Modeling of the internal certification system of educational resources

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Abstract

The article analyzes the research, which was carried out for several years to model the system of internal certification of educational resources for blended and e-learning in Higher education. The authors describe the prerequisites for the internal certification system modeling and the features of recent changes in the process of internal certification of educational resources, approved by the university regulations, which is related to the requirements of the situation with COVID-19. The article describes the current model of the system of internal certification of educational resources, which is based on the approbation of the pilot model of e-learning courses (hereinafter – ELC) certification. The key components of the internal certification system are three mandatory expertise (professional, resource and technical). Based on the results of which, the methodological commission decides on the quality of educational resources of the ENC and its certification. Expectations from the current system of internal certification of ELC implementation were justified to a high degree, in particular, we have the following advantages of their use: the creation of quality educational resources, expanding access to various categories of participants in the educational process to educational content; ensuring the individualization of the educational process under the needs, characteristics and capabilities of learners; improving the quality and efficiency of the educational process through the use of digital and innovative educational technologies; ensuring systematic monitoring of the quality of education, implementation of blended and e-learning in higher education.

Keywords

internal certification system, e-learning courses, ELC, educational resources

1. Introduction

The situation with COVID-19, such as social distance, limited access to classrooms, the transition to blended and e-learning, today requires a change in many dimensions in higher education. Not only approaches to the educational process need to be transformed, but also the consciousness of teachers, their psychological attitude and motivation to actively use e-resources in the process of implementing blended and e-learning [1, 2].

The implementation of blended and e-learning in the educational process has prompted the administration to take decisive action to involve teachers in creating teaching materials in various electronic formats, and subsequently to introduce a more rigorous system for assessing the quality of teaching materials used by students. General global trends in education require a

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transformation, because on the one hand the generation of students who need modern resources, on the other hand, the challenges of the pandemic do not leave alternatives in choosing the form of education [3, 4].

Higher education institutions try in different ways to solve the issue of ensuring the quality of e-learning, including e-courses and e-content through the development of standards and the creation of e-learning systems [5], implementing many-sided evaluation of e-learning and digital competences of teachers [6]. An important factor influencing the quality of educational e-resources is determined by their students' assessment both in the process of use and upon completion of work in e-courses through various surveys [7, 8].

To ensure the quality of educational resources, it is necessary to implement their comprehensive evaluation, which includes students' assessment of e-course, expertise of the e-resources and determination of technological feasibility of e-course components.

From this point of view, the preparation of quality educational resources for higher education can be provided by the university system of internal certification.

The research aimed at modeling the system of educational resources internal certification for blended and e-learning in University took place in several stages:

1. Creation the pilot model of the e-learning courses (hereinafter – ELC) certification.
2. Approbation of the pilot model of e-learning courses certification.
3. Development of internal certification system of educational resources for blended and e-learning in higher education.

The approbation pilot model for e-course certification, those ELC which teachers created as an additional resource to support academic disciplines, was tested by collectively discussing the results of the implementation. At the same time, trainings were held for teachers who wanted to be at the forefront of promoting blended and e-learning at the University.

The research was managed by IT in Education Laboratory together with institutes and faculties of Borys Grinchenko Kyiv University. The development of the system of internal certification of educational resources for blended and e-learning took place at the University level and resulted in the approval of the Regulations on the creation and certification of e-learning courses, which is the main tool for the internal certification of educational resources offer for University [9].

It should be noted that until the approval of the internal certification system to ensure education at the University, only 9% of certified ELC were used for bachelor's degree, and 18% for master's degree [10].

The current model of the internal certification system of educational resources, which is described later in the article, is based on the analysis of the results of testing the pilot model of ELC certification, the description of which is presented in the manual [11].

2. ELC design in the e-Learning system

The university e-learning system is a special educational portal built on the Moodle platform, which allows you to create learning material that is stored as a structured ELC and through which is implemented as blended and e-learning [12]. The e-learning system is designed to provide the educational process at the university.

