Review research paper

DIFFERENTIATING E-LEARNING CONTENT IN ESL COURSES TO MEET SPECIAL NEEDS OF STUDENTS WITH LEARNING DIFFICULTIES

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Abstract. *Dyslexia is a special need more than a reading difficulty considered along with the notion of language aptitude regarded as a cluster of cognitive factors related to language learning. This paper reports on a study that focused on special learning needs of students with reading and writing difficulties or dyslexia who take English as a compulsory course at the institutions of tertiary education in Russia. The study was guided by understanding that differentiating the content, the process, the product, and the learning environment can be effective for achieving the educational goals of students struggling with foreign language learning. It involved 320 tertiary education students who took an online self-study English language course with differentiated content, to identify their special learning needs and difficulties in English language learning. The Learning Management System analytics was conducted, and the results of engagement and success rates of the students completing the tasks with or without differentiated content were compared. The findings of the study demonstrate students' higher engagement and success rates when working with differentiated content since it provides options for completion, choosing one's way to present the results, and to complete the course assignments.*

Key words: *dyslexia, special learning needs, educational content, differentiated learning*

1. INTRODUCTION

Diversity in today's classrooms at all levels of education is what teachers might encounter, and what might be one of the challenges for them. Diversity often requires different approaches and techniques to meet students' needs to make sure all of them reach their full academic potential. How might then students differ in the language classroom? They might differ in terms of motivation, aptitude for language learning, and differences in the pace of learning, as well as economic, social, linguistic, and ethnic diversity, and specific learning differences such as, for example, special physical or learning needs.

In education, the notion of 'inclusion' was originally introduced in the area of special needs' education, and later has been expanded to specify a type of education that caters for all students (Erlam et al. 2021). Inclusive education is defined as a process of strengthening the capacity of the education system to reach out to all learners and can thus be understood as a key strategy to achieve education for all (Acedo 2008). It is also advised that as an overall principle, inclusive education should guide all education policies and practices, starting from the fact that education is a basic human right and the foundation for a more just and equal society (UNESCO report 2016). Consequently, inclusive education is not about highlighting the difference but about how to support everyone in the class.

2. INCLUSION AND SPECIAL NEEDS

According to the Rosstat' statistics, special needs students in Russia make between 1% to 8% of the tertiary student population depending on the choice of future profession (Social Monitoring of the Ministry of Education 2017, p.3). As explained in Daitov and Daitova 2022, special needs are regarded as disabilities in the Russian system of education. These involve such categories as visual, hearing or mobility impairment, and physical disabilities. Inclusive education practices are mostly offered for these categories. However, they might include individualized education programs as university students can experience even more pressure to meet special requirements to graduate. Integration of those who are impaired is challenging but yet can be successful (Tuzlukova et al. 2023).

Foreign language is one of the tertiary education requirements both in Sciences and Humanities that leads to an exam at the end of the second year of a Bachelor's degree. To achieve the learning outcomes and pass the exam, students have to complete the course that involves such components as reading for specific purposes, making presentations of organized ideas, and academic writing. The results of a six-year monitoring of the students who come to the university choosing non-linguistic specialties show that the level of English differs from A1 to B2. The number of students performing at A1 are about 30% depending on the faculty. The federal standard for the secondary school states that those graduating from the ninth grade are supposed to have an A2 level of English and those finishing the eleventh grade are at least at B1 level (Federal Standard, 2022). The question that this research is trying to answer is whether poor academic performance in English is due to low language aptitude of a student or due to learning difficulties that students are not aware of, like dyslexia.

Dyslexia is not among the categories of disabilities in Russian education, and students struggling with reading or writing in English are not supported by any special needs programs and students are not provided any assistance.

According to the British Dyslexia Association, "dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. It is especially interesting that reading comprehension is described as a secondary consequence that may reduce reading experience that can impede growth of vocabulary and background knowledge. (IDA 2008, p.16)

Educators worldwide emphasize that dyslexia is among the most common language-based learning disabilities that affects reading, spelling, and information processing of

roughly 20 % of the world population (Pauc 2005). Heiman and Precel 2003 believe that dyslexia is a lifelong disability, and the difficulties that individuals experience at school continue into higher education. Lopez-Escribano, Sanchez and Carretero 2018 are of the opinion that the ability to read and write properly pose even more challenges to the dyslexic individual as the expectation for effective note taking and academic writing is higher at tertiary level, and this is when, as noted by MacCullagh 2014, globally, there is indication that higher education institutions are seeing an increasing student population with disabilities, particularly dyslexia.

The above-mentioned approaches to treat dyslexia in education prove that it needs deeper understanding by educators than just a reading or writing difficulty.

