

KAUNAS UNIVERSITY OF TECHNOLOGY
LITHUANIAN UNIVERSITY OF EDUCATIONAL SCIENCES
ŠIAULIAI UNIVERSITY
LITHUANIAN SPORTS UNIVERSITY

MINDAUGAS DUBOSAS

**APPLICATION OF INTERACTIVE TECHNOLOGIES FOR
FOSTERING STUDENTS' SELF-DIRECTED LEARNING**

Summary of Doctoral Dissertation
Social Sciences, Education, (07S)

2017, Kaunas

This doctoral dissertation was prepared at Kaunas University of Technology, Faculty of Social Sciences, Arts and Humanities, Department of Educational Studies during the period of 2012-2017.

Scientific Supervisor:

Assoc. Prof. Dr. Gintarė TAUTKEVIČIENĖ (Kaunas University of Technology, Social Sciences, Education, 07S)

Editor: Birutė Jurkšaitė (Publishing Office “Technologija”)

Dissertation Defence Board of Education Science Field:

Prof. Dr. Brigita JANIŪNAITĖ (Kaunas University of Technology, Social Sciences, Education, 07S) – **chairwoman**;

Prof. Dr. Habil. Marijona BARKAUSKAITĖ (Lithuanian University of Educational Sciences, Social Sciences, Education, 07S);

Prof. Dr. Aušra KAZLAUSKIENĖ (Šiauliai University, Social Sciences, Education, 07S);

Prof. Dr. Velta LUBKINA (Rezekne University of Applied Sciences, Latvija), Social Sciences, Education, 07S);

Prof. Dr. Romualdas MALINAUSKAS (Lithuanian Sports University, Social Sciences, Education, 07S).

The official defence of the dissertation will be held at 11 a.m. on October 27, 2017 at the public meeting of the Dissertation Defence Board of Educational Science Field in the Rectorate Hall at Kaunas University of Technology.

Address: K. Donelaičio Str. 73-402, 44249 Kaunas, Lithuania

Tel: (+370) 37 300 042; Fax: (+370) 37 324 144; Email: doktorantura@ktu.lt

The summary of the doctoral dissertation was sent on September 27, 2017.

The dissertation is available on the internet (<http://ktu.edu>) and at the libraries of Kaunas University of Technology (Gedimino st. 20, Kaunas, Lithuania), Lithuanian University of Educational Sciences (Studentų st. 39, Vilnius, Lithuania), Šiauliai University (Vytauto st. 84, Šiauliai, Lithuania) and Lithuanian Sports University (Sporto st. 6, Kaunas, Lithuania).

KAUNO TECHNOLOGIJOS UNIVERSITETAS
LIETUVOS EDUKOLOGIJOS UNIVERSITETAS
ŠIAULIŲ UNIVERSITETAS
LIETUVOS SPORTO UNIVERSITETAS

MINDAUGAS DUBOSAS

**STUDENTŲ SAVIVALDAUS MOKYMOŠI SKATINIMAS
TAIKANT INTERAKTYVIĄSIAS TECHNOLOGIJAS**

Daktaro disertacijos santrauka
Socialiniai mokslai, edukologija (07S)

2017, Kaunas

Disertacija rengta 2012-2017 metais Kauno technologijos universiteto Socialinių, humanitarinių mokslų ir menų fakultete Edukologijos katedroje.

Mokslinis vadovas:

Doc. dr. Gintarė TAUTKEVIČIENĖ (Kauno technologijos universitetas, socialiniai mokslai, edukologija, 07S).

Redagavo: Birutė Jurkšaitė (Leidykla “Technologija”)

Edukologijos mokslo krypties disertacijos gynimo taryba:

Prof. dr. Brigita JANIŪNAITĖ (Kauno technologijos universitetas, socialiniai mokslai, edukologija, 07S) – **pirmininkė**;

Prof. habil. dr. Marijona BARKAUSKAITĖ (Lietuvos edukologijos universitetas, socialiniai mokslai, edukologija, 07S);

Prof. dr. Aušra KAZLAUSKIENĖ (Šiaulių universitetas, socialiniai mokslai, edukologija, 07S);

Prof. dr. Velta LUBKINA (Rezeknės aukštoji mokykla, Latvija, socialiniai mokslai, edukologija, 07S);

Prof. dr. Romualdas MALINAUSKAS (Lietuvos sporto universitetas, socialiniai mokslai, edukologija, 07S).

Disertacija bus ginama viešame edukologijos mokslo krypties disertacijos gynimo tarybos posėdyje 2017 m. spalio 27 d. 11 val. Kauno technologijos universiteto Rektorato salėje.

Adresas: K. Donelaičio g. 73-402, 44249 Kaunas, Lietuva.

Tel. (370) 37 300 042; faks. (370) 37 324 144; el. paštas doktorantura@ktu.lt.

Disertacijos santrauka išsiųsta 2017 m. rugsėjo 27 d.

Su disertacija galima susipažinti internete (<http://ktu.edu>) ir Kauno technologijos universiteto (Gedimino g. 20, Kaunas, Lietuva), Lietuvos edukologijos universiteto (Studentų g. 39, Vilnius, Lietuva), Šiaulių universiteto (Vytauto g. 84, Šiauliai, Lietuva) ir Lietuvos sporto universiteto (Sporto g. 6, Kaunas, Lietuva) bibliotekose.

INTRODUCTION

One of the Europe 2020 strategy goals is the progressive growth, i.e., the promotion of knowledge, innovation, education, and digital society. Dissemination and mastering of the latest knowledge (i.e., teaching and learning) is an important factor in order to ensure a high level of the country's economy and progressive future for the society. Continuous learning and knowledge updating becomes an integral part of every member of society and rapid development of information technology, especially the Internet, opens up new learning opportunities.

Professionals working in various fields widely use interactive technologies, also they are included into the study process (Coleman, 2011; Lawrence et al., 2012). The usage of these technologies in the educational process is characterized by: active student participation, collective intelligence, cooperation, interactivity, social interaction, and the ability to create learning networks (Bryant, 2006). The use of technologies in the study process develops new characteristics and they make tasks more interesting for learners (Keller and Suzuki, 2004). According to Dabbagh and Kitsantas (2012), the usage of social network in higher education promotes student-centered self-directed learning.

While learning, current students strive to be active, participate in decision making both for learning content and for studying tools; thus, the number of students who use interactive technologies and participate in learning social networks constantly increases. Technologies extend communication and learning opportunities, therefore, higher education institutions should make use of their opportunities and enable them in formal education environments (McLoughlin and Lee, 2010, 2011). The experience gained while learning to use interactive technologies helps meet the needs of students and develops self-directed learning skills (McLoughlin and Lee, 2010). A large part of the studying process is based on self-directed learning which depends on many aspects including students' characteristics (Merriam, Caffarella, and Baumgartner, 2007; Prabjandee and Inthachot, 2013; Chen and Hu, 2014; Gibbons, 2014; Guglielmino, 2014; Chou and Chen, 2015), the self-directed learning process (Loyens et al., 2008; Huang, 2008; Murad and Varkey, 2008; Rossetti and Meed, 2008; Hendry and Ginns, 2009; Brockett and Hiemstra, 2010; Thornton, 2010), and the environment which surrounds the student (Attwell, 2007; Underwood and Banyard, 2008; Pata and Våljataga, 2007; Fiedler and Pata, 2009). Considering the analysis of scientific works, the **scientific problem** of this study is raised using the question: how to foster students' self-directed learning while using interactive technologies?

Aim of the research

The aim of this dissertation is to evaluate the peculiarities of the usage of interactive technologies in the study process for fostering students' self-directed learning.

In order to realize the purpose, the following tasks were set out:

1. To justify the interactive technologies model as a tool to foster self-directed learning;
2. To justify the research methodology for fostering students' self-directed learning while using interactive technologies in the study process;
3. To determine empirically whether interactive technologies in the study process might foster students' self-directed learning while using interactive technologies in the study process.

The concept of student's self-directed learning fostering while applying interactive technologies is based on the following **conceptual approaches**:

- The analysis of students' learning in the formal environment is based on the *paradigm shift theory* which emphasizes the change from teaching to learning (Alheit and Dausien, 2002; Kuhn, 2003; Jucevičienė and Petkūnas, 2006; Morkūnienė, 2010). With respect to these paradigms, the interaction paradigm also exists (Jucevičienė et al., 2005; Morkūnienė, 2010). It emphasizes interaction, collaboration, and partnership between the educator and the learner.
- *Learning strategy concept* is applied to analyse the integration of learning based on interactive technologies to formal learning environments. Learning strategies reflect the learner's attitude to the learning process itself (Saljo 1979; Ramsden, 2001; Felder and Brent, 2005).
- *Self-directed learning concept* is applied to investigate students' improvement tendencies in the learning process (Dewey, 1949; Tough, 1971; Vygotsky, 1978; Knowles, 1975; Candy, 1991).
- In order to analyse and create the aspect of adults' learning fostering in the formal learning environment, the constructive approach is used (Ahlberg, Dillon, 1999; Dewey, 2013). As the essential methodical knowledge principle, the construction of knowledge means self-knowing, testing, experimenting, continuously constructing while using ideal and material ways and giving a sense with the reference to personal interests and *motivations* (Reich, 1996).
- The analysis of learning guided by the interactive technologies usage in the study process is based on the *theory of connectivism*. Learning performed in the pre-defined environment with continuously changing renewable elements is emphasized (Siemens, 2007).

The empirical research is based on the following **methodological approaches**:

- *Case study* strategy was used to understand social phenomena in one or several naturally occurring phenomena (Bloor and Wood, 2006).

- *Mixed-research* strategy was used to collect the most comprehensive information possible to perform data evaluation (Creswell, 2007; Gay, Mills, and Airasin, 2009; Denscombe, 2010). *Quantitative research* was applied to reveal the characteristics of the research object and its statistical parameters. *Qualitative research* methods were chosen for their flexibility (Kardelis, 2002) as data analysis focused on interpretation. The dissertation uses *method triangulation* when in order to understand the researched phenomenon, several different quantitative and/or qualitative research methods were used (Kardelis, 2002; Denscombe, 2010).

