduate students which choose to work in education as a second chance increases every year. They are adult learners, with a bachelor in other specialization, with experience in learning.

The adult students differ from traditional-aged college students through strengths, like educational experience, a high degree of motivation, but in the same time they have to face obstacles, like work and family responsibilities, financial limitations, psychological barriers.

Teachers' educators have to work with a heterogeneous group of students: diverse fields of specialization, diverse levels of using computer and mobile devices, diverse experiences in education.

According to these reasons, to prepare teachers for the future, especially in a post-graduate study program, heutagogy is the appropriate framework.

Computers and mobile devices are in a spectacular evolution and their use in the classroom demands capable teachers who should know how to learn and keep pace with these changes.

In teachers' education, it is an obligation to use new methodologies as example for the students' prospective work. They have to be able to explore, create, collaborate, connect, share and reflect. The self-determined learning will empower them with appropriate features for a teacher.

In the future, the teacher education departments should try to extend the heutagogic framework to the majority of courses.

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