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Civil engineering students' English language lexico-grammatical competence formation in reading

Формування англомовної лексико-граматичної компетентності студентів будівельних спеціальностей в читанні

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Abstract

The current study compared two instructional approaches to supporting reading comprehension and lexico-grammatical competence in instruction of English for Specific Purposes for Civil Engineering students. The first instructional approach was structured according to students' content domain knowledge, using sketch construction technical drawings and information, and included simultaneous learning of different language structures in each content topic. The second instructional approach was systematically structured according to language domains and included step by step mastering of various language topics. Both instructional approaches incorporated principles of a communicative-cognitive approach, such as informational transfer and reflection as a metacognitive strategy. The samples of reflection tasks exemplify the reflection principle to showcase students' robust metacognitive awareness. Over 6 months, students completed assignments which embedded the use of one of the instructional approaches in the spotlight of above mentioned principles. Results demonstrated the efficiency of the content domain approach over that of the language domain approach. Thus, the content domain

Анотація

У поточному дослідженні порівнювалися два навчальні підходи до підтримки розуміння прочитаного та лексико-граматичної компетентності під час навчання англійської мови професійного спрямування для студентів будівельних спеціальностей. Перший навчальний підхід був структурований відповідно до знань студентів з фаху або контенту спеціальності, з використанням ескізних будівельних технічних креслень та інформації, і включав одночасне вивчення різних мовних структур у кожній темі змісту. Другий навчальний підхід був систематично структурований відповідно до мовних структур і включав поетапне оволодіння різними мовними темами. Обидва підходи до навчання включали принципи комунікативно-когнітивного підходу, такі як передача інформації та рефлексія як метакогнітивна стратегія. Зразки завдань на рефлексію є прикладом принципу рефлексії, щоб продемонструвати надійну метакогнітивну обізнаність студентів. Протягом 6 місяців студенти виконували завдання, які включали використання одного з навчальних підходів у центрі уваги вищезгаданих принципів. Результати продемонстрували ефективність

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approach, which is conceptually similar to interleaved practice, fosters lexico-grammatical competence acquisition in reading on the basis of the sketch construction project.

Keywords: lexico-grammatical competence, civil engineers, the sketch construction project, content domain , language domain.

контетного підходу порівняно з підходом мовних форм. Таким чином, контентний підхід, який концептуально подібний до практики інтерліву, сприяє набуттю лексико-граматичної компетенції в читанні на основі ескізного будівельного проекту.

Ключові слова: лексико-граматична компетентність, інженери-будівельники, ескізний проект будівництва, контентна сфера, мовна сфера.

Introduction

The problem of forming foreign language lexical and grammatical competencies, taking into account the profession of students, has long been in the center of attention of researchers studying the process of learning foreign language vocabulary by students of non-language institutions of higher education (Bolton & Jenks, 2022; Bhatia, 2022; Cigan & Kordic, 2013; Tarnopolsky, 1993). Thus, Tarnopolsky, O. (Tarnopolsky,1993) explained that whereas students in language departments focus on understanding the English language as a linguistic system, students studying English for specific purposes in non-language departments rely on their existing knowledge of their content domain, and have a more instrumental approach, seeing English as a tool for achieving their professional goals. Bolton, K. (Bolton & Jenks, 2022) and Bhatia, V. (Bhatia, 2022) further emphasized the importance of developing a deep understanding of English for specific purposes to allow students to better understand nuances in professional settings. Relatedly, Cigan, V. (Cigan & Kordic, 2013) investigated gains in proficiency of students enrolled in English for specific purposes classes, and found that students' level of performance showed more substantial improvement in lexical as compared to grammatical competence.

