

Aspects Related to Information Security within the ESP Course at Russian Colleges and Universities

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Abstract: The paper gives a picture about the current state of teaching and learning information security related topics within the ESP course at Russian colleges and universities. The research was completed on an example of colleges of Moscow region and the Russian University of Transport, Moscow. The results of thematic analysis of paper and electronic ESP textbooks are presented and the learning methods used are stated. The findings show that the thematic coverage of the textbooks used at colleges is wider if used sequentially than of the ones created for universities. Moreover, the university textbook created under the guidance of the graduate chair covers a wider range of topics than most of the British textbooks. The research also proves that there is a sound continuity in ESP teaching between colleges and universities. Active learning methods used by the ESP teachers at colleges and universities comprise mostly project work, role plays, preparation for the students' conferences. The necessity of strong partnership of linguistic and graduate chairs is highlighted.

1 INTRODUCTION

The problem of teaching English for Specific Purposes (ESP) emerged at Russian colleges in 2016 when the new Federal Educational Standard (FGOS) of Secondary Vocational Education for speciality 09.02.07 – Information systems and programming was adopted, and the speciality was included into the list of 50 top-requested for the Russian economy specialities. The Tentative Educational Program of the speciality introduced a new academic discipline named “Foreign Language for a Career”. The only recommended textbook at that time was “Information Technology” by Evans V., Dooley J., Wright S. (Express Publishing, 2011). By 2018 it has become clear that this textbook was unable to cover the entire course of about 200 academic hours, and the Publishing House “Academia-Media” established an interactive platform “Moscow Area Digital College” having invited a number of authors to develop educational supplies of different types in a variety of subjects: textbooks; online courses; virtual learning-by-doing materials; skill training modules with simulations and virtual practices; and learning packs (educational and methodological complexes). We

were lucky to be among the authors and have developed an electronic learning pack for studying English for Specific Purposes. When our materials were revised, approved and published, we were happy to know that three more educational resources for teaching English for Specific Purposes to college students majoring in Information systems and programming appeared on the platform. They are skill training modules “Computer Network Cabling”, and “IT Network Systems Administration” and “Web Development”; and an online course in English for Specific Purposes (ESP). Thus, the coverage of the topics related to computer systems was enlarged, and the types of activities for learning English appeared to be quite diversified. College teachers got a chance to use qualitative educational supplies in the learning process.

As for teaching ESP to students majoring in a wide range of specialities related to Computer Sciences at Russian Higher Education Institutions (HEI), it is being performed within the course of professionally oriented foreign language. It dates back to contextual education ideas (Verbickj, 1999) on learning a foreign language in the context of future professional activity, later developed by a number of

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Russian academics (Maslova, 2000; Grigorenko, 2001) and others.

The works of British methodologists contributed greatly to the methodology of teaching English as a Foreign Language (EFL) at Russian universities in general and English for Specific Purposes (ESP) in particular (Hutchinson & Waters, 1987; Strevens, 1988). Nowadays, Russian teachers, the same as teachers of foreign languages from all around the world, endeavour to adjust their ideas to a new reality in order to achieve the main goal – forming professional foreign language and communicative competence in bachelors' degree students.

This paper presents a research on the current state of teaching and learning information security related topics within the ESP course at Russian colleges and universities and is aimed at mapping a path of enhancing learning as information security is becoming a top priority area in the modern digitized world.

2 METHODOLOGY

When we speak about teaching ESP, three necessary components should be considered (Nurpahmi, 2016): Who, why, when and where are thought (learning situation)? What to teach to ESP students (language description)? How to teach (teaching methods)? These are the three components engaged in our research.

Proving that integrated approach in ESP course design is the most suitable among others, Nurpahmi highlights that it involves integrated source of requirements – a stakeholder, a learner, a teacher, and an expert. Stakeholders are students' parents. (Chapleo et al., 2010). educational institutions, content providers, educational technology providers, accreditation bodies, and employers (Wagner et al., 2006).

