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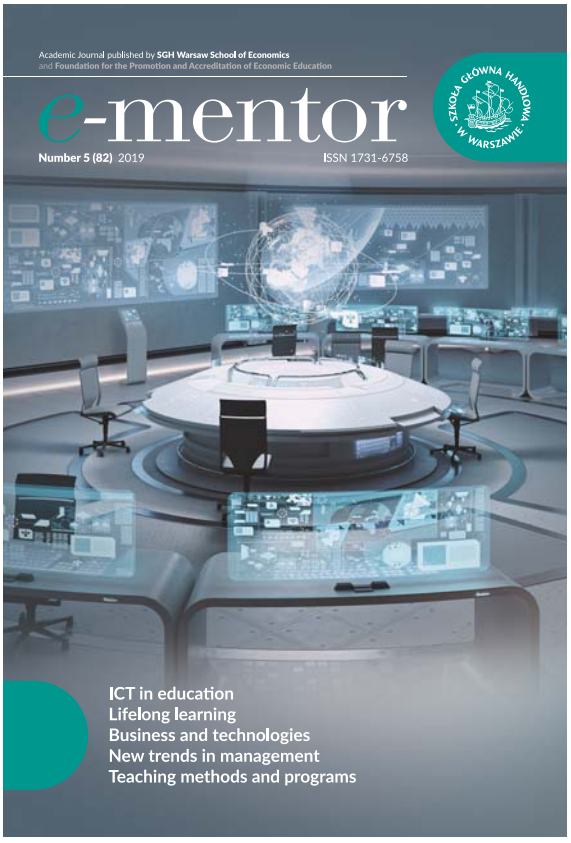

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Four B-learning Models in Children's Speech-language Therapy

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Abstract

B-learning is a new tool in children's speech-language pathology, one which has not previously been tested empirically by Polish scholars. Polish speech-language pathology has used information and communication technologies for diagnostic and therapeutic purposes for more than 30 years. Originally, speech-language pathologists in Poland used computer software translated from other languages, but in the 1990s, they began to develop their own programs to accommodate the specificity of the Polish language. The advent of the Internet brought with it speech-language therapy e-learning platforms. The author of this paper created a remote speech-language therapy course concept in 2009, which was used to create the first Polish e-learning platform for children with speech impediments, available at www.elogo.edu.pl. Developed in 2010, it was part of the EU project: "Stworzenie internetowego serwisu E-Logo-Edukacja, opartego na innowacyjnych e-usługach: e-logopedia i e-statystyka" ("Development of the E-Logo-Edukacja online service based on innovative e-services: e-speech therapy and e-statistics"). The platform has been used in the speech-language therapy of children with speech impediments in order to verify if new technologies can help improve articulation. The creator of the concept named it b-learning, and it incorporates online exercises into traditional speech-language therapy. A study conducted between 2011 and 2014 on two 35-person groups (an experimental group and a control group) proved that b-learning can be effective when applied in children's speech-language therapy. This paper demonstrates the effectiveness of four b-learning models. The results obtained proved that the most effective b-learning model involved the concurrent use of traditional speech-language therapy and the e-learning platform.

Keywords: speech-language therapy, speech disorders, information and communication technologies, e-learning platform, b-learning, b-learning models

Using new technologies in education has become commonplace in recent years. Information and communication technologies are used at all stages of education, from preschool to university, in both formal and informal education, as well as in educational therapy contexts. In this paper, the author demonstrates the use of an e-learning platform in the speech-language therapy of children with speech impediments, aged between 4 and 9 years. The focus of the article is on b-learning, which is why its selected definitions are provided in addition to a brief historical overview of the use of new technologies in Polish speech-language therapy. The author also describes her b-learning research process and the effectiveness of its four models.[1]

Definitions of b-learning – a review

B-learning is a new term in Polish literature. It comes from the term *blended learning* (Głowicki, 2004), which implies a combination of methods, and its synonyms include *mixed model* and *resource-based learning*. Maciej Tanaś, the originator of the Polish term *nauczanie komplementarne* (complementary education) considers his proposed term to be the best equivalent to b-learning (Tanaś, 2005), and his opinion is shared by some researchers (Mischke & Stanisławska, 2006; Postek, 2010; Czarkowski, 2012). Others, however, identify an electronic aspect in b-learning, which captures the essence of this type of education (Lorens, 2011; Plebańska, 2011).

According to Jakub Czarkowski (2012):

> complementary education is a concept according to which the teaching-learning process should combine in a flexible manner traditional education, with its direct communication, and remote education, which uses the Internet and other media. The essence of complementary education is that it combines these two modes of learning so that the individual elements complement one another. (p. 226)

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[1] The paper is based on the author's doctoral dissertation *B-learning in children's speech-language therapy and diagnosis*.