An additional issue is the instructional approach, and specifically, the communicative-cognitive approach has been found to be effective in promoting lexico-grammatical competence for students of non-language higher educational establishment. For example, Shamov, A. (Shamov, 2008) found that using cognitive-communicative strategies, such as memory, attention, imagination and cognitive thinking improved achievement in vocabulary acquisition of students of German as a foreign language. Another advantage of the communicative-cognitive approach is that it fosters self-regulated learning, as described within the theory of constructivism (Ruofei & Di, 2022; Xu & Luo, 2022). Self-regulated learning refers to the learner's own understanding of educational activity. To achieve self-regulated learning, the communicative-cognitive instructional approach highlights several important principles, including integrated learning, systemacity, functionality, information transfer, unity of learning, education and development, authenticity, problematicity, reflection, improvement of educational process by the engagement of students into the usage of metacognitive and cognitive strategies.

The current study focused on 2 main principles of the communicative-cognitive approach, namely information transfer, and using reflection as a metacognitive strategy. From the viewpoint of Nation, I. and Meng, Z. information transfer means students' ability to transition from verbal to visual information and vice versa (Nation & Newton, 2009; Meng & Zhao, 2015). Such information transfer is especially important for civil engineering students, because they are constantly required to combine verbal information in the form of general notes with technical drawings and floor plans. Topanata, J. and Li, M. distinguish that the metacognitive strategy of reflection is when students analyze and assess their own learning and monitor their progress (Toapanta, 2022; Li & Yuan, 2022).

These instructional principles were implemented here within the context of actual construction projects. Construction plans consist of detailed images, which include commonly used symbols and terms, accompanied by explanatory text. The participants in the study had gained experience during their civil engineering training in comprehending, correcting and creating such plans in their native language, Ukrainian. The English training described here was anchored to develop students' ability to similarly comprehend, correct and create such construction plans in English.

The present study was designed to make a contribution to better understand optimal instruction approached, by presenting findings on how different instructional approaches can support the developing reading comprehension of the sketch construction project with principles of a communicative-cognitive approach in English by future civil engineers.

We address the following research questions:

1. How is English language lexico-grammatical competence formed within the context of a sketch construction project within two instructional approaches in the light of such communicative-cognitive principles as information transfer and reflection as metacognitive strategies
2. Which instructional approach leads to larger gains in learning?

The rest of the paper is organized as follows: The introduction presents and discusses findings of the English language lexico-grammatical competence content formation' stages and groups of exercises with the usage of informational transfer and reflection as a metacognitive strategy. The Literature reviews highlights two instructional approaches for supporting the formation of the English language lexico-grammatical competence of future civil engineers. Methodology includes information about participants and research instruments. Results and Discussion present and discuss the outcomes of the experiment and it is defined if content domain or language domain approach is better; highlight controversial issues about the results of lexico-grammatical competence for future civil engineers in reading. Conclusion and limitations present summaries of the research paper.

Theoretical Framework or Literature review

Several theoretical concepts of English language lexico-grammatical competence including lexical and grammatical knowledge, skills and language awareness have been suggested in the literature (Almarshedi, 2022; Palangan 2021). I share the same English language lexico-grammatical concept but point to the sketch construction project as the context of its formation and regarding civil engineers' professional activity which demands understanding of construction drawings.

Stages of developing competence have been outlined by Shatilov, S. (Shatilov, 1986). He has defined an oriented-preparatory stage, where students get acquainted with new language phenomena, followed by a stereotype-situated stage, where the language skill is repeated by multiple repetition. The final stage is the variative-situated stage, when language skills become more flexible in variable speech situations. In the current project, we have adopted this framework and implemented it in the context of a sketch construction project: The oriented-preparatory stage is directed at acquaintance with new language material of the sketch construction project; The stereotype-situated stage is aimed at formation of receptive lexico-grammatical skills on the level of word, word combination, sentence in small and big texts of the sketch construction project; The variative-situated stage is directed at the formation of lexico-grammatical skills on the level of unity (the whole texts); In this final stage, the goal is that students accomplish integrated speech and reading skills.