For effective work of teachers and students in the e-learning system were created personal digital cabinets of users (students, teachers, administrators), which provide quick access to useful digital resources: class schedule, means of communication and cooperation with colleagues and students, libraries (scientific materials, access to scientometric databases, etc.), electronic portfolio systems, search for scientific publications and checking student work for plagiarism, questionnaires for students to assess ELC, catalog of courses of choice for university students and other useful links [13, 14].

In the personal cabinet, teachers have the opportunity to use filters to show the ELCs they are currently working with, view their own workload, work with the automated module "Individual teacher plan" and so on.

ELC are formed automatically in accordance with the curricula of higher education students in the academic/educational professional program of the university. The ELC is developed by authors, which can be a teacher or a team of teachers, who are appointed by the decision of the department of the university from among the academic staff/professors/lecturers/employees of the university. In the future, teachers are enrolled in the ELC and their role is defined: author, author-teacher, teacher with appropriate levels of access.

The developed ELC is the property and intellectual property of the University and must have a unified structure and meet the following characteristics:

- structured teaching and methodical materials;
- logical configuration of the discipline studies;
- a clear schedule for students to complete the curriculum;
- the system of interactive interaction of participants of educational process among themselves, means of resources of ELC and technologies of distance learning, during all time of studying of discipline is adjusted;
- high-quality training materials that allow the form of competencies declared in the working program of the academic discipline;
- system of control and evaluation of all types of educational activities of students.

Electronic resources included in the ELC have two types according to the level of student activity. Resources are designed to provide students with the content of educational material, such as structured electronic lecture notes, multimedia lecture presentations, audio and video materials (podcasts, videocasts, webcasts, etc.). And methodical recommendations, resources that ensure the development of the studied material, the formation of skills, acquisition of general and special (professional) competencies, self-assessment and evaluation of educational achievements of applicants, for example: tasks, testing, questionnaires, forums, etc. including the use of digital technologies. The digital learning technologies encourage the development of cognitive, creative, communicative and collaborative skills [15, 16] using ELCs, which are developed for each discipline of the curriculum.

3. ELC structure

The structure of the ELC needs obligatory components of the ELC, approved by the Regulations on the procedure for creating e-learning courses, their certification and use in the e-learning system of Borys Grinchenko Kyiv University [9]:

1. The section with the description of ELC with the indication of the the Academic/Education Professional Program (name, educational level), contains the reference to the actual working program of educational discipline in the Institutional repository; general information about the discipline (resources: working program; evaluation criteria; printed and Internet sources; glossary; announcements; information about the author);
2. Teaching and methodical materials from each content module:
    - theoretical material (structured electronic learning materials, manual in the form of resources Lecture or Book, multimedia presentations of lectures, audio, video, animation learning resources, a list of printed and Internet sources);
    - practical/seminars/laboratory works (content, methodical instructions on their performance, list of tasks, form of presentation of results of performance, terms of performance, evaluation criteria);
    - tasks for individual work of applicants (content, guidelines for their implementation, list of tasks, form of submission of results, deadlines, evaluation criteria);
    - module control (control questions, tasks, form of work submission, deadlines, evaluation criteria);
3. Materials for the final control in the form of an examination (description of the procedure, examination program or references, indicative list of questions, evaluation criteria); in the resource Exam give a brief description indicating the procedure for the exam and evaluation criteria.
4. Additional materials.

Special conditions: if the course is practical, it is advisable to present theoretical information in at least one general resource Lecture or Book; for courses where listening, speaking, etc is obligatory, the form of submission of the completed work in the form of audio or video file, communication/interview in voice or video chat is allowed.

4. The ELC internal certification system

4.1. Model of the ELC internal certification system

The process of testing the pilot model lead to its significant modeling and design of a qualitatively new integrated system of internal certification of educational resources for blended and e-learning (figure 1).

The ELC internal certification system is regulated by the approved Regulations and, accordingly, is carried out monthly following the decisions of the Academic Councils of the institutes and faculties of the university.

The main processes of the certification system presented in the model are: ELC design; organization and conduct of expertise; analysis of expertise results and certification decision-making.