In Russia, the problem of reading and writing difficulties has been studied for several decades and is connected with the names of A. Luriia 1987, R Levina 2000, R, Lalaeva 2003 and others. Complex approach combining the studies in medicine, psychology and pedagogy aimed at understanding the nature of different aspects in learning writing and reading, has been proven in the works of B. Ananiev (1982), L. Paramonova (2001), I. Sadovnikova (2005) and others. Dyslexia is viewed as a special learning need mostly defined as reading difficulty, while dysgraphia is considered a writing difficulty. (Letter from the Ministry of Education 2023, p. 2-3).

There is some inconsistency in terminology that is used in pedagogical and medical sources. This is due to the fact that Russian doctors use The International Statistical Classification of Diseases and Related Health Problems, the 10th edition (IDA 2008) where there is no such disease as dyslexia. There is a specific reading disorder with a disease code F81.0, but it covers only severe cases when a child has difficulties comprehending the material along with letter recognition (ICD-10 2019). As a result, Russian neurologists do not work with dyslexia in Russia. At primary and secondary school levels, dyslexic children get assistance from psychologists and psychotherapists who deal primarily with reading and writing difficulties in the Russian language, and difficulties in math. Those struggling with reading and writing in Russian might not be high achievers in a foreign language as a subject at school; however, when they choose to continue their education, they still have to learn a foreign language, predominantly English at the tertiary level.

3. APTITUDE AS AN IMPORTANT FACTOR IN LANGUAGE LEARNING

At a secondary school level, the support to dyslexic students is meant to be provided by a school psychologist. A guide from the Ministry of Education dated from 2019 optimizes pedagogical and psychological support for those who face difficulties in writing and reading. Dyslexia is considered as a specific selective difficulty influencing the academic performance of certain students (Kornev 2003). There is also a guide published in 2020 (A Guide for School Teachers and Speech Therapists 2019) that regulates the work of teachers and speech therapists at school to provide support to the students struggling with writing and reading. This guidance is aimed mostly at supporting the students while learning Russian. There is no official guidance from the Ministry of Education in terms of teaching English as a foreign language at school to those who have difficulties in reading and spelling.

So English is quite often left behind by a student and their parents who primarily focus on improvements in the Russian language. This is because by the time such students finish school and start planning their further education, they have to achieve a high standard of state exams, including exam in Russian, and, as a rule, tertiary education students do not have signs of dyslexia in their mother tongue. At the same time, they still might face difficulties in learning a foreign language. This could happen because they did not spend time and effort to overcome difficulties in writing or reading in English as this was not their priority. They come to a university and have to fulfill the requirements of the syllabus that includes reading, writing - both general and academic, listening, and speaking on a level not lower than B1 by the end of the second year (Program, 2023, p.15).

Students come with a low level of English, they have not grammar more than 3 academic hours of classes a week and about 35 hours of self-study work a semester. Those who did not have signs of dyslexia, but just did not learn English well at school are struggling to achieve the goal of the course. Those who have signs of dyslexia should experience even more pressure. The question of our research is whether foreign language learning can be improved by better input provided by differentiated content and individual support of the students, or is the language aptitude what limits the level that a student can achieve in certain circumstances.

Research suggests that in the context, where the input is poor, language aptitude is important (Wen 2018). Language aptitude refers to the learner's inherent ability for language learning that is not involved in the learner's general intelligence (Abrahamsson & Hyltenstam 2008). The language aptitude clusters cognitive factors that researchers believe are related to success in learning a foreign or second language (Dörnyei 2005).

The three main components of the language aptitude are:

1. *Language analytic ability* that refers to the ability to see patterns and regularities in language and to develop an understanding of how language works. It underlines the learning of the grammatical structures of a language.
2. *Phonemic encoding ability* that relates to the ability to associate symbols and sounds. It is associated with the ability to decode aural language and to express oneself orally.
3. *Memory.* Of all the components of language aptitude, understanding about memory is the one that has changed the most over time. Current thinking refers to 'working memory' as being important for language learning. Working memory is a complicated construct that is involved in the storage and processing of information (Miyake & Friedman 1998).

Language aptitude is not about the fact that a student might have challenges in developing of all four skills: listening, reading, speaking, and writing. It is possible that a student is more proficient in any of the skills and weak in others. The question is how the teacher can best cater to the different aptitude strengths and weaknesses of the students that they have in their class. Research suggests that giving learners explicit information about the language they are learning, including grammar rules and explanations is important because it tends to even out differences that there might be for learners in terms of the aptitude (Erlam 2005).

