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TEACHING TECHNICAL DOCUMENTATION AND PROCESS DESCRIPTION IN ESP COURSES FOR CHEMICAL TECHNOLOGY AND PHARMACY STUDENTS

Abstract. The article proposes an approach to teaching technical documentation and process description in an English for Specific Purposes (ESP) course for students of chemical technology and pharmacy. The relevance of the topic stems from the fact that the ability to read professional documentation, describe a technological process and explain a technology in English is increasingly becoming a direct professional requirement rather than a general educational add-on. In contrast to the traditional teaching of terminology along the lines of "text — definition — use," the article advances a logic based on four interconnected components and grounded in authentic educational, technical, regulatory and safety sources. The first is a needs analysis of chemical-technology and pharmacy students, which identifies the typical professional situations in which English is used and the corresponding language tasks. The second component is the systematisation of terminology sources and registers — textbooks, standards, instructions, regulatory documents (ICH, EMA, EDQM, FDA PQ/CMC), safety documentation (safety data sheets, SDS) and technical specifications; it is shown that the same term functions in different registers across these document types. The third component is a typology of tasks based on types of professional activity: reading a technical text; describing a technological process; working with an SDS, a technical note, and a specification; and explaining a technology orally. The fourth component is the assessment of professional communication tasks, which focuses not only on terminological competence but also on the ability to describe a process, explain risks, and use normative terminology correctly within the relevant genre. It is concluded that this approach integrates language training with the field's real professional genres and documents and develops the communicative, informational, and critical competences of future specialists in line with the competence-based logic of contemporary higher education. Further research perspectives include piloting the model within the educational process, compiling a task bank by document type, and refining the criteria for assessing professional communication.

Keywords: English for specific purposes, technical documentation, process description, needs analysis, terminology sources and registers, safety data sheet, assessment of professional communication, chemical technology and pharmacy students.

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НАВЧАННЯ ТЕХНІЧНОЇ ДОКУМЕНТАЦІЇ ТА ОПИСУ ТЕХНОЛОГІЧНИХ ПРОЦЕСІВ У КУРСІ ФАХОВОЇ АНГЛІЙСЬКОЇ МОВИ ДЛЯ СТУДЕНТІВ ХІМІЧНИХ ТЕХНОЛОГІЙ І ФАРМАЦІЇ

Анотація. У статті запропоновано підхід до навчання технічної документації та опису технологічних процесів у курсі фахової англійської мови (English for Specific Purposes, ESP) для студентів хімічних технологій і фармації. Актуальність теми зумовлена тим, що вміння читати фахову документацію, описувати технологічний процес і пояснювати технологію англійською мовою дедалі частіше стають прямою професійною вимогою, а не загальноосвітнім доповненням. На відміну від традиційного навчання термінології за схемою «текст — визначення — використання», у статті обґрунтовано логіку, що ґрунтується на чотирьох взаємопов'язаних складниках і спирається на автентичні навчальні, технічні, регуляторні та безпекові джерела. Першим етапом є аналіз потреб (needs analysis) студентів хіміко-технологічних і фармацевтичних спеціальностей, який дає змогу визначити типові професійні ситуації, у яких застосовується англійська мова, а також відповідні мовленнєві завдання. Другий складник — систематизація джерел термінології та реєстрів: підручників, стандартів, інструкцій, регуляторних документів (ICH, EMA, EDQM, FDA PQ/CMC), паспортів безпеки (safety data sheets, SDS) і технічних специфікацій; показано, що той самий термін у різних типах документів функціонує в різних реєстрах. Третій складник — типологія завдань за видами професійної діяльності: читання технічного тексту, опис технологічного процесу, робота з SDS, technical note та специфікацією, усне пояснення технології. Четвертий складник — оцінювання завдань професійної комунікації, орієнтоване не лише на термінологічну компетентність, а й на здатність описати процес, пояснити ризики та коректно вживати нормативну термінологію в межах відповідного жанру. Зроблено висновок, що такий підхід інтегрує мовну підготовку з реальними професійними жанрами й документами, а також розвиває комунікативні, інформаційні й

критичні компетентності майбутніх фахівців відповідно до компетентнісної логіки сучасної вищої освіти. Перспективи подальших досліджень пов'язані з апробацією моделі в освітньому процесі, укладанням банку завдань за типами документів та уточненням критеріїв оцінювання професійної комунікації.