Research methods:

- *Analysis of scientific literature* was executed in order to outline the elements of the problem researched in the dissertation and to justify the model and research methodology for the application of interactive technologies for fostering students' self-directed learning.
- *Written survey* was used in order to ascertain students' purposes and features in the use of interactive technologies (452 students of one Lithuanian University were surveyed). This data was used to plan the case study and carry out the dissertation research.
- *Structured interview (before studying and after it)* was made in order to reveal students' self-directed learning levels before using learning based on interactive technologies and after it. The purpose was to find out whether the usage of interactive technologies affects changes in the level of self-directed learning (46 students participated in both interviews).
- *Supervision* was performed in order to evaluate students' activity while using interactive technologies for learning purposes (during the research, 89 students participated in the interactive environment).
- *Discussion focus group*. Its purpose was to reveal students' understanding, attitudes, and opinions, and how the interactive technologies fostered their self-directed learning (one focus group discussion was organized with 5 participants who used interactive technologies in their studying process).

Data analysis methods:

- *Qualitative content analysis* was used while processing the data obtained through structured interviews (initial and final) and the focus group discussion. The data was analysed while performing the following procedures: selection of appropriate texts; text decomposition into components; then the latter were assigned to subcategories; the subcategories were assigned to categories (Mayring, 2001); the categories were assigned to topics. Then the categories and content were interpreted and the results as well as conclusions of the research were provided.

- *Statistical data analysis* to process the quantitative data of a written survey was performed while using SPSS 16.0 statistical data processing software. Descriptive statistics methods were used to characterize the variables: average evaluates and the percentage frequency to describe students' opinion on some questions of the survey. To check the non-parametric hypotheses, the Chi-square test (χ^2) criterion together with statistical significance level $\alpha=0.01$ were used.

Scientific novelty:

- Self-directed learning levels were defined and theoretically justified;
- The model for fostering students' self-directed learning in the interactive technologies environment was created;
- The research methodology for the application of interactive technologies in the learning process for fostering students' self-directed learning was justified;
- The characteristics of students' self-directed learning while using interactive technologies as a tool to foster self-directed learning were emphasized.

Practical value

- The model for fostering students' self-directed learning using interactive technologies was created and tested; the research methodology can be applied to foster students' self-directed learning;
- The created fostering model for students' self-directed learning by using interactive technologies can be applied in any study module in order to foster students' self-directed learning.

Work Structure

The scientific work consists of Introduction, three Sections, Conclusions and Recommendations, References, and Appendices. The volume of the study is 139 pages without appendices. There are 16 Tables, 19 Figures, and 3 Appendices. The list of reference consists of 237 sources of scientific literature.

CONTENT OF THE DISSERTATION

LIST OF TABLES

LIST OF FIGURES

KEY DEFINITIONS

INTRODUCTION

1. THEORETICAL SUBSTANTIATION OF FOSTERING SELF-DIRECTED LEARNING WHILE APPLYING INTERACTIVE TECHNOLOGIES

1.1 The concept and features of self-directed learning

1.2 Characteristics of a self-directed learner and self-directed learning levels

1.3 Application of interactive technologies in learning considering self-directed learning

1.4 Methods of fostering students' self-directed learning while using interactive technologies

1.5 Model for fostering students' self-directed learning while using interactive technologies

2. RESEARCH METHODOLOGY FOR FOSTERING STUDENTS' SELF-DIRECTED LEARNING WHILE APPLYING INTERACTIVE TECHNOLOGIES

2.1. Research logic and methods

2.1.1 Research data collection methods

2.1.2 Methods used to analyse the research results

2.2 Case selection and sample

2.2.1 Sample characteristics

2.2.2 Justification of case selection and sample

2.3 Justification of research instruments

2.3.1 Questionnaire of the written survey (pilot study)

2.3.2 Justification of interview questions

2.3.3 Questionnaire of the final interview

2.3.4 Questionnaire of a focus group

2.4 Validity of the research tools and research ethics

3. RESULTS OF THE EMPIRICAL RESEARCH ON ENVIRONMENT FOSTERING SELF-DIRECTED LEARNING WHICH IS ENRICHED WITH INTERACTIVE TECHNOLOGIES

3.1 Students' usage of interactive technologies (pilot study)

3.2 Application of interactive technologies for fostering students' self-directed learning

3.2.1 Initial level of students' self-directed learning

3.2.2 Students' usage of interactive learning environment (observation results)

3.2.3 Influence of interactive technologies for students self-directed learning activities

3.2.4 Influence of interactive technologies for students' level of self-directed learning

3.3 Peculiarities of the interactive environment usage for the purposes of self-directed learning

3.4 Generalization of the research results and discussion

CONCLUSIONS

RECOMMENDATIONS

REFERENCES

APPENDICES

1. THEORETICAL SUBSTANTIATION OF FOSTERING SELF-DIRECTED LEARNING WHILE APPLYING INTERACTIVE TECHNOLOGIES

1.1 The concept and features of self-directed learning

The learning paradigm can be self-directed learning orientated by active and motivational encouragement for learners to rise and achieve their own learning purposes. Tough (1967) emphasizes the importance of the self-directed learning process. Merriam and Caffarella (1991) note that self-direction can be defined as a study form developing learners' knowledge and skills or enriching personal learning environments. The main idea behind it is the personal need to develop and improve.

Self-directed learning can be observed in person's innovative activities, behaviour, and skills. A self-directed learner has to be curious, active, dare to generate new ideas and start new activities. It is crucial that a learner would be able to motivate him/herself and practice self-control in various learning situations.

According to the scholar literature analysis, self-directed learning is described as responsibility, self-control, strong motivation, and self-questioning. In this dissertation, self-directed learning is defined as a learning concept based on personal initiative to detect learning needs, plan learning, execute, monitor and assess learning results, and to practice personal autonomy in the process.

1.2 Characteristics of a self-directed learner and self-directed learning levels

According to Hiemstra (1994), self-direction is best described as characteristics determining each person or a situation into certain learning levels. According to self-directed learning characteristics, reflective learning (Bubnys, 2012), Bloom learning taxonomy, and Thornton (2010) self-directed learning process, levels of self-directed learning can be determined. The ranking of levels from zero (the lowest) to four (the highest) is based on the manifestation of self-directed learning features at each level and the description of typical activities in each level.

Every person can have a certain level of self-directed learning. The zero level manifests as person's unwillingness to take responsibility for his/her achievements; the first level manifests as an ability to rise learning purposes and need for self-development, yet the purposes are not achieved due to internal and external factors; the second level manifests as a demonstration of a need for self-development, defining learning purposes and activities but the execution is inefficient due to a poor learning activities planning; the third level manifests as achieving the learning purposes through well planned activities but not assessing the achievements; the fourth level manifests as strong motivation for self-development, exercising control of internal and external factors, a clear definition of learning purposes, execution and achievement assessment.

1.3 Application of interactive technologies in learning considering self-directed learning

Interactive technologies based environments can help foster student-orientated learning. In formal education, interactive technologies based environments can serve as a tool transforming one direction information flow from a teacher (as an expert) to a student (as a novice) to information exchange network. A teacher provides less learning material and his/her role transforms into the role of a consultant, helper, or network member. This manifests features of the Modern paradigm and its elements. Learners can use the Internet and peers, including lecturers and other students, to construct their knowledge. Interactive technologies ensure the access to an expert's and other peers' content, allow communicating with peers in informal environments, and foster dialogue, collaboration, and creativity. Interactive technologies expand learning possibilities, personal competence, and the choice of learning environments. While integrating interactive technologies to formal learning environments, it is important to ensure that educators and learners are capable to use interactive technologies.

1.4 Methods of fostering students' self-directed learning while using interactive technologies

Students' capability to learn in interactive technologies based learning environment depends on their skills and motivation. Internal and external person's motivation can encourage learners to practice self-directed learning. Internal motivation rises from personal characteristics of the learner, such as character traits and readiness to learn. The external motivation factors can be created while adapting a sufficient learning infrastructure, creating engaging interactive learning environments, and providing support throughout all the learning process.

The learning infrastructure, enriched with interactive technologies, requires to choose relevant learning methods. The blended learning method integrates both face to face learning in auditorium and interactive learning online. It is considered to be the best way to integrate interactive technologies to formal learning environments. Combining activities offline and online helps foster student's self-directed learning. Blended learning has advantages as it is proven to be effective, multilevel, modern, accessible, innovate, and flexible.

Lecturer's skills, communication, and support play a crucial role while encouraging students' self-directed learning and providing the learning material in unconventional ways. One of the blended learning forms is flipped learning, where the usage of technologies changes the focus from offline to online learning. The role of the lecturer changes from an expert and information provider to a supporter and consultant who spends more time communicating with students and differentiating learning.

1.5 Model for fostering students' self-directed learning while using interactive technologies

The dissertation theoretically defines concepts of self-directed learning and interactive technologies, distinguishes characteristics specific for a self-directed learner and self-directed learning activities, and justifies self-directed learning levels. The work also analyses and theoretically justifies characteristics specific for the learning environment enriched with interactive technologies: infrastructure, readiness of the lecturer and the student, collaboration and support. This section presents a systematic attitude to possibilities provided by the usage of interactive technologies in the study process that encourage students' self-directed learning.

In order to construct the environment which fosters students' self-directed learning while using interactive technologies, it is necessary:

- to create an interactive learning environment which fosters self-directed learning through its infrastructure, readiness of the student and the lecturer, and through the possibilities of communication and support. Such environment enables the student to perform activities that are specific for self-directed learning while using his/her abilities, the prepared infrastructure as well as help and support from other individuals;
- to activate students to perform self-directed learning activities in the interactive learning environment. Students who use interactive technologies are encouraged to perform self-directed learner's activities;
- to determine evaluation principles for fostering students self-directed learning while using interactive technologies. The advance in students' self-directed learning activities is evaluated through self-reflection by emphasizing their experiences during the learning process.

Considering the results of the scientific literature analysis, the theoretical model for fostering students' self-directed learning while using interactive technologies is made. We will discuss the components of this model and characteristics that influence students' self-directed learning.

1. Environment based on interactive technologies and receptive for self-directed learning and self-directed learning levels. After the shift of the education paradigm from teaching to learning and technologies switching from passive (World Wide Web 1.0) to active (World Wide Web 2.0 – interactive technologies), the integration of these phenomena is emphasized and it can be presented as an integration of interactive technologies into the formal learning environment. Students are learning in formal, non-formal, and informal learning environments. They complement each other and make integral self-directed learning environments with each other that go beyond the limit of formal education. The central element of such environment is the learner who has natural potential to learn self-directly (Prabjandee and Inthachot, 2013).