In the current study, language exercises were designed based on the stages outlined above. Accordingly, four groups of exercises were developed: 1) Oriented-preparatory stage exercises focused on building acquaintance with new language material, by using visual and verbal supports, including marks of architectural-constructive elements on the layouts of the sketch construction project; 2) Exercises for the stereotype-situated stage were designed to foster receptive lexico-grammatical skills on the level of word, word combination and sentence. To this end, students were now presented with more elaborate layouts with notes of the sketch construction project and with linguistically richer tables and descriptions of the construction project 3) At the variative-situated stage, exercises required students to comprehend even larger text units, including descriptions of the construction project and stages of implementation 4) At the final integrative stage, students practiced different levels of involvement with the text, including skimming, scanning and deep reading, based on the specific requirements of the task at hand.

The suggested groups of exercises correlate with the stages, which include subgroups of exercises. A distinguishing feature in the construct of lexico-grammatical competence for future civil engineers is that they constantly refer to drawings while doing tasks with notes for them and vice versa. This means that the information transfer principle is constantly evident in each stage. In addition, reflection was also included after each exercise and at the end of the group of tasks at each stage. Thus, reflection tasks, in which

students analyze and assess the results of study, followed each exercise when.these reflective exercises included instructions such as – "Analyse how well you know the words. Write down those you don't know well. Learn them". "Compare your words with your partner's. Which ones did you miss, which mistakes did you make? Learn the words". What grammar structures are difficult for you to understand?

Another reflection task is repsented in the table 1 after the group of tasks where students monitor their progress in studying.

Table 1.
Reflection task

	Well	Badly
I know …	How to continue progress effectively by the end of the term	How to improve knowledge step by step by the end of the term
I can …	How to continue progress after the end of the term.	How to improve knowledge after the end of the term.

Designed as compiled by the authors

Therefore, in the present study the construct of lexico-grammatical competence is viewed in the light of such communicative-cognitive principles as information transfer and reflection as metacognitive strategies geared towards students gaining more metacognitive awareness of their learning and in accord with the stages of skills formation.

In the current study, we compared two instructional approaches in order to investigate which one is the best for civil engineering students.

When introducing students to language situated within an actual construction project, there are at least two approaches to ordering and introducing topics for study.

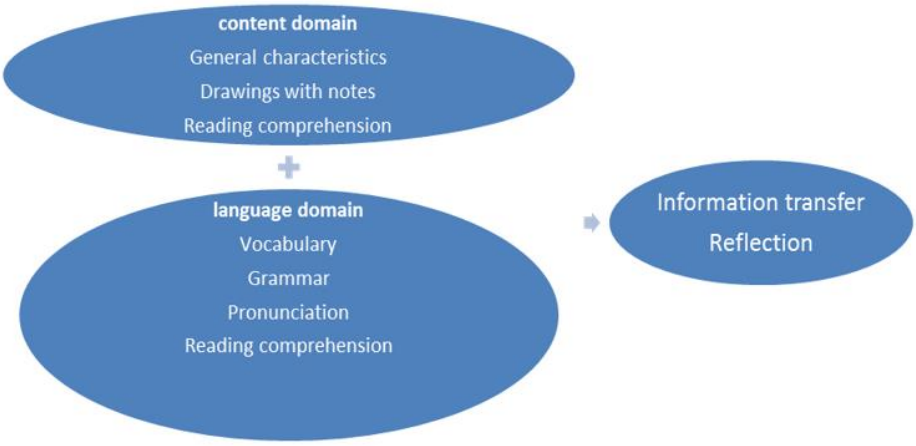

Figure 1. Content and language domain instructional approaches with information transfer principles of communicative-cognitive approach
Designed as compiled by the authors

When introducing students to language situated within an actual construction project, there are at least two approaches to ordering and introducing topics for study. One approach, the content domain approach, follows the logic of the construction project, and follows the instructional stages outlined above within each content domain. Each construction project content domain encompasses two main topics: general characteristics which includes information about contractor's duties, zoning chart (address, numbers of lot, block, zone, information about bulk and yard, principal use of the building), building characteristics, design load schedule (load on roof, attic and floors) and drawings with notes (plot plan, floor plan, elevation).