Employers don't deal with the ESP teaching and learning at educational institutions directly, they influence the process through their affiliates – Worldskills Russia movement practitioners for colleges and graduate chairs at universities. The Worldskills demonstrational examination nowadays is an integral part of secondary vocational education, the movement dictates, pushes forward, and facilitates through its structural subdivisions such as Regional Competence Centres and Advanced Career Centres, content providers, and educational technology providers to work hard on education renewal by means of new curricula creation and the Moscow Area Digital College platform ensuring

delivering educational materials to students and processing and managing their success.

The Russian University of Transport is a sector-specific university. Its founding shareholder is the Ministry of Transport of the Russian Federation. Some of the engineering training programs refer to transport sector, such as 09.03.02 - Information systems and technology on transport, others have a wide range of transport-related disciplines. The graduate chairs "Information Management and Protection" and "Transport Process Management Digital Technology", review, approve and supervise ESP syllabus, provide recommendations on the topics to be included.

The task of our research is to examine ESP textbooks for college and university students majoring in Computer Sciences in terms of a thematic analysis, and in respect to the topic related to Information Security teaching and studying.

At this stage, we analysed both paper and electronic ESP for computer users textbooks used at colleges and universities to know how much the aspects of information security within the ESP course at these educational levels are inter-lapped, and if there are any thematic gaps needed to be bridged.

The ideas and concepts on information security involved in studying ESP at Russian colleges and universities were grouped according to the International Federation for Information Processing (<https://ifip.org/>): (1) cyber defense (cryptography, computer security, network security, and information assurance); (2) cyber operations (cyber attack and penetration testing, reverse engineering and cryptoanalysis); (3) digital forensics (hardware and software forensics on hosts and service, mobile devices, embedded systems, incident response, cyber crime, and cyber law enforcement); (4) cyber physical systems (SCADA, IoT, and industrial control systems), (5) secure software developments (secure systems design, secure coding), (6) cyber policy, governance and law; (7) cyber risk management (disaster recovery and business continuity); (8) cyber economics; (9) human behaviour relating to cyber systems and operations (social engineering).

The paper and electronic ESP textbooks under examination were marked as follows.

For colleges:

1 - Evans V., Dooley J., Wright S. "Information Technology." Express Publishing, 2011.

2 – Electronic Learning Pack in ESP for college students majoring in speciality 09.02.07 – Information systems and programming, Moscow Area Digital College;

3 - Online course in ESP for college students majoring in speciality 09.02.07 – Information systems and programming, Moscow Area Digital College;

4 – Electronic skill training modules in ESP for the Worldskills competency “Information network cabling”, Moscow Area Digital College;

5 – Electronic skill training modules in ESP for the Worldskills competencies “IT Network Systems Administration” and “Web development”;

For universities:

6 – Esteras S. R. “Infotech English for Computer Users.” – 4th edition. – Cambridge University Press (Intermediate), 2008.

7 – Esteras S.R., Fabre E.M. “Professional English in Use. For Computers and the Internet. ICT”. Cambridge University Press. 2009.

8 – Uchebno-metodicheskoye posobie dlya prepodavateley i studentov k uchebniku “Infotech. English for Computer Users” by Santiago Remacha Esteras (4th ed.) [Study guide for teachers and students for the textbook “Infotech. English for Computer Users” by Santiago Remacha Esteras (4th ed.)]. –M.: Higher School of Economics Publishing House, 2018.

9 – Uchebno-metodicheskoye posobie k uchebniku “Professional English in Use. ICT. For Computers and the Internet“ Study guide for the textbook “Professional English in Use. ICT. For Computers and the Internet“ – M.: Higher School of Economics Publishing House, 2013.

10 – Informatika: teksty po spetsial'nosti na angliyskom yazyke k uchebnomu posobiyu “Infotech English for Computer Users. 4th edition” Texts on Informatics. Supplementary materials for the textbook “Infotech English for Computer Users.4th edition”: MIIT), 2018.

The results of the thematic analysis are presented in the following section (Tables 1-2).