The level of learner's self-directed learning. Students come to their purposefully created educational/learning environments with their own self-directed learning experience and skills. The initial evaluation of the self-directed learning level is necessary to provide respective support and help which differs depending on the current self-directedness level. In this study, the self-directed learning levels are distinguished and described according to the characteristics of a self-directed learner and are presented in Section 1.2 considering the activities of a self-directed learner. The zero level describes a learner whose learning totally depends on other individuals as he/she performs activities that are only required by educators. Learners with the first self-directed learning level feel the inner desire to learn, they set the learning goal but do not achieve it as they do not perform the necessary activities for the goal implementation. Learners of the second self-directed learning level are motivated and feel their learning responsibility, they are able to set the learning goal and plan activities but they do not stick to the plan in order to achieve the goal. Learners of the third learning level are motivated, responsible, and they are able to perform all activities of self-directed learning, but they are not able to evaluate the learning results by themselves and correct the learning process considering the goals and achieved results. Learners of the fourth level are absolutely self-directed with respect to learning. Thus, while creating learning environments enriched with interactive technologies, it is expected that they will encourage students to pass from lower to higher learning levels.

II. Fostering students' self-directed learning while applying an interactive learning environment. In order to foster students' self-directed learning, the environment around the learner should encourage and purposefully lead the student to self-directedness. Jucevičienė et al. (2010) claim that a learner should learn while interacting with the environment that supports his/her learning. The students' ability to learn in the context of the educational paradigm shift from teaching to learning depends both on the person's self-directed learning skills, (the ability to determine their learning skills; the ability to plan the activities, resources and time; the ability to implement the set tasks; and the ability to evaluate the results – reflect), on personal traits (strong motivation, independency, activity, critical thinking, novelty), and also on characteristics of the learning environment enriched with interactive technologies (interactivity level, user responsibility, individualization, mobility or time flexibility, information management). The educational/learning environment must be created so that all of its elements would foster students' self-directed learning. This dissertation provides a model for the application of interactive technologies for fostering students' self-directed learning by combining students' self-directed learning levels and four main learning environment elements (readiness of a student, readiness of a lecturer, infrastructure, collaboration and support) (see Figure 1.1).

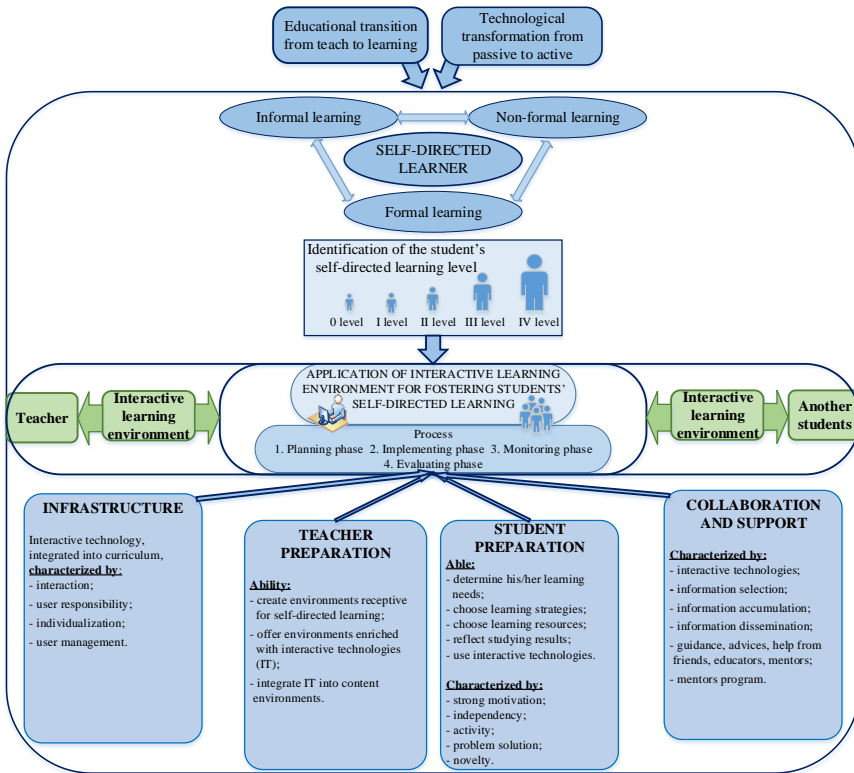


Fig. 1.1 The model of interactive technologies application for fostering students' self-directed learning

Students' ability to study self-directly when the educational paradigm shifts from teaching to learning depends both on student's characteristics and skills of self-directed learning as well as on features and factors of the environment which is respective to the learning needs. The base of the model of the interactive environment application to foster students' self-directed learning is student-oriented, activity encouraging, making the student responsible for his/her learning and the achieved results, enlarging the possibilities for learning by combining the learner's formal, non-formal, and informal learning environments, using their learning resources. The model at first is oriented to determining the student's self-direction skills and evaluating his/her readiness to study self-directly as well as is oriented to the main elements of the formal learning environment based on interactive technologies while emphasizing the importance of readiness of the infrastructure, the lecturer and the student, and also the elements of communication and support.

The learning environment which lacks a sufficient level of one of the elements (infrastructure, readiness of the lecturer, readiness of the student, communication and support) is not full-fledged, so it is necessary that all elements would be active and lead the learner towards the increase of the level of self-directed learner. The learner must be able to determine the learning needs, strategies, resources, to be able to reflect the results and learn to use the tools of the interactive technologies. During the learning process, continuous communication and collaboration is necessary between the counterparts or between the students (see Figure 1.1 “another students”) and the lecturer in the physical, social, and virtual contexts. By integrating the mentioned elements, the environment which is enriched with interactive technologies and can be characterized by integration, reflection, meta-teaching, dynamism, and communication features that conform the self-directed learner’s characteristics was created.

The learning environment constantly changes both due to rapid development of interactive technologies and due to the change of learning subjects’ readiness to learn self-directly, thus, the learning environment enriched with interactive technologies that is created by educators should be continuously developed, renewed, and tuned to the changed environmental conditions and needs. Not only interactive support is necessary for such dynamic and interactive learning methods, but also direct communication in the classroom lectures. Therefore, the most appropriate teaching method is a mixed method when the classroom lectures are combined with the activities provided in virtual space.

The model of the interactive technologies application for students’ self-directed learning emphasizes the integration of formal, non-formal, and informal environments used by a student with interactive technologies to achieve learning purposes. The learning environment enriched with interactive technologies is characterized by factors fostering learning: interactivity, user responsibility, individuality, and mobility. In each learning situation, the learner comes with different readiness and self-directed learning skills that were gained through the earlier learning experience. The communication and collaboration with lecturers and other counterparts help achieve learning purposes by receiving the necessary help and support. In the environment enriched with interactive technologies, an important role is played by the readiness of the lecturer to tune interactive technologies with the learning purposes, learning process and sought learning results, the ability to create learning environments that are receptive to learning, plan and present educational content that is applied and enriched with interactive technologies. The learning results are influenced by physical, social, and virtual environments that complement and can partly replace the learning environment enriched with interactive technologies that is purposefully created by the lecturers.

2. RESEARCH METHODOLOGY FOR FOSTERING STUDENTS' SELF-DIRECTED LEARNING WHILE APPLYING INTERACTIVE TECHNOLOGIES

2.1 Research logic and methods

The empiric aim of this work is to determine the influence the application of interactive technologies makes in a module environment for students' self-directed learning. The research concept and methods were selected while considering the set aim of the research. This is one of the first methods for creating research methodologies (Bettina et al., 2008). Every researcher selects research strategies and methods individually considering the nature of his/her research and also the required results; thus, the aim of the research and the context influence the selection of methods.

The aim of this dissertation is dual: firstly, its purpose is to reveal the influence of interactive technologies in fostering students' self-directed learning (teaching); secondly, with respect to the research results, the aim is to develop the university's educational learning (teaching) environment and to foster self-direction of the students. Such research can be useful in the context of educational transformation to foster students' self-directed learning while applying interactive technologies. The experience gained by the students in the formal educational environment could be applied in various life situations and learning environments.

In order to use interactive technologies, one should know what interactive technologies tools are used by students for learning. Thus, at the first stage, it was decided to perform a pilot study in order to find out whether any of the interactive tools, and on what purpose, were used among the students (for search, information dissemination, communication, etc.), whether they were used for purposeful and self-directed learning, and their peculiarities. This allows determining the students' needs and possibilities to integrate interactive technologies in the learning environment of the university.

The logic diagram of the empirical study is provided in Figure 2.1. Qualitative and quantitative methods are combined in the research and according to Merkys (1999), this allows exploiting their advantages and fully investigate the analysed phenomenon considering various positions as well as to create a more thorough and broader educational vision (Kardelis, 2007). The following actions were made:

1. University, in which the research was carried out, was chosen;
2. Pilot study was made – students' written survey;
3. Case study was made:
 - the interactive learning (teaching) environment was created in which the interactive technologies were integrated into the study module.

- the research during which the influence of interactive technologies for students' levels of self-directed learning was evaluated was performed.
4. Students' discussion in the focus group. Students who studied in the environment enriched with interactive technologies participated in the focus group discussion.

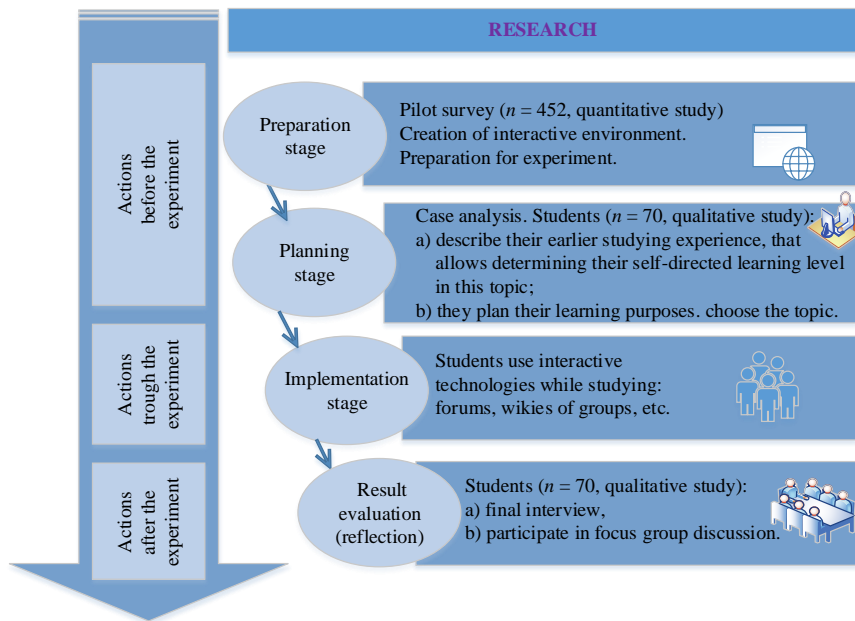


Fig. 2.1 Logic diagram of empirical study

This dissertation evaluates the opportunities of the application of interactive technologies for fostering self-directed learning based on the research results. The results of the pilot study allow evaluating students experience while using the interactive technologies tools for the learning purposes and students' opinion on the purposes and practice of the interactive technologies tools used by lecturers. According to the results, the learning environment enriched with interactive technologies was designed. Before the studies students wrote structured interviews in which they described their self-directed learning experience in the chosen field. Regarding the structured interview results and self-directed learning level defined in the theoretical background, students were allocated to an appropriate level of self-directed learning. During the study process, learners studied while applying interactive technologies, educators provided the necessary help as well as communicated and collaborated with the students not only during the classroom lectures but also in the virtual learning

(teaching) environment. Changes in students' self-directed learning were determined by the supervision, the final interview made after the study and while evaluating the results of the focus group.