4. LEARNING NEEDS OF DYSLEXIC STUDENTS IN A CONTEXT
   OF A RUSSIAN TERTIARY EDUCATION

Practical experience of teaching English to university students of non-linguistic specialties proves that every year about 30% of students coming to university are at no higher than A2 level of English language proficiency. This data came from the observation of about 630 students studying science and technology at online University (Statistics, 2023) from 2017 to 2023. Each year there are about 110 students starting the English course for science and technology. A placement test is used to settle them in groups of different levels of English. There are 6 groups every year, and 2 of them are of A1+ and A2 level, which is about 33 students. By the end of the second year about 25%, or 9 students out of those with a low level of English still do not reach a level higher than A2. There is a hypothesis ref that individual differentiation of the material taught, in terms of the form it is presented, and learning techniques provided could help the students to perform better in English.

The assumption of the research conducted includes the following:
- lower level of English when coming the university is due to the poor language teaching at secondary school;
- lower level of English is due to a low language aptitude;
- lower level of English is due to some reading or writing difficulties that could be signs of dyslexia.

To verify the assumption and research if the students can perform better, the research includes progress monitoring that is composed of the entrance test, progress tests, and the final test. Along with the test results that include the assessment of speaking, writing, listening, and reading skills, the progress monitoring includes the results of a self-study course. To check the assumption that the students might need some individual support in learning to perform better, we have differentiated e-learning content of the English language course that is designed for self-studies and does not include teacher's support except for monitoring completion rate and efficiency.

Methodology

Firstly, to identify the percentage of students who might need additional support due to reading or writing difficulties, a questionnaire was designed. The students were asked ten questions created for adults to define if they have dyslexia. This questioner was published by the International Dyslexia Association (IDA 2023). The questions examined the speed and intensity of reading, any experiences of omission or substitution of letters while reading, as well as spelling and memory capacity while learning. Noticing seven and more difficulties from the list of questions indicates dyslexia. The questionnaire was administered to 320 students. It was voluntary and anyone could withdraw at any time. One hundred sixty-five students gave their responses. Eight participants mentioned 7 and more problems that they face while learning English. Seven students mentioned 5-6 difficulties.

At the next stage of the study, an in-depth interview with fifteen students who mentioned 5-7 difficulties in the questionnaire was conducted. All of the above-mentioned students agreed to participate in the in-depth interviews. The aim was to identify if they had reading and writing difficulties in Russian at school. Three students from this group were aware of their dyslexia. Five had problems in spelling and reading,

but memorizing was fast, which might mean lack of experience in learning English. The remaining 7 students answered that they did not learn English at school well and expressed willingness to study and improve their level of English.

As a result of the in-depth interviews, all 15 students were chosen for the course with differentiated content. At this stage there is no possibility to differentiate the content depending on the type of learning difficulty, so all 15 students will be provided with the same course.

We assume that after secondary school the student of a non-linguistic specialty might not have a solid language background and experience of efficient language learning techniques. This assumption that the students do not have a solid background in learning English at school comes from the analysis of several research aimed at improving the quality of English language teaching on a secondary school level. This assumption is partially proved by Regional Research of The Quality of Education in the Rostov region that included English as a subject. The research was aimed at calculating the average grade of school students in the 8th form. The results prove 51,8% of those having satisfactory marks which means they do not reach A2 that is stated in the standard. (RRQE 2016).

Low level of the English language competency can be connected with the lack of experience in using different learning strategies. We assume that teaching students' certain language learning techniques helps achieve their educational goal. If so, these students' special needs are not connected with the learning content but with the strategies. Since the number of students with low performance in English is rather high and their needs in providing them with learning strategies are not catered for, action was required. The content differentiation that provides different learning strategies and techniques was implemented in the electronic self-study course of English.

4.   Content differentiation to meet special needs of dyslexic students

As every student has to complete the university English course successfully, they have to adapt different techniques to reach their educational goal. The assumption is that the support can be provided by implementing a differentiated instruction approach when designing a course.

According to Tomlinson 2023, instruction is differentiated through four ways: 1) content, 2) process, 3) product, and 4) learning environment.

Content, process and product

Differentiating the content includes differentiating activities that cover different levels of Bloom's taxonomy (Smyslova 2022), which is a classification of levels of intellectual behavior going from lower-order thinking skills to higher-order thinking skills. These levels are: remembering, understanding, applying, analyzing, evaluating, and creating. As dyslexic students might have difficulties with all these levels, a multisensory approach to material design was used when we developed an online self-study course. Students can learn by hearing, seeing, touching and doing activities which may use their hands and bodies. With this approach, students are able to interpret, comprehend and synthesize information better, as they can use more than one sensory input to make connections between facts or understanding.