During the professional expertise the scientific level of the course materials is determined, the correspondence of all created resources to the working programs, goals and objectives of the discipline. The relevance of the content, novelty of the submitted material, its completeness and

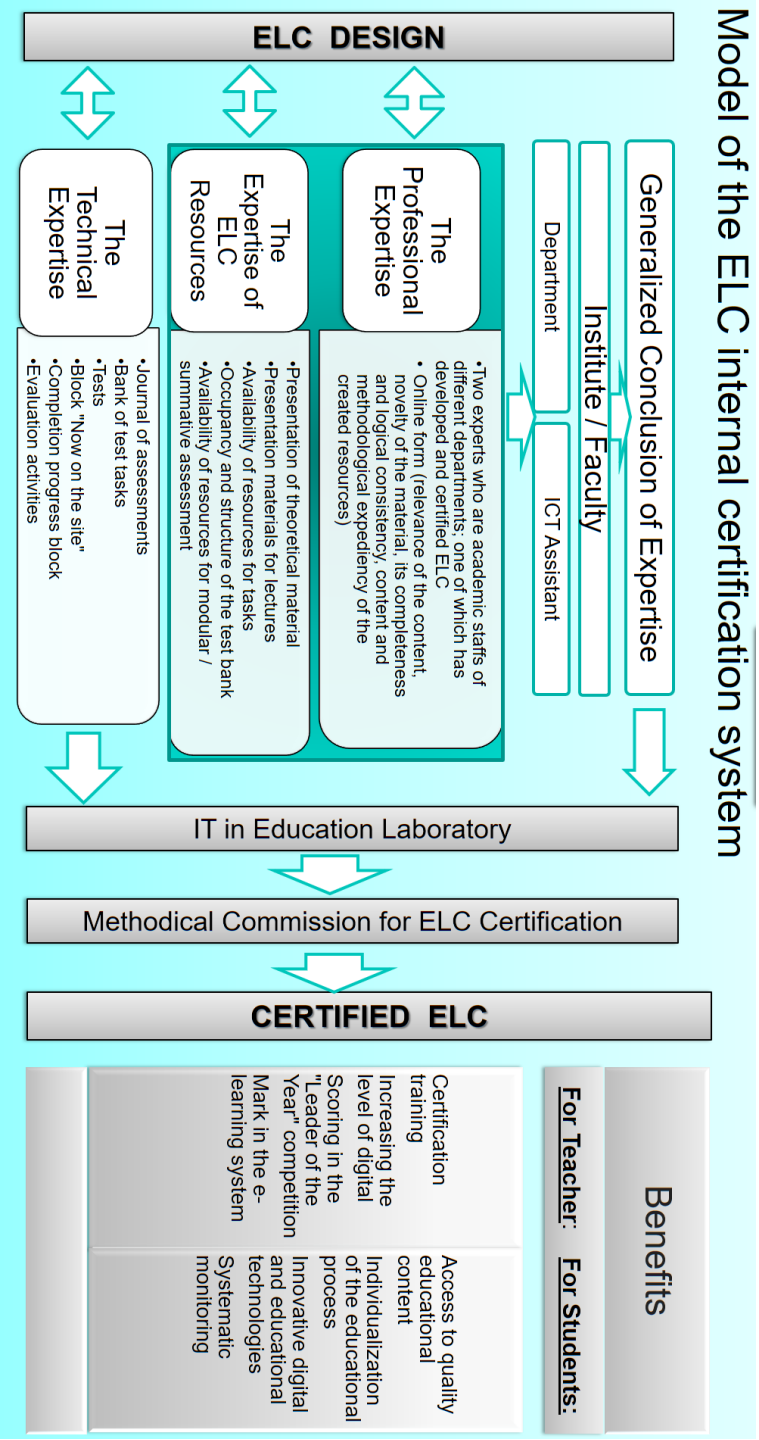

Figure 1: Model of the ELC internal certification system

logical consistency, content and methodological expediency of the created resources, methodological aspects of the course organization, pedagogical and psychological bases of organization of students' and pedagogical staffs' educational activity, their interaction, organization of control system are analyzed.