2.1.1 Research data collection methods

Written surveys were accomplished in order to reveal purposes and features of the usage of interactive technologies that were used by students (452 students of one Lithuanian university were surveyed). This data was used to plan the case study and perform the dissertation research. Structured interviews (initial and final) were performed in order to determine the level of students' self-directed learning before the studying process that used interactive technologies and after it. It helped to evaluate whether interactive technologies fostered the change in self-directed learning levels (51 students participated in both interviews). A supervision was carried out in order to encourage students to use interactive technologies while involving them into corresponding activities and to determine their turnout in the usage of interactive technologies for the learning purposes (during the study, 89 students participated in the interactive environment). The focus discussion group was applied in order to disclose students' understanding, attitudes, and opinions, and to find out whether/and in what ways interactive technologies fostered their self-directed learning (one focus group discussion was made, 5 students who used interactive technologies in their learning process participated).

2.1.2 Methods used to analyse the research results

The qualitative content analysis was used to process the results of the structured interview (initial and final) as well as the results of the focus group discussion. The results were analysed while performing the following procedures: selection of appropriate texts, decomposition of texts into the components, their allocation into subcategories, interpretation of the subcategories text; presentation of the research results and conclusions. Statistical data analysis was used to process quantitative data of the written survey, SPSS 16.0 (Statistical Package for Social Science) software was used. The variables were characterized while using descriptive statistics methods: the averages and the percent frequencies of the data were calculated. The compatibility criterion was calculated in order to evaluate the statistical reliability. While observing the significance of difference between the empirical and theoretical distribution, the chi-square test (χ^2) criterion was used: the chi-square test (χ^2) criterion and number of freedom degrees (fd) were calculated. The selected significance level α was 0.01.

2.2 Case selection and sample

2.2.1 Sample characteristics

A representative sample for qualitative research was selected while keeping a proportion relevant to the whole population (Čekanavičius and Murauskas,

2000). For qualitative research, a purposeful sampling strategy (Bitinas, et al., 2008; Gay, et al., 2009) in order to define a number of participants in a focus group discussion was selected.

2.2.2 Justification of case selection and sample

A university that has a variety of study disciplines was chosen for the case study while focusing on the first year students taking a certain module chosen for the research purposes. The case study was conducted in the spring semester in 2015-2016.

2.3 Justification of research instruments

2.3.1 Questionnaire of the written survey (pilot study)

Students' usage of the interactive technologies questionnaire was conducted from five diagnostic question blocks based on Likert scale and demographic questions.

2.3.2 Justification of interview questions

The structured interview instrument contained questions diagnosing students' self-directed learning level that were based on the theoretical analysis results (see paragraph 2.2).

2.3.3 Questionnaire of the final interview

The final interview questions were incorporated in the last task at the end of the semester. The questions aimed to diagnose students' self-directed learning levels at the end of the semester and determine whether the application of interactive technologies in the study process had any impact on students' self-directed learning change and attitudes towards learning using interactive technologies.

2.3.4 Questionnaire of a focus group

For an in-depth analysis of self-directed learning while using interactive technologies phenomena, a focus group discussion was conducted. Questions for the discussion were based on the parameters defined in the theoretical part.

2.4 Validity of the research tools and research ethics

The composition of the structured interview tools was based on the characteristics and activities specific to self-directed learning. The validity of structured interview tools, the focus group, and the pilot study content were checked while presenting the questionnaire for experts.

According to Tidikis (2003), the group of 5-7 qualified experts was sufficient to validate the instrument. In order to determine whether the structured interview and focus group questionnaires were understandable for the students, the expert evaluation was made. In this case, the experts were students as the students of the first course were interviewed, thus, the aim was to determine whether they understood the interview questions. Five students of the first course were chosen as experts, two of them were studying in the field of technology, while

other three were the representatives of the social study field. Consequently, they corresponded to the criteria of the students who will participate in the research.

Students-experts after the questions analysis mentioned that questions were clear and they did not notice ambiguous, unethical, or incomprehensible questions. Some students did not understand the term “interactive technologies” and suggested to change it into a more comprehensive term “internet technologies”; one of the experts did not know what the term “wiki” meant. After the discussion with the expert team it was decided to leave the terms “interactive technologies” and “wiki” in the interview questionnaires unchanged and not to replace them with other expressions as they are international terms. For greater clarity, the terms were complemented with their explication and examples.

Ethical requirements should be considered for initiating and executing any research. According to Bhattacharjee (2012), though the ethical requirements are not strictly defined, it is expected that scientists will consider the general acceptable and unacceptable professional scientific behaviour agreements.

This dissertation confirms the principles of research ethics. The principle of openness was followed in this research; students were familiarized with the teaching nature during the first theoretical class of the module: the methodology of the module teaching was presented, the structure of the interactive learning (teaching) environment was reviewed, the requirements for accomplishing the course tasks and the teachers delivering the curriculum were presented. The students had an opportunity to contact any teacher via email any time and to ask for help about the usage of the interactive learning environment. Therefore, friendly, open, and student-oriented learning environment was created. During the focus group discussion, the openness principle was maintained while presenting the aim of the research and its mission to the students, familiarizing them with the study course, and providing the possibility to ask questions that were related to the research.

The voluntariness principle is also maintained. Only volunteers by their free will participated in the focus group discussion.

The confidentiality principle was fulfilled while agreeing with the individuals participating in the discussion that any personal participants’ opinion will not be published. The students were also informed that the discussion was recorded and ensured that the provided information will be used only for the generalized data analysis and it will not be used against them. Names of the subjects were not declared only the generalized results were provided.

Few educators of the study case module also participated while conducting the lectures of the module and contributed to the work of the interactive system, but their names are not revealed in this dissertation due to the confidentiality principle.

3. RESULTS OF THE EMPIRICAL RESEARCH ON ENVIRONMENT FOSTERING SELF-DIRECTED LEARNING WHICH IS ENRICHED WITH INTERACTIVE TECHNOLOGIES

3.1 Students' usage of interactive technologies (pilot study)

The aim of the pilot study is to disclose the purposes and features of the students' usage of interactive technologies as they can be applied to create an interactive learning environment. This subsection presents the survey data about the characteristics specific to the interactive technologies tools usage expressed by the students and, in their opinion, lecturers.

Information acquisition means. It was determined that students used different information acquisition methods unevenly ($\chi^2(6)=401.70$, $p<0.01$). The most knowledge acquired by the students was gained through the lecturers (38%) and while searching for information on the Internet (35%). Some students were searching for the necessary information in the library (13%) or gained it from the counterparts (11%). Since the Internet is one of the most important information acquisition methods, the question "what interactive technologies tools are mostly used by the students during the learning process" arises. The respondents mostly (23%) checked the email option as the most important interactive technologies tool used in the learning process. Virtual learning environments (12%) (formal and informal virtual learning process was possible, e.g., programming or foreign languages, etc.), Moodle studying environment (18%), social network (17%), and the Internet phone calls (15%) were important and the respondents used them in their study process.

Aims of the interactive technologies usage among the students. Among respondents the most popular tools of the interactive technologies for communication ($\chi^2(9)=834.59$, $p<0.01$) were social networks (47%) and the Internet phone calls (Skype) (35%). 17% of respondents also marked an email option as a communication tool. The respondents singled out the Internet phone calls (21%), blogs (17%), emails (14%), and audio/video broadcast (11%) for the group work ($\chi^2(9)=452.94$, $p<0.01$). The respondents found virtual learning environments (33%), moodle.ktu.lt environment (30%), wiki websites (26%), audio/video broadcasts (22%), video sharing websites (20%), and blogs (17%) as the most appropriate interactive technologies for purposeful learning ($\chi^2(9)=221.97$, $p<0.01$). The respondents indicated emails (20%), social networks (19%), and the Internet phone calls (16%) as the mostly used interactive technology for information dissemination ($\chi^2(9)=338.93$, $p<0.01$). 11% of respondents indicated that the audio/video translations, video sharing websites, and wiki websites were also suitable for information dissemination. The respondents noted that all interactive technologies indicated in the survey were suitable for information dissemination and audio/video broadcast was mostly appropriate for the creation of information.

The interactive technologies tools used by the lecturers. When asking about the usage of the interactive technologies tools in the study process by the lecturers, the respondents did not have a strong opinion. Only 36% of respondents thought that lecturers did not use interactive technologies tools in the study process and only 13% of respondents thought that lecturers exploited these possibilities ($\chi^2(3)=61.97, p<0.01$). More than a half of the respondents (57%) thought that some lecturers lacked knowledge how to use the interactive technologies tools and only 22% of respondents had a different opinion ($\chi^2(3)=158.65, p<0.01$).

The results show that when creating the learning environment at university, it is purposeful to use information acquisition methods used by students and interactive technologies used for learning. Following this assessment, the educational environment recipient for learning was created and the virtual learning environment was enriched with interactive technologies.

3.2 Application of interactive technologies for fostering students' self-directed learning

The results of this research stage reveal the interactive environment which is appropriate to foster self-directed learning considering the main theories (see Section 1), self-directed learning activities: planning, implementation, supervision, and evaluation. In the interactive environment of the module, two planning stages are distinguished: the first is rather global in terms of the module (passive with respect to the student) and is intended to foster the self-directed learning process through specific determined activities; the second is rather local (active with respect to the student) and is intended to create and implement activities at students' discretion. The diagram is provided in Figure 3.1.