B-learning is frequently considered a type of e-learning, along with synchronous and asynchronous learning and self-education (Lorens, 2011). E-learning and b-learning utilize similar technological solutions: computers, software, platforms and the Internet. However, they differ in how the teaching process and training programs are organized. The role of the teacher is also different, as are the means of motivating students.

The initial premises of combining traditional teaching methods with e-learning, where the student has control over their own education, proved to be insufficient. It was necessary to expand the role of the teacher by creating a new, mixed learning concept (Graham, 2006). It is the position of the teacher as an authority figure which is key to improving the b-learning concept.

Sławomir Postek notes in his article *Od e-learningu do c-learningu…* (*From e-learning to c-learning…*) that, in the hybrid model, the teacher becomes a guide who "leads the student through the material, helps them organize knowledge and finds the right learning strategy" (Postek, 2010, p. 218). The teacher no longer has to be a source of information and the person responsible for assessing student knowledge. Modern-day educators encourage students to self-assess, teach selected information and how to deal with content overload, as well as to motivate learners to seek innovative solutions. They are trainers rather than sources of knowledge and, thus defined, they can play a key role in the success of b-learning or, to be more specific – c-learning (complementary learning).

In b-learning, students acquire specific knowledge and competences in traditional classes, where they have direct contact with teachers, before continuing their learning on an online platform. B-learning is considered highly effective as teachers "know their online course participants and what additional exercises and materials they need, and also have control over individual engagement and offering more options to motivate learners" (Lorens, 2011, pp. 12–13).

Marlena Plebańska (2011) claims that b-learning can be more beneficial than e-learning:

> taking into account the specificity of e-learning courses and remote learning, blended learning courses can be considered their most effective form. They combine the benefits of traditional methods and electronic tools, without the flaws and weaknesses of either of these types of learning implemented separately. Blended learning, by effectively combining the complementary benefits of the training methods, makes it possible to optimally educate, maximizes the results obtained in the learning process and renders it easier to execute established development strategies. It combines traditional and modern, electronic methods. (p. 20)

According to Głowicki, in blended learning, the traditional and remote forms of learning synergize with each other, which is highly beneficial to learners, provided that they possess rudimentary media competencies. The author also acknowledges the weaknesses of hybrid learning, which include difficulties with motivating learners to study, various imperfections of digital media and overloading learners with too many interactions, which may limit their creativity (Głowicki, 2004, p. 313). This is why direct contact between the teacher and the learner is so important in b-learning course planning, referred to as F2F (face-to-face) in the relevant literature (Carman, 2002; Sharma & Barrett, 2007, p. 7).

In his article *Dylematy współczesnej edukacji: nauczanie tradycyjne czy zdalne?* (*Modern education dilemmas: traditional or remote learning?),* Mischke (2005), in his support of b-learning, emphasizes that it is important to "abandon the myth of the separation between traditional and electronic education. Implementing e-learning (including remote learning) requires far-reaching modernization of the traditional education system, and any serious attempt at modernizing the existing teaching practices inevitably leads to e-learning, most frequently in the form of blended learning" (p. 53).

To sum up the above review of the definitions of b-learning, it is important to emphasize that the combination of information and communication technologies with the traditional influence of the teacher is determined by the school subject in question.

Can it be implemented in speech-language pathology,[2] in particular in the therapy of children with speech disorders? In order to answer this question, it is worth studying the history of new technologies in Polish speech-language pathology and specify what forms b-learning assumes in this field.

New technologies in Polish speech-language therapy

According to Józef Surowaniec (1989, 1996), Polish speech pathologists began to use computers in the 1980s. Originally, foreign software (e.g. *Sokoban, Tetris, Games for Kids* or *MousePen* by Appoint Inc., which enabled children to draw and write) was adapted to the specificity of the Polish language (Surowaniec, 1991).

In the 1990s, the Institute of Education of the University of Silesia used the *ProEuro* program for corrective exercises in Polish pronunciation, grammar and orthography. The software was originally designed for foreign language learning and consisted of two applications: *ProEuro* and *Euro*. The former was used to create language lessons, record individual sounds, words, expressions or sentences and save them. Its developers emphasized that it could also be used to diagnose children with speech impairments. The latter was used for children's therapy and offered the option to analyze

[2] The term blended learning was first used in Polish speech-language pathology by Monika Bombol-Lagha and Lech Śliwa in 2012 in relation to training future speech-language therapists.

recordings by comparing the speech of the child with that of the therapist. It was also possible to connect words with their spelling. The developers claimed that using computers for the purpose of speech disorder diagnosis and therapy "should increase the effectiveness of therapy and ensure maximum customization" (Juszczyk & Zając, 1997, pp. 131–133).