The language domain approach completes each of the instructional stages across all content domains, before moving on to a more advanced instructional stage. In the language domain

approach, learning is ordered by language structures (for example, first vocabulary and then grammatical structures), such that linguistic content relating to different stages of construction (for example, floor plan and elevation), are introduced simultaneously.

Let's review each of the instructional approaches. Figure 3 shows the content domain approach. The same color in the first column shows that all lexical and grammar information is studied step by step within one stage. Only then there is transfer to the next topic. After all topics are studied, there is consolidation which is aimed at development of reading comprehension, particularly vocabulary and grammar in skimmed reading, scanning and deep reading.

The content domain approach is focused on a consistent organization of training, which involves step by step mastering the material of the first topic 1. «General characteristics of the sketch construction project» in the oriented-preparatory, stereotypically-situational and variant-situational stages, then topics 2. «Drawings with notes» with the corresponding sub-themes at the same stages, and then topic 3. «Sketch construction project» is studied at the final step. There is successive transfer in the form of progress check from one topic to another.

General characteristics	Plot plan	Floor plan	Elevation
Oriented-preparatory	Oriented-preparatory	Oriented-preparatory	Oriented-preparatory
Stereotype-situated	Stereotype-situated	Stereotype-situated	Stereotype-situated
Variative-situated	Variative-situated	Variative-situated	Variative-situated

Consolidation (Sketch construction project)
Vocabulary , grammar skimmed reading
Vocabulary , grammar scanning
Vocabulary , grammar deep reading

Figure 2. Content domain approach
Designed as compiled by the authors

Figure 3 shows the language domain approach. The same color in the row of the table demonstrates that vocabulary and grammar information from 4 topics in each stage are learned simultaneously. For example, vocabulary and pronunciation tasks at the oriented-preparatory stage are done within the topic "General characteristics' ", then within themes "Plot plan", "Floor plan", "Elevation". Only then another language domain, such as grammar, is addressed again across the 4 content topics. Parallel organization of training here means that material at each stage (orientational-preparatory, stereotypical-situational and variant-situational) is studied simultaneously. But there is no grammar vocabulary balance (1 or 2 grammar forms to 6 lexical units) due to high concentration of vocabulary within topics at the same time. At the same time, such dynamic changes of topics within each stage fosters analytic-synthetic activity and might facilitate memorization. After all language domains in topics are studied, this approach also includes a consolidation stage which is aimed at development of reading comprehension, particularly vocabulary and grammar in skimmed reading, scanning and deep reading.

General characteristics	Plot plan	Floor plan	Elevation
Oriented-preparatory	Oriented-preparatory	Oriented-preparatory	Oriented-preparatory
Stereotype-situated	Stereotype-situated	Stereotype-situated	Stereotype-situated
Variative-situated	Variative-situated	Variative-situated	Variative-situated

Consolidation (Sketch construction project)
Vocabulary , grammar skimmed reading
Vocabulary , grammar scanning
Vocabulary , grammar deep reading

Figure 3. Language domain approach
Designed as compliled by the authors.

Our hypothesis is that the content domain approach will be more effective, for three reasons. First, this approach preserves the grammar-vocabulary balance suggested by Byrkun, L. (Byrkun, 1993), according to which the optimal balance is 1 or 2 grammar forms to 6 lexical units . Second, the content domain approach allows the learners to rely on the logic of their existing civil engineering knowledge of the stages of project construction, which they are familiar with in their native language. Therefore, it might be easier for learners to easily engage with the language material by integrating it with familiar topics. Finally, the current content domain approach is conceptually similar to interleaving practice, because grammar and vocabulary are practiced at the same time. For example, Nakata, T. demonstrated that within grammar learning, interleaving practice of various grammatical structures, has shown benefits for long-term retention (Nakata, 2019). So when learners are introduced to the “General characteristics” section, they study both vocabulary patterns (for example, N+N, Adj+N) and grammar patterns (for example, sentences with “shall” in the meaning of have to). These patterns are then repeated within the following topics of the sketch construction project , “Plot plan”, “Floor plan”, “Elevation”. In contrast, in the language domain approach, item orders are more analogous to blocked practice, where learners practice one skill at a time. Students are first exposed to vocabulary, with focus on pronunciation, across the four topics of the sketch construction project, and only then they proceed to the next “language block”, namely grammar patterns, which are introduced in the framework of these themes.