To investigate the third component of the ESP which is how to teach or the methods of teaching we conducted a survey for ESP teachers at colleges and universities. We would like to know if college and university ESP teachers consider the ESP taught to students majoring in Computer sciences (including the topic related to information security) to be aimed at promoting live professional communication or the ESP course still remains “vocabulary teaching” and “reading comprehension” (Kenny, 2016). We wanted to know if active learning methods are used in teaching and learning ESP in this special subject area, as it is exactly active learning methods that are focused mainly on developing thinking, improving speech and business behavioural skills, social skills,

forming communicative strategy and tactics, general and professional competencies (Kryachkov et al., 2015). They engage students in intellectual, creative and more often independent work: role plays, solving cases, debating, verbal sparring, making albums, newspapers, short videos, etc. Scientific papers from all over the world describe a number of practices in teaching the ESP courses: debate (Rybushkina et al., 2016); project work, namely, creation of video projects (Marenzi et al., 2013); case studies and presentations preparation (Kenny, 2016).

We offered the ESP teachers at Russian colleges and universities the question: What active learning methods do you use in teaching topics on information security within the ESP course? We suggested the options:

- preparation for the conferences;
- role plays;
- case studies;
- open space workshops;
- creative projects;
- other methods.

A respondent could provide comments giving detail information on the methods he/she uses. The survey participants were Moscow Region college ESP teachers and the Russian University of Transport ESP teachers who were delivered the survey through the educational authorities’ social media groups. The results of the survey are presented in Table 3.

3 RESULTS

This section presents the results of the research.

Tables 1-2 present the thematic analysis of the predetermined paper and electronic ESP textbooks used at Russian colleges and universities showing the appearance of the aspects grouped according the International Federation for Information Processing as follows: (1) cyber defence (cryptography, computer security, network security, and information assurance); (2) cyber operations (cyber attack and penetration testing, reverse engineering and cryptanalysis); (3) digital forensics (hardware and software forensics on hosts and service, mobile devices, embedded systems, incident response, cyber crime, and cyber law enforcement); (4) cyber physical systems (SCADA, IoT, and industrial control systems), (5) secure software developments (secure systems design, secure coding), (6) cyber policy, governance and law; (7) cyber risk management (disaster recovery and business continuity); (8) cyber economics; (9) human

behaviour relating to cyber systems and operations (social engineering).

Table 1: Aspects of information security within the ESP course at Russian colleges.

Textbooks	1	2	3	4	5
Themes					
Thematic group (1)	+	-	+	+	+
Thematic group (2)	+	+	+	-	-
Thematic group (3)	-	-	-	-	-
Thematic group (4)	-	-	+	+	-
Thematic group (5)	-	-	+	-	+
Thematic group (6)	-	-	+	+	-
Thematic group (7)	-	-	+	-	-
Thematic group (8)	-	-	-	-	-
Thematic group (9)	+	-	-	+	-

Table 2: Aspects of information security within the ESP course at Russian universities.

Textbooks	6	7	8	9	10
Themes					
Thematic group (1)	+	+	+	+	+
Thematic group (2)	+	+	+	+	+
Thematic group (3)	-	-	-	-	-
Thematic group (4)	-	-	-	-	-
Thematic group (5)	-	-	-	-	+
Thematic group (6)	-	-	-	-	+
Thematic group (7)	-	-	-	-	-
Thematic group (8)	-	-	-	-	-
Thematic group (9)	+	+	+	+	+

The results of the research show that the aspects related to information security studied by means of textbooks within the ESP course at Russian colleges are more diverse than at Russian universities and cover 7 of 9 predetermined thematic groups: (1) cyber defense, (2) cyber operations, (4) cyber physical systems, (5) secure software development, (6) cyber policy, governance and law, (7) cyber risk management and (9) human behaviour relating to cyber systems and operations, while such topics as (3) digital forensics and (8) cyber economics are not presented in the college ESP textbooks. In general if studied sequentially the textbooks give students a good picture about the information security issues in English.