Ключові слова: фахова англійська мова, технічна документація, опис технологічного процесу, аналіз потреб, джерела й реєстри термінології, паспорт безпеки (safety data sheet, SDS), оцінювання професійної комунікації, студенти хімічних технологій і фармації.

Problem statement

The professional activities of chemical technology and pharmacy specialists are closely linked to English-language technical documentation: technical texts, standards, regulatory documents, safety data sheets, and specifications. The ability to read such documents, describe a technological process and explain a technology in English is becoming a direct professional requirement rather than a general educational add-on. At the same time, an English for Specific Purposes (ESP) course is often still built around the memorisation of terminology, while work with the actual genres and documents of the profession remains secondary. This creates a gap between what students learn in a language course and what they have to do in real professional communication, and it calls for a course logic built on the needs of the future specialist and on the documents they will use [1; 8].

Analysis of recent research and publications

Contemporary ESP methodology rests on the idea that a course should be designed based on a needs analysis and on authentic materials that reflect the real communicative situations of the future profession [1]. For pharmacy and chemistry, studies show that a language course is most effective when it is oriented towards typical professional actions — reading professional texts, working with standards, and producing oral and written messages — rather than towards the mere accumulation of vocabulary [8].

Documents in the chemical and pharmaceutical fields provide a rich, normatively grounded basis for such a course. Regulatory and technical sources — the quality guidelines of the International Council for Harmonisation (ICH) [6], the glossary of regulatory terms of the European Medicines Agency (EMA) [3], the Standard Terms database of the European Directorate for the Quality of Medicines & HealthCare (EDQM) [2] and the Pharmaceutical Quality/Chemistry, Manufacturing and Controls (PQ/CMC) materials of the U.S. Food and Drug Administration (FDA) [4] — define key concepts such as active substance, dosage form, stability, quality specification, batch formula and quality risk management

within specific document types and registers. Safety documentation has its own internationally harmonised genre: the safety data sheet (SDS), whose structure and content are defined by the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), which prescribes a fixed sixteen-section format [7]. Authentic educational texts, such as the open-access OpenStax Chemistry 2e textbook, present the field's basic concepts with definitions and examples [5].

Despite the availability of sound ESP methodology and high-quality professional documents, the question of how to organise an ESP course around the genres of technical documentation and process description — rather than around isolated terminology — remains underexplored. Most studies address either the general principles of ESP or the analysis of students' needs, whereas a coherent model that links needs analysis, a typology of document sources and registers, profession-oriented task types and the assessment of professional communication requires further development [1; 8].

The purpose of the article

The article aims to substantiate an approach to teaching technical documentation and process description within an ESP course for students of chemical technology and pharmacy. The approach is organised around four components — a needs analysis, a typology of terminology sources and registers, a typology of ESP tasks based on types of professional activity, and the assessment of professional communication tasks [1; 8] — and draws on authentic educational, technical, regulatory and safety sources: open chemistry textbooks, the ICH quality guidelines, the EMA glossary of regulatory terms, the EDQM Standard Terms database, FDA PQ/CMC materials and GHS-based safety data sheets [2; 3; 4; 5; 6; 7].

Presentation of the main material

1. Needs analysis for chemical and pharmaceutical ESP

The course design begins with a needs analysis, a foundational procedure in ESP [1]. Its aim is to identify the real-world situations in which chemical technology and pharmacy students and graduates use English, as well as the documents and genres associated with those situations. It is common to distinguish among the target professional situations (target needs), the gap between the current and required levels of language (lacks), and the learners' own expectations (wants) [1].

For chemical-technology and pharmacy students, a needs analysis typically reveals a set of recurring professional tasks: reading and interpreting technical and regulatory texts; understanding and partially compiling safety documentation; describing a technological process; working with specifications and quality documents; and explaining a technology or a process orally to colleagues or partners [8]. These tasks, rather than an abstract vocabulary list, serve as the

reference point for selecting materials and designing activities. The needs analysis thus determines which document types and registers (Section 2) and which task types (Section 3) the course should prioritise.