Bronisław Siemieniecki, the creator of the Multimedia Teaching Library, described the use of *Sound Recorder* and *Media Player* in pronunciation exercises with children in 1999. He noted that recording, playing back, correcting, listening and differentiating makes it possible to intensify therapy, which yields much greater results. He also emphasized that "the effective use of computers requires taking into account the specificity of the hardware and software on the one hand, and the general rules of traditional speech-language pathology on the other" (Siemieniecki, 1999, p. 12).

Over the years, the possibilities offered by primarily Western software were explored after being adapted to Polish, in particular in working with deaf (Szczepankowski & Lemirowski, 1998) or mute children (Buczyńska, 1999a; Siemieniecki, 1999; Grycman & Smyczek, 2004; Grycman, 2009; Zielińska, 2012).

After exploring foreign software, which was primarily designed in highly developed countries, the Polish speech pathology community began to develop its own programs. The first piece of speech-language therapy software was developed at the Department of Speech-language Pathology and Educational Linguistics of the Pedagogical University of Cracow between 1988 and 1990, as part of a ministerial R&D project. The program, *Logoped*, facilitated speech disorder diagnosis and therapy and consisted of two modules: *LogDgn* (speech-language disorder diagnosis), developed by Barbara Kędzierska and Józef Surowaniec, and *LogTerap* (speech-language therapy), by Anna Mieszkowska and Józef Surowaniec (Kędzierska, Mieszkowska, Olszyńska & Surowaniec, 1990; Surowaniec, 1995, 1996).

A great many computer programs used in children's speech disorder therapy were developed between 1988 and 2015, with new ones still being developed. These fall beyond the scope of this article – more information on them can be found in the relevant literature (Buczyńska, 1999b; Gruba, 2004, 2007; Juszczyk & Zając, 1997; Kaczorowska-Bray & Miklaszewska, 2006; Ożdżyński, 2007; Walencik-Topiłko & Miklaszewska, 2000; Walencik-Topiłko & Bąk, 2004; Walencik-Topiłko, 2005; Surowaniec, 1995; Szady, 2012; Szczepankowski & Lemirowski, 1998; Waligóra-Huk, 2015).

The development of the Internet, better access to it and faster connection speeds ushered in a network era of speech-language therapy software, which was now available online. The first Polish speech-language e-learning platform, www.elogo.edu.pl, was launched in 2010.[3] It was soon followed by www.toker.com.pl, as well as websites such as www.wymowapolska.pl, www.mimowa.pl, www.ktotomowi.pl, www.czytampisze.pl and www.e-terapie.pl. In addition to speech-language therapy platforms and websites, new online speech therapy service networks were developed between 2009 and 2014. Websites such as www.s-mile.pl, www.abcpoprawnejwymowy.pl, www.polskilogopeda.com and www.logopasja.pl offered access to professional advice and consultations, as well as remote therapy via Skype and Hangouts.

The online speech-language therapy market develops to match the social demand. Many parents seek advice online before consulting a speech-language professional. Table 1 shows search engine data from 2016 and 2018 – an upward trend can be observed.

Table 1. Google.pl search results from 2016 and 2018

No.	Searches in google.pl	Number of searches in 2016	Number of searches in 2018
1.	logopedia (speech-language pathology)	1,640,000	15,500,000
2.	logopedia (speech-language pathology)	1,220,000	5,050,000
3.	logopeda online (speech-language pathology online)	393,000	4,720,000
4.	terapia logopedyczna (speech therapy)	297,000	2,230,000
5.	logopedia w internecie (speech therapy online)	290,000	1,510,000
6.	gry logopedyczne (speech therapy games)	264,000	524,000
7.	diagnoza logopedyczna (speech therapy diagnosis)	198,000	307,000
8.	terapia logopedyczna w internecie (speech therapy on the Internet)	128,000	335,000

Source: author's own work.

[3] In 2010, the author of this article became head of the EU project: "Stworzenie internetowego serwisu E-Logo-Edukacja, opartego na innowacyjnych e-usługach: e-logopedia i e-statystyka" ("Development of the E-Logo-Edukacja online service based on innovative e-services: e-speech therapy and e-statistics"), the purpose of which was to develop Poland's first e-learning therapy platform for children with speech impediments. More information on how the platform was developed and its research applications can be found in the relevant literature (Jatkowska & Kaszubowski, 2012; Jatkowska & Hennig, 2013; Jatkowska, 2014; Jatkowska, 2018; Jatkowska, 2019).