The main goal of the current study is to examine which instructional approach, the content domain approach or the language domain approach, leads to higher gains in English language lexico-grammatical competence.

Methodology

Participants

The participants of the experiment were 72 2nd year civil engineering students enrolled in the optional course "English language for specific purposes" . The course included 30 hours of classroom instruction delivered through English, and 42 hours of individual work, over 6 months.

Participants were assigned to two experimental groups, which differed in the instructional approach used in their classes. Participants were recruited through announcement to receive course-credit in the discipline "English language for specific purposes" for participation. They gave informed consent to take part in the study.

Research instruments

Participants’ level of English lexico-grammatical competence was measured using a multiple choice test. Tai, H. (Tai et al., 2022) stated that this kind of test has a number of advantages in testing; for instance, providing scoring reliability in crowded groups is easier with these tests and the ability to accommodate a large number of items allows it to cover critical content in the subject area along with high content validity. Similar multiple choice tests were also used

during the course to assess students' interim knowledge and progress check.

The experimental test was conducted in the form of testing, which was carried out on two topics: "General characteristics of the sketch construction project" and "Drawings with notes". The test included items requiring different levels of comprehension: single word or sentence, superficial text reading, detailed reading comprehension and inference. Each level accounted for 25% of the final score on the test. The maximum score on the text was 40 points, and it included 43 items. Table 2 provides a full description of test tasks (see also Appendix A for example test items).

Table 2.
Test tasks

Comprehension Level	Tasks types	Maximum points
Vocabulary: single words, word in sentence Grammar: isolated structure; single sentence	TT (test task) 1–20: (20 test tasks x 0,25 points) TT 21–25: (5 test tasks x 1point)	10
Vocabulary and grammar in text, requiring skimmed reading	T3 26–27: (2 test tasks x 5 points)	10
Vocabulary and grammar requiring deep reading	T3 28: (1 task x5 points); T3 29–33: (5 test tasks x1 point)	10
Contextual conjecture and inference	T3 34–43: (10 test tasks x1point)	10
Total 40		

Designed as compiled by the authors.

The purpose of the experiment was to test the effectiveness of our methodology for the formation of future civil engineers English lexical and grammatical competence in reading, which is implemented in four stages and the use of a specially designed subsystem of exercises. Raw scores on the text were converted to percent correct. According to Bespalko, V. (Bespalko, 1968), a satisfactory level of achievement, indicating that students have internalized the learning, is a minimum 0,7 or 70% accuracy.

Learners' lexico-grammatical results were examined at two data collection times corresponding to two terms of study: at the beginning of the study year and at the end of it. In order to ensure reliability, tests were piloted and marked consistently. The horizontal nature of the experiment allowed to test the which instructional approach (content domain or language domain) elaborated methodology is more effective.

The unvariated conditions of the experiment were: 1) the number of the participants in the experimental training; 2) the use of the same subsystem of exercises; 3) duration of experimental training; 4) tasks of pre- and post-experimental tests; 6) criteria for assessing the level of lexical and grammatical knowledge and skill

The varied condition of the experiment was the type of instructional approach, as detailed in the method section.

Results are presented in Table 3. In order to determine the adequacy of the level of formation of English lexical and grammatical competence in reading, we calculated the coefficient of learning according to the above mentioned formula of Bespalko, V. (Bespalko, 1968).