The procedure for managing a professional expertise includes the following steps:

1) appointment of experts by the director dean of the structural unit;
2) online expertise by appointed experts with conclusion;
3) discussion of the results of the expertise at the meeting of the department.

The expertise of ELC resources is carried out by the ICT Assistant Director/Dean and involves the analysis of the availability of obligatory ELC components and the determination of the level of compliance of each component with the requirements specified in the regulation. The passing score for the expertise of ELC resources for further submission for technical examination is 70 (out of 130 possible).

The professional expertise and expertise of resources takes place in the first two weeks of the current month, after which the ICT assistant can acquaint the author/authors with the conclusions of the expertise.

The generalized conclusion of the ELC examination is signed by the director/dean and submitted by the ICT assistant to IT in Education Laboratory.

The technical expertise of the ELC is carried out by the IT in Education Laboratory at the request of structural units with obligatory monitoring in an online document, which is set up open access for viewing to all participants in the educational process. Technical expertise provides an analysis of the implementation of system-wide requirements: the correct operation of the Journal of Assessments; optimal filling of the test bank; correct test setup; availability and settings of blocks "Now on the site", "Progress of completion"; setting deadlines for tasks.

4.2. Key-steps of the ELC internal certification

The ELC certification decision is made by the methodical commission for ELC certification, the composition of which is approved by the order, is adopted collectively based on the generalized conclusion of the head of structural division based on conclusions of expertise.

Authors should initiate ELC certification and take the following steps:

1. Send a request to the ICT Assistant to lead an expertise of resources and request the appointment of the director/dean of the structural unit of experts (at least 2 people who are employees of different departments; one of which has developed and certified ELC. Specialists from other structural unit of the University and/or educational and scientific institutions may be also involved.
2. Enroll experts in the ELC and invite them by letter with a link to the ELC and password access.
3. Monitor and respond on time to the results of the expertise submitted by experts through the online form "Professional expertise". (Viewing the results of professional expertise is open and available on a corporate account).

The results of each stage of certification are reflected in a free-to-view document, which allows authors to make adjustments to the submitted ELC in accordance with the submitted recommendations.

5. The impact of certification on the quality of learning resources for blended and e-Learning

In a pandemic, the university's educational process was organized using e-learning, to ensure which the university's e-learning system was used quite actively in combination with online communication and collaboration tools [11].

The number of activities by both teachers and students of higher education has increased many times, which confirms a significant increase in the use of ELC. The number of actions of students in 2020 exceeded 9 million and, compared to 2019, increased more than 3 times, teachers – exceeded 2,5 million, an increase of 4 times, due to the processing of educational material, performance and loading of tasks applicants, checking the downloaded tasks, as well as filling the ELC with educational content and keeping a journal of assessment by teachers.

Ensuring the quality of educational resources with which students work has become an important task for the University teachers.

The number of ELCs created in 2020 has almost doubled compared to 2019, which made it possible to provide ELCs to almost 90% of disciplines, of which 60% of ELC are fully developed and fully used in the study of disciplines, others are gradually filled with educational content and used for keeping a log of assessments.

Analysis of ELC that are actively used in the educational process confirms an increase in active ELC by 1,5 times compared to 2019 (figure 2).