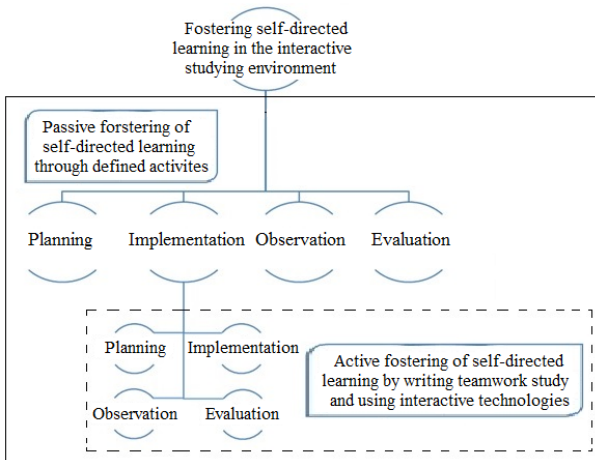


Fig. 3.1 Fostering self-directed learning through the environment enriched with interactive technologies by the self-directed learning process

The interactive learning environment created for the research encourages to maintain the execution of activities specific for the self-directed learning through the activities provided in the interactive environment. In the theoretically defined self-directed learning environment (see Section 1), the first stage is planning, thus, the structure of the interactive environment is presented in a way that it is easy to perceive the planning aspects. In the planning stage, firstly, the general aim of the module is provided; according to it, the information sources are distinguished as recommended (literature) and primary (course material), human resources (educators), assessment criteria (final mark), and time periods when a student must provide middle semester reports (or other defined tasks) and write the group work while using interactive technologies. In this way the environment is created for the students in which, on the one hand, they are free to choose references from the list of recommendations, to plan the attendance of theoretical classes (as the course material are provided in interactive environment), to plan their individual task provision for assessment times according to the provided timetable, but, on the other hand, the students are limited by the studying order determined by educators.

Halfway through the execution of the module and when the students get acquainted with the principles of self-directed learning, the students have the opportunity to perform activities specific for self-directed learning, i.e., to plan, implement, supervise, and evaluate. In the middle of the semester, students must write a group work on the chosen topic. In this way, students themselves, independently from the lecturers, must set a goal, plan the necessary resources and time periods to achieve that goal, supervise the performance of the achievement of the goal, and evaluate their accomplishments.

The aim of the creation of the interactive learning environment is to foster students for self-directed learning while applying interactive technologies. The student, as a person, might have characteristics that are specific for a self-directed learner and perform activities that are specific for self-directed learning. The technologies used by students also might have characteristics and activity aspects which are specific for self-directed learning. It is the only way for technologies to foster self-directness for those who are not self-direct yet or to encourage the growth of self-directness transferring from a lower to higher level of those who are already partly self-direct.

3.2.1 Initial level of students' self-directed learning

The Initial interview results revealed students' self-directed learning level before participating in interactive technologies environments. Self-directed learning levels were based on the theoretical descriptions.

3.2.2 Students' use of interactive learning environment (observation results)

The results of the observation (during the task assessments and discussions) revealed the peculiarities of students' participation in the interactive technologies based environments.

3.2.3 Influence of interactive technologies for students' self-directed learning activities

The final interview results revealed activities that are characterized as relevant to self-directed learning in the interactive technologies environments.

3.2.4 Influence of interactive technologies for students' level of self-directed learning

While using the results of the final and initial interviews, the data of students who participated in both interviews (n=51) were compared and individual changes for each student were evaluated. For clearer comparison of the self-directed learning levels before and after learning (teaching) based on interactive technologies, the quantitative changes in the students' self-directed learning levels expressed as percentages are presented in Figure 3.2.

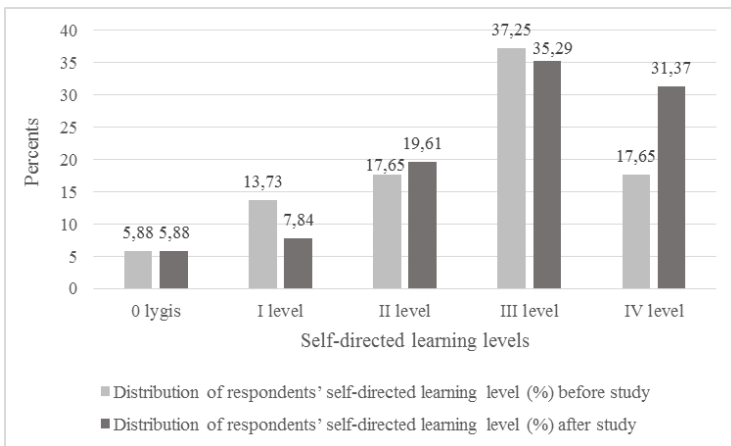


Fig. 3.2 Distribution of respondents' self-directed learning level (%) before and after study

The first step was to determine predominance of any level of self-directed learning before the beginning of the research and after finishing it. The results showed that the third level of self-directed learning were significantly higher among the students both before the beginning of the research ($\chi^2(4)=14.73, p<0.01$) and after finishing it ($\chi^2(4)=18.11, p<0.01$).

As can be seen from the results (Figure 3.2), the overall level after learning (teaching) while using interactive technologies had increased if compared with the data before and after the study, though there was no statistically significant increase in self-directed learning level determined ($\chi^2(4)=5.47, p>0.01$) after finishing the learning/teaching based on interactive technologies. During the usage of interactive technologies in the individual module, the number of students in the first and the third level of self-directed learning had decreased, thus, the number of students in the second and the fourth level of self-directed

learning had increased. The data showed that the number of students who did not studied self-directly did not change as they did not execute the activities specific for the self-directed learner when studying in the virtual learning environment.

While analysing the results of each student who participated in the whole research (who provided the structured interview and the data before and after the study), it was obvious that the level of self-directed learning of 19 students had increased, whereas the learning level of 20 students did not change after learning with the applied interactive technologies.

It is important to note that students' self-directed learning level when interactive technologies were applied for learning changed, i.e., increased or decreased not only per one level but also per two or even per three levels. The self-directed learning level per one step had increased for 11 students and decreased for 4 students. The increase per two steps occurred for 5 students and the decrease per two steps occurred for 6 students. The results showed that for some students the self-directed learning level changed even per three steps (increased for 3 students and decreased for 2 students).

While considering the results, it can be stated that at the beginning of the semester the student who had a lower level of self-directed learning (0, 1) after learning (teaching) based on the interactive technologies had reached a higher self-directed learning level, some of them even "jumped" through several steps at once. For the students with other self-directed learning levels (2, 3, 4) the interactive learning level did not contribute to their self-directed learning level increase and remained unchanged or the initial self-directed learning level decreased per one step. The assumption can be made that interactive technologies cannot be assumed as an appropriate fostering tool for all students and cannot be always contributed to the increase of the self-directed learning level.

3.3 Peculiarities of the interactive environment usage for the purposes of self-directed learning

In order to reveal the features of the students' usage of the interactive environment through the questionnaire of the final structure interview (which was provided at the end of the semester after finishing learning (teaching) based on interactive technologies), four questions were included on this topic and later the focus group discussion was organized. The purpose of the mentioned studies was to reveal the factors of collaboration, support, and infrastructure. This subsection presents results of this part of the research.

The results of the structured interview showed that the infrastructure elements of learning enriched with interactive technologies for a modern student were not so puzzling or difficult to learn. A student who grew up in the world of rapidly developing technologies and actively used them can easily understand and learn to use the tools of the interactive environment. Few students thought that due to some disadvantages of the infrastructure (inconvenient management

of the user environment or inaccessibility or due to the lack of internet connection) they would rather collect and systemize the material necessary for the verbal illustrated report at home while using their personal computer rather than using the interactive learning environment. The majority of students emphasized the advantages of the implementation of assessment tasks during the semester and written work provision using the interactive environment (freedom with respect to place and time, openness, quick feedback, less occurring interferences, and less stress). They also emphasized the importance of collaboration between the counterparts, which was asserted through the information collection, accumulation, and dissemination as well as the collaboration between the educators and the students which was asserted through the objectivity of educators when they evaluated the contribution of each student to their semester report.

In order to complement the results of the structured interview on the peculiarities of the interactive technologies usage and reveal whether these technologies might foster students' learning and help them to develop self-directed learning skills as well as in what ways they might foster, the focus group discussion was organized. During this discussion, five positive aspects that increased students' interest in learning while using interactive technologies were found. All participants of the discussion agreed on the reasons why the interactive technologies were useful:

1. *open data accessibility*, they can take the necessary material at any time and in any place that is convenient to them: "I can make various tests at home in front of my computer", "I can study at convenient times", "It is convenient because you can study wherever you want".
2. *information dissemination and sharing*, as the required material or important information is placed in the interactive environment: "When completing various tasks, I usually used the slides from the Moodle program, and they helped to familiarize with tasks and perform them", "All course info at one place", "The slides from Moodle help perform home tasks independently".
3. *individuality and free creativity*, as you can learn not only in class with counterparts, but also individually at a convenient place delving more deeply into the learning material: "When learning in the virtual space you can analyse more deeply some aspects of the provided material", "It is easy to find the material of the specific lecture", "You don't need to make the compendium yourself as everything is uploaded to Moodle, you can save time.", "The material in Moodle is very convenient if you can't come to the lecture".
4. *learning environment based on interactive technologies orientation towards students' needs*, as for the assessment of tasks you don't need to be in class; the tasks for semester assessment can be uploaded or performed directly in

the virtual learning environment: “Various tests, assessment tasks can be accomplished”.

5. *simplicity*, communication, and collaboration when students can communicate and collaborate with counterparts and educators at any convenient time: “Most students find the virtual learning method more acceptable”, “Simple to use”, “Course friends upload their slides there, it is very useful”.

Interactive technologies can be used during the entire period of the study module or during some parts of the module. Thus, in order to determine in which stage of the learning process the use of interactive technologies can foster studying, we have asked the participants of the focus group to rate the provided stages of learning (by devising/setting a learning goal, planning activities for studying, organizing the learning process, receiving the necessary help, implementing the learning plan (by completing tasks, tests, looking for materials for wikis, etc.) and while supervising and controlling the learning achievements, receiving the feedback from the counterparts and lecturers, evaluating the learning process).