Results are presented in table 3. In order to determine the adequacy of the level of formation of English lexical and grammatical competence in reading, we calculated the coefficient of learning according to the above mentioned formula of Bespalko, V. (Bespalko, 1968).

Table 3.
Average indicators of the level of the English language lexico-grammatical competence formation in reading for students of content domain approach and language domain approach (pre-experimental test/ post-experimental test)

Approaches	Indicators by criteria								Total test score
	Vocabulary: single words, word in sentence Grammar: Isolated structure; single sentence		Vocabulary and grammar in text, requiring skimmed reading		Vocabulary and grammar requiring deep reading		Contextual conjecture and inference		
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post test	Pre-test	Post -test	Pre-test/ Post-test
Language Domain approach	3.58	7.42	3.58	7.3	3.75	7.03	3.39	6.5	14.3 (36%) / 28.3 (71%)
Content Domain approach	3.42	8.33	3.4	7.78	3.67	7.8	3.42	7.03	13.92 (35%) / 30.9 (77%)

Designed as compiled by the authors.

The table 3 demonstrates better yielded results after the study within both instructional approaches (content domain and language domain). The learning coefficient in both groups is above minimum 0,7 (71% in language domain approach and 77% in content domain approach). Students who attended classes structured according to the content domain approach show better results after all four tasks have been done. The analysis of individual test results shows that 24 out of 36 students from the group with language domain approach have reached the minimum learning whereas 32 students out of 36 in content domain have attained this coefficient.

The horizontal nature of the experiment has allowed to test which instructional approach (content domain or language domain) is more effective. To do this, we use the multifunctional statistical criterion ϕ * - Fisher's angular transformation, which is designed to compare two samples by frequency of the effect to ϕ researcher. It identifies if there is or there is no effect of the elaborated methodology. The essence of Fisher's angular transformation is the transformation of percentages into the value of the central angle, which is measured in radians. A larger percentage corresponds to a larger angle ϕ, and a smaller percentage corresponds to a smaller angle ϕ disntiguished by Sidorenko, E. (Sidorenko, 2002). The effectiveness of each domain separately has been verified by the multifunctional statistical criterion ϕ. Having used the table XII of Supplement 1 elaborated by Sidorenko, E. (Sidorenko, 2002), we have identified φ, which correlate with percentage rate in the language domain and in the content domain instructional groups.

Table 4.
Comparison of performance on the final test for students in the language domain and the content domain instructional approaches

Approaches	«There is an effect»			«There is no effect»			Total amount of student
	Number of students	Percentage rate	φ	Number of students	Percentage rate	φ	
Language Domain approach	24	66,7 %	1,911	12	33,3 %	1,230	36
Content domain approach	32	88,9 %	2,462	4	11,1 %	0,679	36
In general	56			16			72

Designed as compiled by the authors.

Thus, the findings of the current study demonstrate that a higher percent of students in the content domain approach have reached the threshold of 70% accurate performance. A Mann-Whitney rank order analysis of independent samples indicated that this difference was significant (U=522, p=.044).

Results and Discussion

The current study examined how different instructional approaches (content domain and language domain) can support students' developing reading comprehension in studying English for specific purposes. Both instructional approaches used here included communicative-cognitive approach principles, such as informational transfer and reflection. Students made significant learning gains in both instructional approaches with the above mentioned principles.

As we hypothesized, the content domain approach turned out to be more effective than the language domain approach. The experimental verification has been introduced.

The present results, demonstrating the effectiveness of the content domain approach implemented here, serve as a proof-of-concept for grammar-vocabulary balance suggested by Byrkun, L. (Byrkun, 1993). Specifically, in the content domain approach implemented here, students were exposed to approximately 1 or 2 grammar forms for each 6 lexical units, similar to Byrkun's study, and indeed this balance led to greater gains in performance.