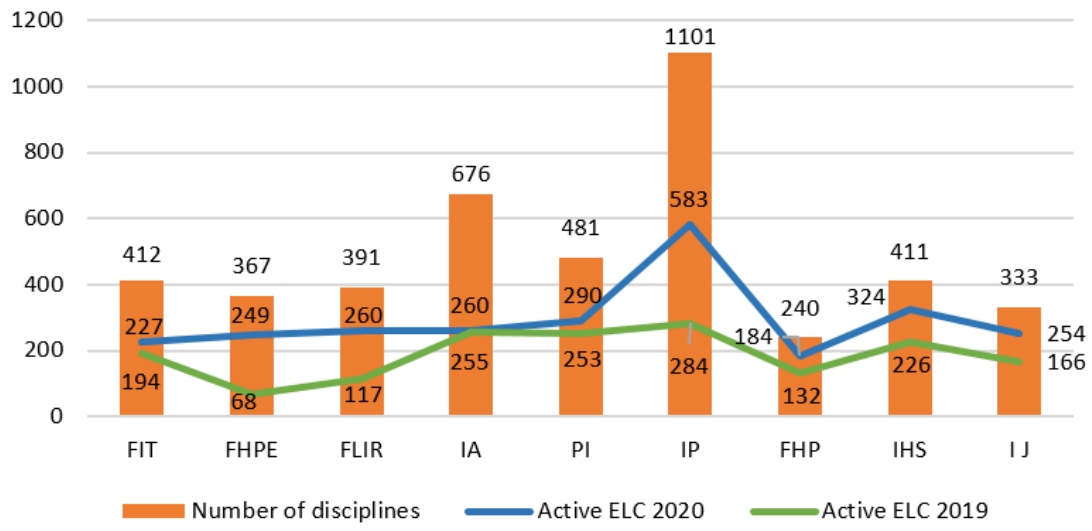

Figure 2: Comparison of the number of active ELC.

Students rated the ELC on a five-point scale from 0 to 5, according to the proposed criteria: Clarity; Accessibility; Relevant; Creativity; Expediency. The evaluation of the ELC in 2020 compared to 2019 remained almost at the same high level of evaluation (figure 3).

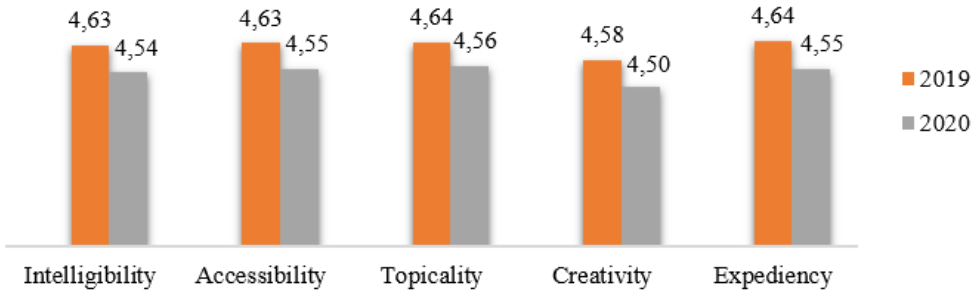

Figure 3: The results of ELC assessment by students.

The observed decrease in the assessment of ELC exhibited by students is caused by the creation and simultaneous use of them during a pandemic, in the mode of full distance learning. Among the reasons are: during the transition to distance learning teachers and students experienced technical difficulties (the need to create activities quickly; insufficient level of digital competence of teachers, psychological barriers to using e-learning, sometimes poor access to the Internet). In 2020, teachers began to use the e-learning system in extreme conditions, not all were fully created ELC, some ELC contained only checkpoints for scoring to form a journal of grades, so students objectively more rigorously assessed ELC in the e-learning system already having a large number of ELC for comparison.

The analysis of the evaluated ENCs confirms the use of ENCs that were filled with content at the same time as the classes, as only 22% of the evaluated ENCs were certified and, accordingly, the level of evaluation of such ENCs averages 4,6 out of 5,0, which remains at levels of 2019.

According to the results of student assessment, certified ENCs are qualitatively developed, the resources presented to them are clear, accessibility; relevant; creativity; expediency and they are sufficient to master the discipline (figure 4).

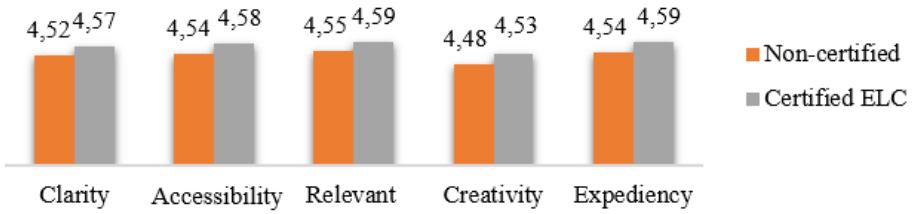

Figure 4: Comparison of assessment of certified and non-certified ELC.