2. Terminology sources and registers

A key idea of the proposed approach is that the field's terminology is not homogeneous: the same concept is realised differently across document types, each with its own register and conventions. Rather than treating terminology as a single "list", the course uses a typology of sources — educational texts (textbooks), standards, instructions, regulatory documents, safety documentation and technical specifications.

Educational texts — for example, the OpenStax Chemistry 2e textbook — present the basic concepts of chemistry (chemical reactions, catalysis, solutions, purification, materials and process control) in an explanatory register, with definitions and examples [5]. Standards and controlled vocabularies, such as the EDQM Standard Terms database, fix terms in a prescriptive register: the controlled term dosage form and related dose-form and route-of-administration terms are defined unambiguously and harmonised across languages [2]. Regulatory documents — the ICH quality guidelines [6], the EMA glossary of regulatory terms [3] and the FDA PQ/CMC materials [4] — present terms such as active substance, drug product, stability, quality specification, batch formula and quality risk management in a normative, procedural register tied to the product lifecycle.

Safety documentation constitutes a distinct genre with a strictly standardised structure. A safety data sheet (SDS), as defined by the GHS, comprises sixteen sections in a fixed order, covering, among others, hazard identification, composition, first-aid measures, handling and storage, and physical and chemical properties [7]. Technical specifications, in turn, present requirements and acceptance criteria in a concise, formal register. Working with this typology, students learn that terms such as stability or solution carry different emphasis in a textbook, a regulatory guideline, an SDS, and a specification, and that choosing the appropriate register is part of professional competence [2; 4; 7]. Tasks at this stage include comparing how the same term is presented across two or three document types and identifying the register-specific features of each.

3. Types of ESP tasks

Rather than being grouped into abstract blocks, the course tasks are organised by types of professional activity, so that each task models a real professional action and its associated genre [1; 8]. This makes the link between a language task and a future professional task explicit to the student.

The main task types are as follows. Reading a technical text — locating and interpreting terms in an authentic professional or educational text and

reconstructing its logical structure [5]. Describing a technological process — producing a coherent description of a process (for example, a synthesis, a purification or a manufacturing step) using appropriate sequence markers and terminology. Working with safety and quality documents — reading and partially completing a safety data sheet, a technical note or a specification, and extracting the required information [4; 7]. Explaining a technology orally — giving a short oral explanation of a process or an innovative pharmaceutical technology to a defined audience. Each task type is supported by the corresponding document source in Section 2, ensuring that language work is consistently tied to a professional genre.

4. Assessment of professional communication tasks

Assessment in such a course is oriented not towards reproducing isolated terms but towards the ability to perform professional communication tasks. The focus of assessment is on what the student can do: describe a process clearly and in the correct sequence, explain the risks associated with a substance or a process, extract and use information from a regulatory or safety document, and choose terminology appropriate to the genre and register [1; 8].

It is advisable to formulate assessment criteria using parameters such as: the accuracy and appropriateness of terminology in a given genre; the completeness and logical sequence of a process description; the correct use of normative terminology when explaining risks and quality requirements (with reference to the ICH, EMA, EDQM, FDA and GHS sources); the coherence and clarity of an oral explanation; and the correct handling of a document's structure (for example, the sections of an SDS or a specification) [2; 3; 4; 6; 7]. Formative tools — checklists for process descriptions, drafts of a technical note, and peer assessment of oral explanations — enable tracking of progress and alignment of language training with professional needs [1].

Conclusions and prospects for further research

The study has substantiated an approach to teaching technical documentation and process description in an ESP course for students of chemical technology and pharmacy, built on four components: a needs analysis, a typology of terminology sources and registers, a typology of tasks based on types of professional activity, and the assessment of professional communication tasks. In contrast to a model focused on isolated terminology, this approach treats the profession's genres and documents — technical texts, standards, regulatory documents, safety data sheets and specifications — as both the content and the context of language learning [2; 4; 7].

This approach integrates language training with the real-world professional activities of future specialists and develops their communicative, information and critical competences, in line with the competence-based logic of contemporary

higher education [1; 8]. Further research perspectives include piloting the model within the educational process, compiling a bank of tasks organised by document type, and refining the criteria for assessing professional communication in chemical-technology and pharmacy ESP.

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