The current finding of the efficiency of the content domain domain approach aligns with previous research demonstrating that interleaving practice yields sizeable learning benefits for long-term retention. For example, Nakata, T. (Nakata, 2019) established the benefits of interleaving practice in grammar learning, and showed that it was more effective than blocked practice. In the current content domain approach, interleaving was more extensive, as students had ample opportunities to practice grammar and vocabulary simultaneously. Once again, this interleaving approach was found to be more effective than the language domain approach implemented here, in which students practiced grammar and vocabulary separately, and only combined these types of knowledge towards the end of their course of studies.

The common feature is that in both the current research, and in and Nakata's work, students had a relatively high level of prior knowledge, in spite of different learning types. The difference is that in Nakata's paper students had prior exposure to target language structures whereas in our research students had previous knowledge of the structure and some background information about the sketch construction project in Ukrainian.

In addition to the positive impact of balance and interleaving practice, we propose that a likely explanation for the efficiency of the content domain approach is that it can rely on students' background knowledge of the sketch construction project. Students' previous experience with the sketch construction project in their native language is complemented with new knowledge and skills in English. The familiarity with the content domain can act as a scaffold for new forms and representations introduced and English, which can then more easily be linked to existing conceptual and structural knowledge. The theoretical underpinning of the content domain's coincidence with interleaving practice is its way

of usage (multiple skills at once) notwithstanding the way of learning.

The current study included a limited range of topics (General Characteristics; Floor plan; Plot plan; Elevation) within the sketch construction project. Future research can extend inquiry into other topics which align with civil engineering. Further, the current study focused mainly on reading comprehension. Future work can examine whether the same principles of instruction are also effective when examining students' development of speaking and writing skills. Finally, the current approach can be extended by including additional specific features related with activities for students following different courses of study, beyond civil engineering. By examining these methodological considerations, research papers could be expanded further and thus potentially result in a more in-depth discussion and application of the English language lexico-grammatical competence in writing, reading, speaking on ESP courses.

Conclusion

Our findings suggest that language acquisition can be more efficient across the same number of lessons and tasks when English instruction is tailored to the existing content knowledge of the future student's profession with a view to yielding significant lexico-grammatical gains in reading comprehension in the English-speaking professional environment.

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Appendix 1

I. Assessment criteria Correctness of understanding lexical units on the word/ word combination/ sentence level

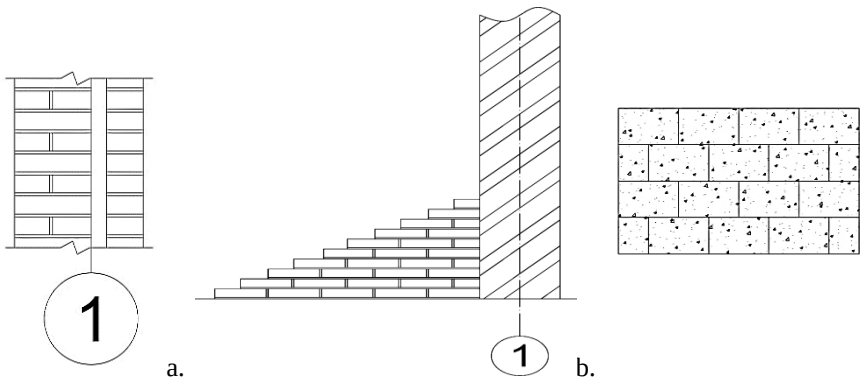
Task type word meaning skills formation

Task 1ª

1. Which of the following words doesn't mean подвійні двері**? *(0-0,25 points)***
a. sliding door b. bifold door c. double door

Task 1 b

Which of the drawings do this sentence correspond to? (***0-1 points)***
Provide minimum air space between sheathing and brick veneer.



a. b. c.

II. Assessment criteria Correctness of understanding lexical units and grammar structures on the level of text (skimmed reading)

Task type word meaning, grammar *structure* and sentence concept skills formation in the text (skimmed reading)

Which list of words belongs to the description of interior, exterior and CMU walls in the wall schedule (from the construction project «Two family residence») ? (***0-5 points)***

a. Below grade, sheathing, brick veneer, gypsum wallboard, wall type C, brick shelf, siding color, gypsum board inside.
b. Point of beginning, wind rose, double door, bifold door, brick shelf, siding color, gypsum board inside.
c. Elevation indication, exterior wall, contractor, design load, garage, storage, laundry.