In 2020, the number of certified ELC has almost doubled compared to 2019, the number of ELC submitted for certification has also increased to 709, which is also twice as high as in 2019 and indicates a positive trend in providing disciplines with certified ELC (figure 5).

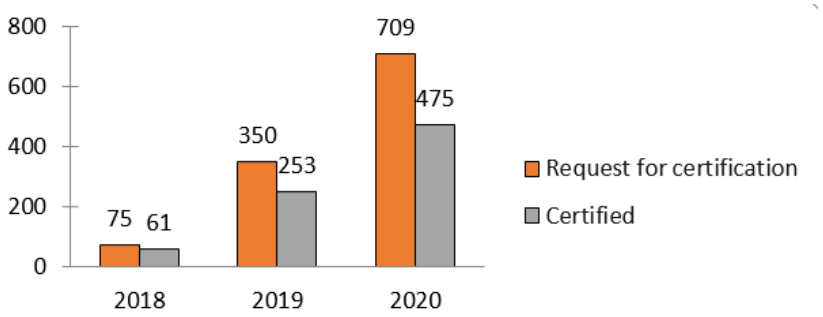

Figure 5: Dynamics of ELC certification.

The positive trend of increasing the number of certified ELCs confirms the need for them by students and teachers. That is why the introduction of the internal certification system justifies an important role in the preparation of quality educational resources and in general in the modernization of the e-learning system of the University now and in the future.

In particular, the opportunity has already been realized for students in a separate ELC not only to have access to educational materials 24/7/365, but also to monitor the progress of personal educational activities. The introduction of the ELC internal certification system has prompted the creation of academic/educational professional programs in the e-learning system, the main advantages of which are the student's ability to see a list of all disciplines to study during semesters and scores in disciplines (figure 6).

The implementation of academic/educational professional programs in the e-learning system has provided the structuring of the e-learning system, access to educational resources of all disciplines of the curriculum; made it possible to carry out constant monitoring of the provision of academic disciplines with the relevant ELC, the level of their development and certification. It is due to the functioning of the internal certification system that there is an increase in the percentage of quality ELCs that have the status of certified. In the future, it is expected that 100% of all educational programs will be certified by ELC.

Part of the ELC internal certification system is the automated control "Report by the department", which reflects the percentage of certified ELC, provided by the curriculum in graphical form (figure 7).

When deploying such a report, the e-learning system displays a complete list of names of disciplines for which ELC are developed and used and which of them are certified, which encourages teachers to improve the ELC used and initiate their certification.

The analysis of the results of the implementation of the ELC internal certification system shows its positive impact on the quality of educational resources and the provision of educational services in general.

6. Conclusions

Based on the testing of the pilot model of ELC certification, a system of internal certification of educational resources for blended and e-learning has been developed in University, which can