Most students agreed that, firstly, the interactive technologies helped to receive the necessary help related to learning and to organize the learning process. In the second place, the advantage of interactive technologies when implementing the study plan and evaluating the learning process was indicated. In the third place, the contribution of the mentioned technologies to the supervision and control of students’ learning achievements was indicated. As the less important impact of interactive technologies was asserted through the learning goal setting, receiving the feedback from the counterparts and lecturers and also when evaluating the learning process.

The summary of the results shows that students perceived the advantage of learning based on interactive technologies through: independency, when the student was independent from place and time, when completing tasks for assessment; clarity, when the material for task completion was provided in the interactive environment; learning freedom, when the theoretic course material, material of additional literature was provided in the interactive environment and the selection of the learning place and time allowed deeper analysis of the material; interactivity of tasks completion, and simplicity of the use, when it was easy to use the interactive environment and complete the assigned tasks.

3.4 Generalization of research results and discussion

The dissertation empirical research implies a need of in-depth discussion. The discussion part compares the results with theoretical conclusions, other studies results, and insights. The following main fields of the discussion are:

- educational environment enriched by the interactive technologies;
- students’ readiness to learn in the virtual learning environment supported by the interactive technologies;

- lecturers' competence to purposively apply interactive technologies in formal learning environments;
- collaboration and support.

The expression of factors fostering self-directed learning in the research is provided in Figure 3.3. Factors that influenced the level difference of students' self-directed learning the most are emphasized in bold font. Factors put in a rectangle box should be checked with additional research.

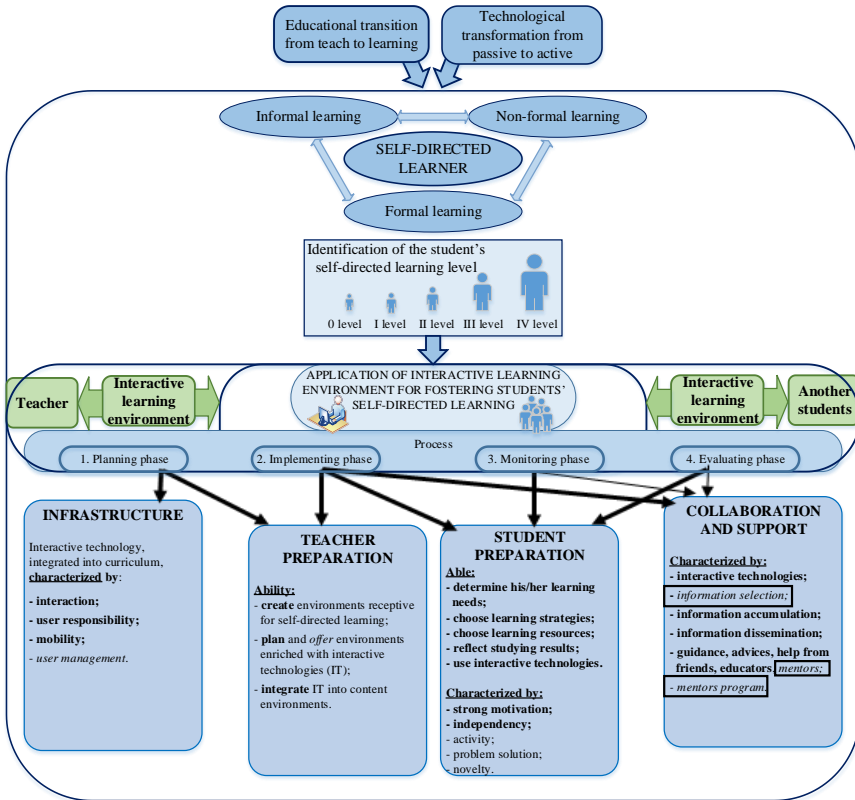


Fig. 3.3 Expression of factors fostering students' self-directed learning

Thus, this research determined different expressions of factors fostering the change in students' self-directed learning levels:

- a group of infrastructure factors: interactivity, user's responsibility and mobility were the factors having the biggest influence. The user management factor had less influence. The condition that is essential in fostering self-directed teaching/learning is to choose correctly the infrastructure characterized by

interactivity, mobility in the planning stage. It should also enable users to perform learning related activities responsibly.

- a group of teacher preparation factors: the most influencing factor in this group is teacher's ability to create environments receptive for self-directed learning. This is also related to the ability to plan properly and integrate IT into the educational content. This condition is obligatory as without a proper preparation of the teacher in the self-directed learning planning and implementation phases students' self-directed learning/teaching will not be fostered. Teacher's preparation to provide the educational content enriched with interactive technologies is a compulsory but insufficient condition.

- a group of student preparation factors: the factors that caused changes in students' self-directed learning included the determination of learning needs, the choice of learning strategies and resources, the usage of interactive technologies, the results reflection, motivation, and independency. These student's preparation factors are compulsory in the implementation, monitoring, and self-evaluating phases. Other not less important factors are activity, problem solving, and application of novelties in the process.

- a group of collaboration and support factors: the change in self-directed learning levels was influenced the most by the possibility to communicate while using interactive technologies, to share information with the help of interactive technologies, to disseminate information, and to accumulate information in the shared environment. In the group of factors, consultations, advices, and help of friends as well as educators are especially important. The mentioned collaboration and support factors are compulsory in the implementation phase and are less important in the monitoring and self-evaluation phases.

The research did not evaluate the information selection, mentors support, and expression of the mentorship programme factors.

CONCLUSIONS

1. The model of the usage of interactive technologies in environments which foster self-directed learning emphasized the expression of the self-directed learner characteristics while encouraging students' self-directed learning in the interactive learning environments. Such environment should be characterized by interactivity, mobility, and the opportunity for the learner to make decisions and manage his/her learning process. The readiness of the lecturer to create environments enriched with interactive technologies is also necessary as well as to ensure the smooth integration of interactive technologies to the learning process. During the learning process, it is essential to warrant the system of collaboration and support which is expressed through an active participation, possibility to receive and disseminate the information with the help of the technologies, communication and collaboration with other colleagues, opportunity to get

help from the lecturers, counterparts, and mentors with higher competence or the members of the broader internet community.

2. The research of the environment fostering students' self-directed learning was accomplished while applying interactive technologies while using the case study and combining qualitative and quantitative methods. The survey method was used to evaluate the needs of students and lecturers together with their experience to use interactive technologies for the purposes of learning. It helped to determine how students usually received the information required for learning, which technologies were used during the learning process and for what purposes students and lecturers used the interactive technology tools. The structured interview with the students allowed to reveal the self-directed learning level of students and changes in the level before the learning (teaching) course based on interactive technologies and after it. The supervision helped to determine the features of students' participation in the interactive environment. The discussion of the focus group allowed deeper insight and analysis into the qualitative research results about fostering self-directed learning (teaching) while applying interactive technologies.
3. The revealed main aspects in the results of fostering the students' self-directed learning while using interactive technologies in different aspects are:
 - *Infrastructure.* The learning environment which fosters students' self-directed learning must be characterized by flexibility and variety of used interactive technologies. The possibility to integrate technologies that students already know and use in everyday life gives more trust and freedom to act. While creating learning environments enriched with interactive technologies tools, it is purposeful to use the tools that are mostly used by students for the purposes of studying.
 - *Readiness of the lecturer.* Only a small part of lecturers uses the tools of interactive technologies when creating and providing the material for the subject and also while evaluating the semester tasks. The cause is insufficient knowledge how to use these tools.

The success in fostering students' self-directed learning while applying interactive technologies depends on the readiness of the lecturer to create the environments recipient for self-directed learning and on his/her ability to organize and provide the learning course so that the learner feels enabled and motivated to learn.

The motivation to learn is encouraged while including the course tasks that are relevant and help solve real life problems. A student should get more autonomy and freedom to choose: a possibility to prepare the learning plan which corresponds the needs, a higher freedom level to

manage the learning process himself/herself together with the learning pace, and an order of task provision for the assessment.

- *Readiness of the student.* Students tend to use interactive technologies for learning, information creation, production and dissemination, communication, and workgroups.

The students who aim to learn in the environment enriched with interactive technologies must have characteristics which are specific for a self-directed learner: inner motivation, independency, activeness, critical thinking, and the pursuit of innovation.

- *Collaboration and support.* The technologies that promote collaboration increase the possibility to choose the appropriate method to get the information required for learning, provide more opportunities to learn from other counterparts, lecturers, and information available on the Internet. The use of less known interactive technologies in the learning process for students requires more effort from the lecturer to foster learning with help of these technologies and more support to master the operating principles of these technologies.

APPROBATION OF THE RESEARCH RESULTS

Article in periodicals and single-use articles published collections

1. Tautkevičienė, Gintarė; Dubosas, Mindaugas. The purposes of students' use of web 2.0 tools for learning at the university // Journal of emerging trends in computing and information sciences. [S.l.]: ARPN Publishers. ISSN 2079-8407. 2014, Vol. 5, No. 12, p. 962-967.

Articles published in other reviewed scientific journals

1. Pliauga, Vytautas; Stanislovaitis, Aleksas; Dubosas, Mindaugas; Kurševičius, Jonas. Skirtingos pramankštos įtaka krepšininukų greitumo - jėgos rodiklių kaitai // Fizinis aktyvumas ir sportas universitete - 2012 = Physical activity and sport at university 2012 : tarptautinės konferencijos pranešimų medžiaga / Kauno technologijos universitetas. Kaunas: Technologija. ISSN 2029-9931. 2012, p. 135-137.

Articles published in conference materials

1. Tautkevičienė, Gintarė; Dubosas, Mindaugas. Universiteto studentų savivaldaus mokymosi įgalinimas naudojant saityno 2.0 technologijas // ALTA'12: Open Educational Resources : international conference proceedings = Atvirieji išteklių edukacinėje praktikoje : tarptautinės konferencijos pranešimų medžiaga. Kaunas: Technologija. ISSN 2335-2140. 2012, p. 45-52.
2. Dubosas, Mindaugas; Klizienė, Irina. Mobilųjų programėlių taikymas studijų procese // ALTA'15 : Pažangios mokymosi technologijos : konferencijos pranešimų medžiaga, 2015 m. gegužės 7 d. = Advanced learning technologies: conference proceedings, 7th of May 2015 / Nacionalinė distancinio mokymo asociacija, Kauno technologijos universitetas, Nacionalinė skaitmeninė koalicija, Baltijos edukacinių technologijų institutas. Kaunas: Kauno technologijos universitetas. ISSN 2335-2140. 2015, p. 76-78.