III. **Assessment criteria** Correctness of understanding lexical units and grammar structures on the level of text (deep reading)

Task type word meaning, grammar *structure* and sentence concept skills formation in the text(deep reading)

Which of the four concepts (a, b, c) to save costs are relevant for the floor plan below and the demands of the owner? (***0-5 points)***

Demands of the owner: 1. The first floor should be smaller than the second floor; 2 There must be more living spaces; 3. Fireproof building materials should be chosen.

a. **Planning concept 1**

The location of rooms should be changed. Additional rooms should be added. Two leaves opening doors should be changed into one leaves opening doors.

Constructive concept 1
Internal walls should be changed in gypsum walls. Floor tile can be changed in parquet.

b. **Planning concept 2**

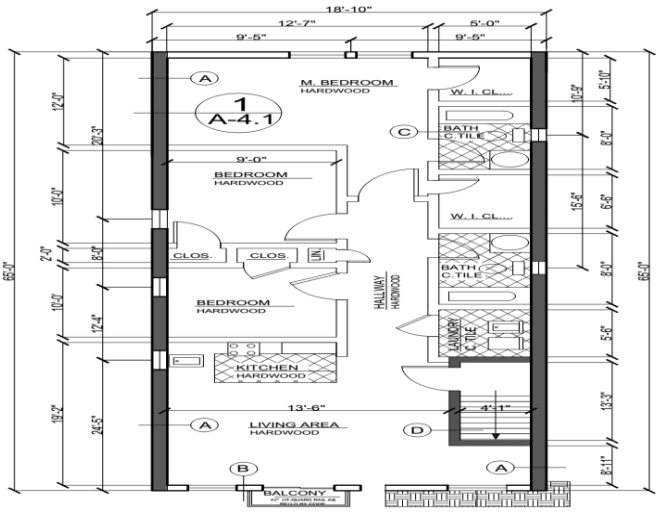
One bathroom should be taken away. Two bedrooms should be combined into one. More space-saving construction of staircase should be made.

Constructive concept 2
Exterior wooden walls in a wall veneered with natural material should be changed in stone and artificial brick or siding with insulating material and gypsum. For this purpose the first floor plan should be changed into the plan of framed type.

c. **Planning concept 3**

Rooms should be relocated.

Constructive concept 3
Exterior wooden walls in a wall veneered with natural material should be changed in reinforced concrete.



IV. **Assessment criteria** Correctness of contextual conjecture and forecast

Task type contextual conjecture and forecast skills formation

Fill in the gaps with appropriate words and grammar constructions for the plot plan below. (***0-10 points)***
The purpose of my presentation is to introduce our new 34. ____ of lake cabin. To start with I will describe layouts of a construction project. Secondly I 35. _____. If you look at this layout, you will see that the draft of buildings and personal plots of land are plotted on this plan. Both plot plans have basic lines: property line, 36. _____ natural gas line, property sanitary line. Elevation part is located to the south for better lightning in comparison with the lowering of the second plot plan which 37 _____ to the south. Left to the house is a garage with 38. ____. There is no attached garage on the second plot plan and it is located not far from the house. Residential building is situated on the plain part of the plot plan on both layouts. Elevation and lowering are observed on this plot plan. There are new 39 _____ in front of the house while there are new planters in front of and behind the house on the second plot plan. There is a 40 ____ in front of the house on the first plot plan in comparison with landscaped areas in front of and behind the house on the second plot plan. There 41 ____ and rear yards on both plot plans. There is a property shrub in front of the house on the first plot plan 42 _____ concrete driveway on the second plot plan. In conclusion, there are the following civil engineering concepts of mine for layouts 43 _____ :