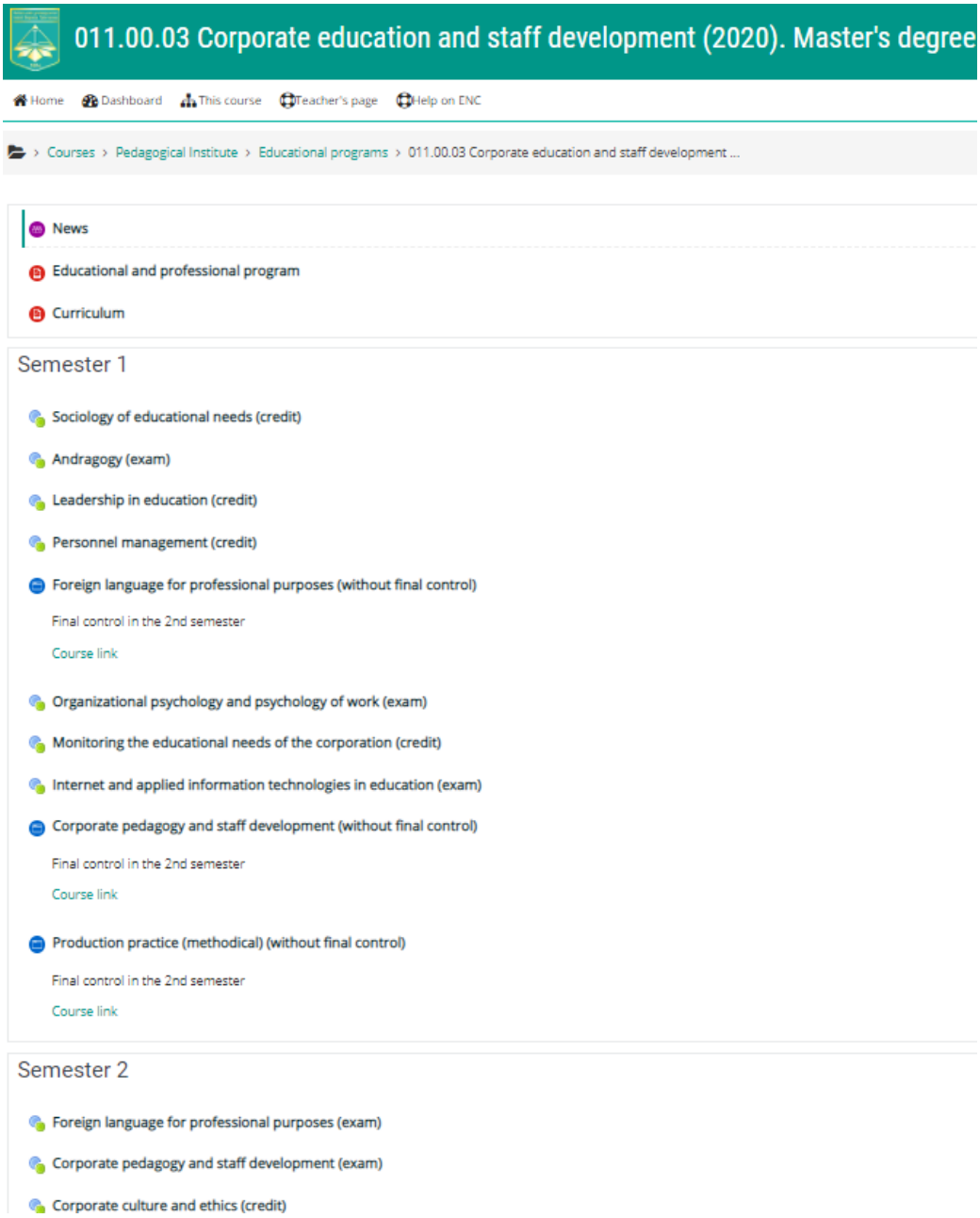

Figure 6: Academic/educational professional programs in the e-learning system.

be recommended for implementation in higher education institutions.

The three independent and diverse expertise (professional, resource and technical) that underlie the system of internal certification and evaluation of ELC by students ensure high quality educational resources and, as a result, the quality of educational services. In the future, it is planned to achieve 100% ELC certification for all educational programs that train professionals

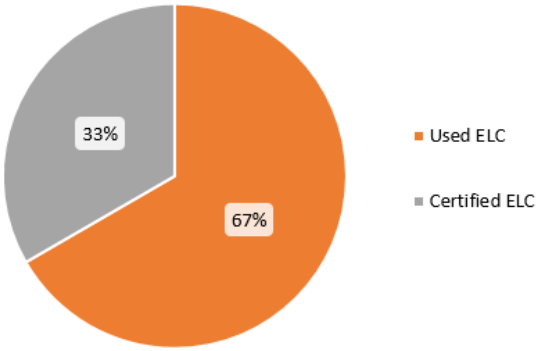

Figure 7: Representation ELC in "Report by the department".

with a sufficient level of digital and professional competence and are competitive in the labor market.

The system of internal certification encourages teachers to increase the level of technical and professional competence, allows them to increase their rating among university teachers; expand the use of digital technologies in the educational process; creation of modern educational digital resources taking into account features of styles of perception of material and designing of criteria of an estimation of their quality; use of digital tools for effective communication and cooperation in blended and e-learning; development of ability and sense of need for constant self-development and self-improvement.

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