INFORMATION ABOUT THE AUTHOR OF THE DISSERTATION

Name, surname Mindaugas Dubosas
Date of birth: 3th July, 1981
Email: mindaugas.dubosas@ktu.lt

Education

2012-2016 Doctoral studies in Social Sciences (Education Science, 07S), Department of Educational Studies, Faculty of Social Sciences, Arts and Humanities, Kaunas University of Technology.

2006-2008 Biology Master's Degree, Lithuanian Academy of Physical Education.

2003-2005 Education Master's Degree, Lithuanian Academy of Physical Education.

1999-2003 Bachelor's Degree in Sports, Lithuanian Academy of Physical Education.

Research and practical experience

2016-2017 Modules taught at Kaunas University of
2015-2016 Technology: “Asmens sveikatos ugdymas”,
2014-2015 “Personal Health Education”, “Sportuojančių asmenų sveikatos ugdymas”

On 14–22 d. August, Scientific traineeship at Tallinn University.
2014

REZIUMĖ

Žinių atnaujinimo poreikis priklauso nuo visuomenės ir darbo rinkos pokyčių, taip pat nuo besikeičiančių šiuolaikinio žmogaus, gebančio aiškiai ir kritiškai mąstyti, galinčio lengvai prisitaikyti prie pasikeitusios aplinkos, poreikių. Mokymo(si) aplinka dažniausiai suprantama kaip žinių gavimo būdas mokantis ugdymo įstaigose, tokiose kaip mokykla, universitetas ir kt. Tačiau žmogus nuolat mokosi iš besikeičiančios aplinkos, bendraudamas su aplinkiniais, draugais ar siekdamas savarankiškai įgyti naujų žinių. Sparčiai tobulėjančių informacinių technologijų amžiuje mokymosi aplinkos persikelia ir į virtualiąją erdvę. Dabartiniai studentai mokymosi metu siekia būti aktyvūs, dalyvauti priimančias sprendimus tiek dėl mokymosi turinio, tiek dėl mokymosi priemonių, todėl studentų, naudojančių interaktyvias technologijas, dalyvaujančių mokymosi socialiniuose tinkluose, nuolat daugėja. Technologijos išplečia bendravimo ir mokymosi galimybes, todėl aukštojo mokslo institucijos turėtų išnaudoti jų teikiamas galimybes ir sudaryti sąlygas technologijas naudoti formaliojo ugdymo aplinkose (McLoughlin, Lee, 2010, 2011). Mokymasis pasitelkus interaktyvias technologijas padeda tenkinti besimokančiųjų interesus ir ugdo savivaldaus mokymosi gebėjimus (McLoughlin, Lee, 2010). Didelė dalis mokymosi yra paremta savivaldžiu mokymusi, kuris priklauso nuo daugybės veiksnių: nuo savivaldžiai besimokančiojo asmeninių savybių, jo gebėjimų (Chen, Hu, 2014; Chou, Chen, 2015; Gibbons, 2014; Guglielmino, 2014; Merriam, Caffarella ir Baumgartner, 2007; Prabjandee, Inthachot, 2013), nuo savivaldaus mokymosi proceso (Brockett, Hiemstra, 2010; Hendry, Ginns, 2009; Huang, 2008; Loyens ir kt., 2008; Murad, Varkey, 2008; Rossetti, Meed, 2008; Thornton, 2010) ir nuo besimokančiojo aplinkos (Attwell, 2007; Fiedler, Pata, 2009; Pata, Våljataga, 2007; Underwood, Banyard, 2008). Atsižvelgus į mokslinių darbų analizę, šio darbo **mokslinė problema** formuluojama kaip klausimas: kaip pasitelkus interaktyvias technologijas skatinti studentų savivaldų mokymąsi?

Tyrimo objektas – studentų savivaldaus mokymosi skatinimas naudojant interaktyvias technologijas.

Tyrimo tikslas – įvertinti interaktyviųjų technologijų naudojimo studijų procese studentų savivaldžiam mokymuisi skatinti ypatumus.

Tyrimo uždaviniai:

1. Pagrįsti studentų savivaldaus mokymosi skatinimo naudojant interaktyvias technologijas modelį;
2. Pagrįsti studentų savivaldaus mokymosi skatinimo studijų procese naudojant interaktyvias technologijas empirinio tyrimo metodiką;
3. Empiriškai patikrinti studentų savivaldaus mokymosi pokyčius mokymuisi skatinti naudojant interaktyvias technologijas.

Įgyvendinant uždavinius remiamasi šiomis teorinėmis nuostatomis:

- Nagrinėjant studentų mokymąsi formaliojoje mokymosi aplinkoje remiamasi *paradigmų kaitos teorija*, kurioje akcentuojamas perėjimas iš mokymo į mokymąsi (Alheit, Dausien, 2002; Jucevičienė ir kt., 2005; Kuhn, 2003; Morkūnienė, 2010). Be mokymo ir mokymosi paradigmų, egzistuoja ir sąveikos paradigma (Jucevičienė ir kt., 2005; Morkūnienė, 2010), pabrėžianti sąveiką, bendradarbiavimą, partnerystę tarp ugdytojo ir besimokančiojo.
- Nagrinėjant mokymąsi, paremtą interaktyviųjų technologijų integravimu į formaliąsias mokymosi aplinkas, vadovaujamosi *mokymosi strategijos koncepcija*.
- *Savivaldaus mokymosi koncepcija* taikoma nagrinėjant studentų tobulėjimo kryptis mokymosi procese (Candy, 1991; Dewey, 1949; Knowles, 1975; Tough, 1971; Vygotsky, 1978).
- Nagrinėjant suaugusiųjų mokymosi skatinimo formaliojoje mokymosi aplinkoje aspektą, remiamasi konstruktyvistiniu požiūriu (Ahlberg, Dillon, 1999; Dewey, 2013).
- Nagrinėjant mokymąsi, paremtą interaktyviųjų technologijų naudojimu studijų procese, remiamasi *konektyvizmo teorija*. Išryškinamas mokymasis, vykstantis iš anksto neapibrėžtoje aplinkoje, kurioje yra nuolat kintančių, atsinaujinančių elementų (Siemens, 2007).

Tyrimo duomenų rinkimo metodai:

- *Mokslinės literatūros analizė* atlikta siekiant atskleisti teorinius disertacijoje nagrinėjamos problemos pagrindus, pagrįsti studentų savivaldaus mokymosi skatinimo taikant interaktyviasias technologijas modelį ir pagrįsti tyrimo metodiką.
- *Apklausa raštu* atlikta siekiant išsiaiškinti studentų naudojimosi interaktyviosiomis technologijomis tikslus ir ypatumus (apklausti 452 studijas viename Lietuvos universitete pasirinkę studentai). Šie duomenys naudoti planuojant atvejo studiją ir atliekant disertacijos tyrimą.
- *Struktūruoti interviu (pradinis ir baigiamasis)* atlikti siekiant nustatyti besimokančiųjų savivaldaus mokymosi lygius prieš interaktyviosiomis technologijomis paremtą mokymąsi ir po jo, norint išsiaiškinti, ar interaktyviosios technologijos daro įtaką savivaldaus mokymosi lygiams (abiejuose interviu dalyvavo 46 studentai).
- *Stebėjimas dalyvaujant* vykdytas siekiant paskatinti studentus naudotis interaktyviosiomis technologijomis, įtraukiant juos į atitinkamas veiklas, ir išsiaiškinti, ar studentai aktyviai naudojami minėtomis technologijomis mokymosi tikslais (tyrimo metu interaktyviojoje aplinkoje dalyvavo 89 studentai).
- *Grupinė diskusija (angl. focus group)* vykdyta siekiant atskleisti studentų supratimą, požiūrį ir nuomonę, ar ir kaip interaktyviosios technologijos

paskatino jų savivaldų mokymąsi (surengta viena grupinė diskusija, joje dalyvavo 5 studentai, mokymosi procese naudoję interaktyviasias technologijas).

Tyrimo duomenų analizės metodai:

- *Kokybinės turinio analizės* metodu apdoroti struktūruotų interviu (pradinio ir baigiamojo) ir grupinės diskusijos metu gauti duomenys. Duomenų analizę sudarė šios procedūros: tinkamų tekstų atranka, tekstų skaidymas į sudedamąsias dalis, šių dalių skirstymas į subkategorijas, subkategorijų turinio interpretavimas ir tyrimo rezultatų bei išvadų pateikimas.
- *Statistinės duomenų analizės* metodu, naudojant *SPSS 16.0* (angl. *Statistical Package for Social Science*) statistinių duomenų apdorojimo programą, apdoroti kiekybiniai apklausos raštu duomenys. Kintamiesiems charakterizuoti taikyti aprašomosios statistikos metodai: skaičiuoti duomenų vidurkiai, procentiniai dažniai.

Mokslinis naujumas ir teorinis reikšmingumas:

- apibrėžti ir teoriškai pagrįsti savivaldaus mokymosi lygiai;
- sudarytas studentų savivaldaus mokymosi skatinimo mokymosi aplinkoje naudojant interaktyviasias technologijas modelis;
- pagrįsta studentų savivaldaus mokymosi skatinimo mokymo procese taikant interaktyviasias technologijas tyrimo metodologija;
- išryškinti studentų savivaldaus mokymosi naudojant interaktyviasias technologijas, kaip savivaldaus mokymosi skatinimo priemonę, ypatumai.

Praktinė disertacijos tyrimo vertė:

- sukurtas ir išbandytas studentų savivaldaus mokymosi skatinimo interaktyviosiomis technologijomis modelis suteikia galimybę taikyti interaktyviasias technologijas ir numatyti skatinimo priemonės tobulinimo kryptis ir būdus;
- sukurtas studentų savivaldaus mokymosi skatinimo taikant interaktyviasias technologijas modelis gali būti pritaikytas bet kuriame studijų modulyje siekiant paskatinti studentų savivaldų mokymąsi.

Disertacijos struktūra ir apimtis

Mokslinį darbą sudaro įvadas, 3 dalys, išvados ir rekomendacijos, literatūros sąrašas ir priedai. Darbo apimtis – 139 puslapiai be priedų. Jame pateikta 16 lentelių, 19 paveikslų ir 3 priedai, panaudoti 237 mokslinės literatūros šaltiniai.