To introduce new vocabulary, the words and expressions are presented through a picture or video, thus providing the meaning, the form of the word appearing on the screen letter by letter, and audio pronouncing the new word several times. Letters are appearing on a light blue screen and are written using smooth lines like in Roboto font. Research indicates that coloured overlays help overcome visual stress that a dyslexic student experiences.

The next task is to look at the word on the screen, write it and say it out loud. It is good to add a voice recognition feature, but too few Learning Management Systems provide it. Such activities integrate auditory, tactile and visual stimuli, students are able to build a relationship between the sound, feeling and appearance of learning activity, which will enable learners to better remember the main information, address phonemic encoding and spelling difficulties issues.

The other option to differentiate the content is to divide a task into several smaller ones and provide a checklist to the task along with the instruction. The student will still accomplish the same goal, but complete it in stages. For example, long texts are divided into paragraphs and there is a list of keywords before each paragraph so that the student focuses on the main information. The questions are provided after each paragraph one at a time.

What is also important is constant revision. Some students mentioned revising the same material 6-7 times before they remember it. Every lesson starts with revision of the previous material. It focuses on key points presented in graphics, pictures or graphs. Revision is planned so that students with dyslexia can have more training. The lesson provides several tasks for vocabulary revision. Those who do not have dyslexia can complete one and go on. Those who need more practice can complete up to 5 tasks. To register the progress in the Learning management system one task is obligatory, but the completion of the others is registered as completed.

The mode of text presentation is also varied to ensure that they can be oral based. All texts and instructions to the tasks are provided both as text and as audio. AI ability to vocalize the text is used to create materials. This is true for the tests also. It helps encompass all senses while learning. There is advice in the lessons for the student to write the concepts and keywords along with listening and reading.

Product means what a student creates by the end of the lesson or a module in an online course. There are PowerPoint presentations on certain topics, written summaries, and oral answers on certain topics that are assessed.

There is an option to record the answer instead of writing where possible, as well as to prepare a PowerPoint presentation to summarize the topic. This takes more effort from the teacher as they need to check such tasks. They cannot be automatically assessed by Learning Management Systems yet but there is a hope that in the future even a simply structured Learning management system will have integrated AI that will be able to check voice answers.

Learning environment

In the classroom this is about interaction patterns, support and opportunity to work individually if necessary. In online courses the need for working individually is fully met. This provided the opportunity for students to follow their own paths in learning. The learning environment is diverse in terms of level, abilities, time needed for the course completion. (Bazanova et al. 2023)

All the above mentioned was implemented in an online English course for IT specialists. As students have offline classes and an online self-study course the results of their progress were monitored by the teacher who used rubrics to differentiate assessment styles. In the online course the Learning Management System educational analytics was used to monitor the completion rate along with the number of attempts to complete different tasks. To have clearer understanding if the differentiation of content works, similar reading tasks were provided with and without support. Eight students who had dyslexia were divided into two groups and provided either the online course without specially organized materials or the course designed to assist dyslexic students. The total completion rate and correct answers provided by the group who used assisting materials was 43% higher. As this is a work in progress research, the results are still being analyzed and there is an understanding that dyslexia is different for every person. So, to get more statistics, we plan to scale the research and provide the material to a larger group of dyslexic students from different faculties. The other important issue is that it is more reliable to compare the results of the same person learning the material with or without assistance. Preliminary results show the necessity of differentiating the content to meet special needs of dyslexic students due to the higher completion rate presented in the research. The results provided the ground for deeper research aimed at working out certain criteria for assessing the materials to be dyslexic friendly to meet the needs of every student.

6. CONCLUSION

The assumption that not all dyslexic students are aware of dyslexia was proven by the survey that proved an average 5% of dyslexic students in a target group. The survey was taken on a group of 320 volunteers, 165 of them provided their answers. As there was no aim to specify dyslexia from language learning difficulties the students participating in the research were either aware of dyslexia or simply have reading and writing difficulties without being diagnosed dyslexia in childhood. Other cognitive abilities that might influence language learning were not studied.

The attempt to differentiate the content to support dyslexic students in our research proved about 40% better comprehension of the material studied. Data obtained from the Learning Management System educational analytics proved that students noticing elements of dyslexia or being dyslexic show 43% higher engagement and success rates when working with differentiated content that provides the options for completion, choosing the way to present the results, and the form of the course.

Differentiating the process of studying is provided by an access to e-learning course that is designed to respect an individual pace of any student. Differentiating production has provided an opportunity for the students to submit the task in different forms, either written or oral. The form of submission should be approved by the institution. This is important for dyslexia to be recognized as a special need that will allow differentiating not only the learning process and techniques but the product that a student is supposed to prepare during the course.

Limitations

The research left the concept of language aptitude behind. There was no possibility to assess it and it needs more study.

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