Only three of the predetermined topics are widely presented in the ESP textbooks for higher education institutions : (1) cyber defense, (2) cyber operations and (9) human behaviour relating to cyber systems and operations. The exception is provided by the educational supply 5 – Informatika: teksty po

spetsial'nosti na angliyskom yazyke k uchebnomu posobiyu "Infotech English for Computer Users. 4th edition" [Texts on Informatics. Supplementary materials for the textbook "Infotech English for Computer Users. 4th edition": [Electronic recourse] : MIIT), 2018. This educational supply was created at the Russian University of Transport and thus includes a wider range of topics, concepts and ideas in information security presented. In addition to three mentioned above thematic groups it presents (5) secure software developments (secure systems design, secure coding) and (6) cyber policy, governance and law texts, concepts and ideas.

Eight college ESP teachers and nine university teachers took part in the survey on the active learning methods used in teaching and learning ESP topics related to information security. The results are shown in Table 3.

Table 3: Active learning methods in teaching topics related to information security within the ESP course at Russian colleges and universities.

Active learning method	College ESP Teachers	University ESP Teachers
preparation for the conferences	7	8
role plays	5	4
case studies	4	3
open space workshops	2	2
creative projects	5	6
other methods	8	8

All suggested in the survey active learning methods were mentioned. The ESP teachers at colleges and university to this or that extent prepare their students for the conferences, use role plays, case studies, open space workshops, creative projects. Among other methods the usage of ICT was mentioned. These are the Moscow Area Digital college platform, some other Learning Management Systems, such as Wardwall, Lifeworksheets, Google Forms. One teacher reported the usage of the gamified lessons on information security Cyber Security Training www.tryhackme.com.

4 DISCUSSION

In our research we have studied the current state of teaching topics related to information security within the ESP course at Russian colleges and universities. The research was completed in two stages. The first stage comprised the thematic analysis of ESP paper

and electronic textbooks used at colleges and universities. The results showed that the wide range of topics related to information security grouped in accord with the International Federation for Information Processing are covered by the examined textbooks. The only topic not reflected in the ESP course books is (8) cyber economics.

We also found out that the affect of the main stakeholders such as Worldskills practitioners community for colleges and graduate chairs for universities on the content of the ESP is quite significant. It is these bodies that deal with the employers directly, understand the employers' requirements, review, adopt and supervise ESP syllabus. Moreover, the findings highlight that there is a sound continuity in studying topics related to information security between Russian colleges and universities.

There is a chance, however, that college graduates entering the university to continue their education in the chosen sphere will feel themselves like "know-all" masters, thinking about the university ESP course as deceptively simple one. In such a case they will need additional attention from the university ESP teachers and their learning needs should be dealt with individually.

The research on active leaning methods used at colleges and universities showed quite a low level of enthusiasm of the ESP teachers to take part in our survey. It could be explained by the fact that mostly traditional methods of teaching are used in the ESP course. It could happen that active learning methods set the additional requirements to knowledge of the ESP teacher in the subject area he/she teaches. For sure, an ESP teacher should not teach content in the subject area as he/she doesn't have sufficient knowledge. But cooperation of the ESP teacher with the subject teacher helps him/her to delve into a subject background and their common efforts would facilitate students' success.

Nevertheless a good number of teachers who probably have advanced expertise in teaching topics related to information security organize project work, conferences, role plays, case studies, open space workshops. Here a few questions arise: if students are involved in the discourse what level of General English they should have to be successful, if studying General English should stop when a student starts an ESP course, if the ESP course should be integrated into the General English course (Chostelidou, 2011; Ju Bei, 2014). These questions for sure require additional investigation.

Our research proves that the continuity in education in respect to active learning methods in the area under study is ensured as well..

5 CONCLUSION

The paper describes the current state of teaching and learning information security related aspects at Russian colleges and universities and proves the textbooks approved for usage in the learning process at colleges and universities cover a diversity of information security related topic, but not all the International Federation for Information processing is concerned with. The topics related to (8) information economics should be considered as the valuable one to be included into the ESP for computer users course. We also claim that the collaboration of the chairs of foreign languages with key stakeholders improve learning conditions and facilitate new educational materials developments. This collaboration should be continued, to meet new requirements to a young specialist in information security, such as the necessity to pass the examination to get the valuable international certificate and in general, to counteract the modern world information wars.

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