REFERENCES/LITERATŪRA

1. Ahlberg, M., & Dillon, P. (1999). Materials for Constructivistic Environmental Education, mainly to be used in pre-service and in-service teacher education: An integrating approach to environmental learning. In De Paz, M., Pilo, M. (Eds.). *European Project for Environmental Education. A Curriculum for European Schools*. Genoa: University of Genoa, Italy, 3–33.
2. Alheit, P., & Dausien, B. (2002). The double face of lifelong learning: Two analytical perspectives on a 'silent revolution'. *Studies in the Education of Adults*, 34(1), 3–22.
3. Attwell, G. (2007). Personal Learning Environments - the future of eLearning? [žiūrėta 2015-09-02]. Prieiga per internetą: http://www.elearningpapers.eu/index.php?page=doc&doc_id=8553&doclng=6
4. Bacow, L. S., Bowen, W. G., Guthrie, K. M., Lack, K. A., & Long, M. P. (2012). Barriers to Adoption of Online Learning Systems in U.S. Higher Education. [žiūrėta 2015-04-01]. Prieiga per internetą: http://online.iu.edu/_assets/docs/bowen-barriers.pdf
5. Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*. Textbooks Collection. Book 3. CreateSpace Independent Publishing Platform.
6. Bitinas, B., Rupšienė, L. ir Žydzūnaitė, V. (2008). *Kokybinių tyrimų metodologija*. Klaipėda: S. Jokužio leidykla-spaustuvė.
7. Bloor, M., & Wood, F. (2006). *Keywords in Qualitative Methods: A Vocabulary of Research Concepts*. London: SAGE Publications.
8. Bryant, T. (2006). Social software in academia. *Educause Quarterly*, 2, 61–64. [žiūrėta 2014-11-28]. Prieiga per internetą: <http://www.educause.edu/ir/library/pdf/EQM0627.pdf>
9. Brockett, R. G., & Hiemstra, R. (2010). The PRO Model after two decades: Bringing the model into the 21st century. Presentation made at the 24th International Self-Directed Learning Symposium, Cocoa Beach, FL. Prieiga per internetą: <http://www.sdlglobal.com/IJSDL/IJSDL8.1.v2.pdf>
10. Candy, P. C. (1991). *Self-direction for lifelong learning: A comprehensive guide to theory and practice*. San Francisco, CA: Jossey-Bass.
11. Chou, P. N. & Chen, W. F. (2015). Exploratory Study of the Relationship between Self-Directed Learning and Academic Performance in a Web-Based Learning Environment. [žiūrėta 2015-09-07]. Prieiga per internetą: <http://www.westga.edu/~distance/ojdla/spring111/chou111.html>
12. Coleman, R. K. N. (2011). Assessing the Adoption of e-Learning in Ghanaian Universities Master's Thesis. Sweden: Lulea University of Technology.
13. Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.
14. Dabbagh, N., & Kitsantas, A. (2012). Personal learning environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, 15(1), 3–8.
15. Denscombe, M. (2010). *The Good Research Guide: for small-scale social research* (4th ed.). Maidenhead: Open University Press.
16. Dewey, J. (2013). *Demokratija ir ugdymas. Įvadas į ugdymo filosofiją*. Klaipėda: Baltic printing House.
17. Dewey, J., & Bentley, A. (1949). *Knowing and the Known*. Beacon Press, Boston.

18. Felder, M. R., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education*, 94(1), 57–72.
19. Fiedler, S., & Pata, K. (2009). Distributed learning environments and social software: in search for a framework of design. In S. Hatzipanagos & S. Warburton (Eds.), *Handbook of Research on Social Software and Developing Community Ontologies* (pp.151–164). Hershey, PA: IGI Global.
20. Gay, L. R., Mills, G. E., & Airasian, P. (2009). *Educational research: Competencies for analysis and applications* (9th ed.). Upper Saddle River, NJ: Pearson.
21. Gibbons, M. (2014). Personal Power Press International. [žiūrėta 2015-09-02]. Prieiga per internetą: <http://www.selfdirectedlearning.com/teaching-self-directed-learning-tools/major-principles.html>
22. Guglielmino, L. (2014). Guglielmino: Self-Directed Learning for the 21st Century- What Research Says. P21 Partnership for 21st century learning. [žiūrėta 2014-04-02]. Prieiga per internetą: <http://www.p21.org/news-events/p21blog/1472-bellanca-and-guglielminotho-self-directed-pathway-to-deeper-learning>
23. Hendry, G. D., & Ginns, P. (2009). Readiness for self-directed learning: validation of a new scale with medical students. *Medical Teacher*, 31, 918–20.
24. Huang, M. H. (2008). *Factors influencing self-directed learning readiness amongst Taiwanese nursing students*: PhD thesis. Brisbane Australia: Queensland University of Technology.
25. Jucevičienė, P., Simonaitienė, B., Bankauskienė, N. ir Šiaučiukienė, L. (2005). *Mokytojų didaktinės kompetencijos atitiktis šiuolaikiniam švietimo reikalavimams: tyrimo ataskaita*. [žiūrėta 2016-03-24]. Prieiga per internetą: http://www.smm.lt/uploads/documents/kiti/MOKYTOJU_DIDAKT_KOMPETENCIJOS_ATITIKTIS_%20SIUOLAIK_REIKALAV.pdf
26. Jucevičienė, P., Gudaitytė, D., Karenauskaitė, V., Lipinskienė, D., Stanikūnienė, B. ir Tautkevičienė, G. (2010). *Universiteto edukacinė galia: atsakas 21-ojo amžiaus iššūkiams: mokslo monografija*. Kaunas: Technologija.
27. Jucevičienė, P. ir Valinevičienė, G. (2010). A Conceptual Model of Social Networking in Higher Education. *Electronics and Electrical Engineering*, 6(102), 55–58.
28. Kardelis, K. (2002). *Mokslinių tyrimų metodologija ir metodai: (edukologija ir kiti socialiniai mokslai): vadovėlis (2-asis patais. ir papild. leid.)*. Kaunas: Judex.
29. Kardelis, K. (2007). *Mokslinių tyrimų metodologija ir metodai*. Šiauliai: Lucilijus.
30. Keller, J., & Suzuki K., (2004), published (2010). Learner motivation and e-learning design: A multinationally validated process. *Journal of Educational Media*, 29(3), 229–239.
31. Knowles, M. (1975). *Self-directed Learning* (New York, Association Press).
32. Kuhn, T. S. (2003). *Mokslo revoliucijų struktūra*. Vilnius: Pradai (Atviros Lietuvos knyga: ALK, ISSN 1392-1673).
33. Loyens, S. M. M., Magda, J., & Rikers, R. M. J. P. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. *Educational Psychology Review*, 20, 411–427.
34. Mayring, Ph. (2001). Combination and integration of qualitative and quantitative analysis. *Forum: Qualitative Social Research*, 2 (1). [žiūrėta 2015-04-01]. Prieiga per internetą: <http://www.qualitative-research.net/index.php/fqs/article/view/967>.

35. McLoughlin, C., & Lee, M. J. W. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26, 28–43.
36. McLoughlin, C., & Lee, M. J. W. (2011). Pedagogy 2.0: Critical Challenges and Responses to Web 2.0 and Social Software in Tertiary Teaching. In M.J.W. Lee, C. McLoughlin (Eds.), *Web 2.0-Based E-Learning: Applying Social Informatics for Tertiary Teaching* (pp. 43–59). Hershey: Information Science Reference.
37. Merkys, G. (1999). Empirinė-analitinė paradigma ir šiuolaikinis socialinis tyrimas. *Filosofija, sociologija*, 3, 53–64.
38. Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood* (3rd ed.). San Francisco, CA: Jossey-Bass.
39. Morkūnienė, V. (2010). Specific Features of Student Learning Assessment in the Aspect of Educational Paradigm. Summary of Doctoral Dissertation. Kaunas.
40. Murad, M. H., & Varkey, P. (2008). Self-directed Learning in Health Professions Education. *Ann Acad Med Singapor*, 37, 580–90.
41. Pata, K., & Văljataga, T. (2007). Collaborating across national and institutional boundaries in higher education – the decentralized iCamp approach. In *Proceedings of Ed-Media* (pp. 353–362). VA: AACE.
42. Prabjandee, D., & Inthachot, M. (2013). Self-Directed Learning Readiness of College Students in Thailand. *Journal of Educational Research and Innovation*, 2, 1–11. [žiūrėta 2013-06-06]. Prieiga per internetą: <http://scholarlyexchange.org/ojs/index.php/JERI>
43. Ramsden, P. (2001). Strategic management of teaching and learning. In ed. C. Rust, *Improving Student Learning Strategically*, (pp. 1–10). Oxford: OCSLD.
44. Reich, K. (1996). Systemisch konstruktivistische Pädagogik. Neuvied: Luther-hand.
45. Rossetti, A. & Meed, J. (2008). Improving Own Learning and Performance. Key Skills Support Programme. [žiūrėta 2013-12-28]. Prieiga per internetą: <http://dera.ioe.ac.uk/7642/1/Improving%20Own%20Learning%20and%20Performance.pdf>
46. Saljo, R. (1979). Learning in the Learner's Perspective. *Reports from the Department of Education*, 76, Goteborg: Goteborg University.
47. Siemens, G. (2007). Digital natives and immigrants: A concept beyond its best before date. Connectivism blog. [žiūrėta 2012-10-10]. Prieiga per internetą: http://connectivism.ca/blog/2007/10/digital_natives_and_immigrants.html
48. Thornton, K. (2010). Supporting Self-Directed learning: A framework for teachers. *Language Education in Asia*, 1(1), 58–170.
49. Tidikis, R. (2003). *Socialinių mokslų tyrimų metodologija*. Vilnius: Lietuvos teisės universiteto Leidybos centras.
50. Tough, A. (1971). *The Adult's Learning Projects* (Toronto, Ontario Institute for Studies in Education).
51. Underwood, J., & Banyard, P. E. (2008). Understanding the learning space. [žiūrėta 2015-09-02]. Prieiga per internetą: http://www.elearningpapers.eu/index.php?page=doc&doc_id=11937&doclng=6
52. Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

UDK 378.091.315.7 (043.3)

SL344. 2017-08-24, 2,5 leidyb. apsk. I. Tiražas: 50 egz.

Išleido Kauno technologijos universitetas, K. Donelaičio g. 73, 44249 Kaunas
Spausdino leidyklos „Technologija“ spaustuvė, Studentų g. 54, 51424 Kaunas