New applications of technology in speech pathology are rarely studied by Polish researchers. Relevant papers on the topic were published in 2002, 2004 and 2015 (Gruba, 2002; Zielińska, 2004; Żuchelkowska, 2015), however, their authors were primarily concerned with using computers and specialized or educational software. No Polish papers on b-learning in speech therapy have been published so far.

Author's own definition of b-learning

Based on the definitions used in the relevant literature, current applications of information and communication technologies in Polish speech-language pathology and the author's own observations made during the study, the author considers it necessary to provide her own definition of b-learning:

> As used in speech-language therapy, b-learning combines two methods: traditional, which involves direct contact of the therapist with the patient, and IT, which uses modern information and communication technologies. Combining these has to be a process planned by the therapist in a way that ensures the two components complement each other and transition from one to the other in a deliberate way until therapeutic success is achieved. (Jatkowska, 2018, p. 131)

Four models of b-learning

Initial organizational efforts and preliminary pilot studies demonstrated that b-learning was not a uniform process, and that its effectiveness was determined by several factors. These included: the speech disorder in question, the readiness of the child to complete online exercises, the digital literacy of the parents and the latter's involvement in the child's therapy. The task of the therapist was to identify these factors, plan the b-learning process and incorporate it into a traditional speech-language therapy. These preliminary analyses, which involved preparing children to participate in b-learning, led to the creation of the four b-learning models.

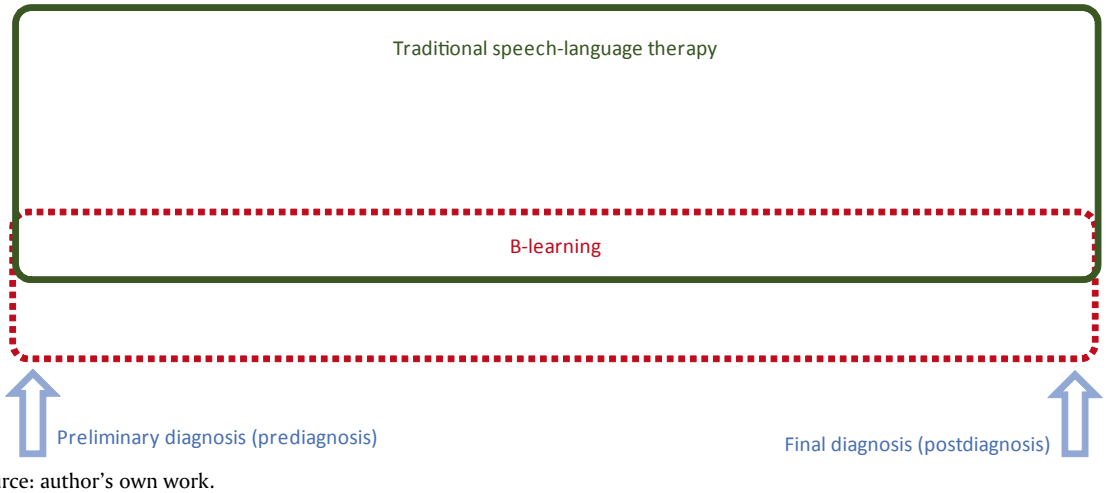
Model 1 involves concurrent traditional therapy and b-learning, from the preliminary diagnosis and until the final diagnosis. Under this model, the therapist examines the child twice (Figure 1). An important requirement for a child to be treated under this model is being ready to perform in-office and online exercises immediately after the preliminary diagnosis. The child does not require any preparation and completes the b-learning course concurrently with the traditional therapy.

Model 2 involves commencing with traditional therapy and b-learning from the moment a preliminary diagnosis is made. B-learning then finishes with a control diagnosis and only traditional therapy is continued, which finishes with a final diagnosis. A total of three diagnoses are made (Figure 2). Under this model, the child is initially willing to cooperate both in-office and on the platform, though the complexity of their speech impediment necessitates the continuation of the traditional therapy.

Model 3 involves commencing with the traditional therapy from the moment the preliminary diagnosis is made and incorporating b-learning after a control diagnosis. The entire process finishes with a final diagnosis. A total of three diagnoses are made (Figure 3). Under this model, it is necessary to prepare the child to use the platform, which is why only traditional therapy is available initially. After a control diagnosis is made confirming the child's readiness to use the platform, the traditional therapy is continued and combined with b-learning until the entire process is successful. Both parts of the process finish with a final diagnosis.

Model 4 involves commencing with the traditional therapy starting from the preliminary diagnosis. B-learning is incorporated during the traditional therapy, and traditional exercises continue after the b-learning part is complete. A total of four diagnoses are made: preliminary, two control diagnoses and a final diagnosis (Figure 4). This model is used for children

Figure 1. B-learning, Model 1



Source: author's own work.

Figure 2. B-learning, Model 2

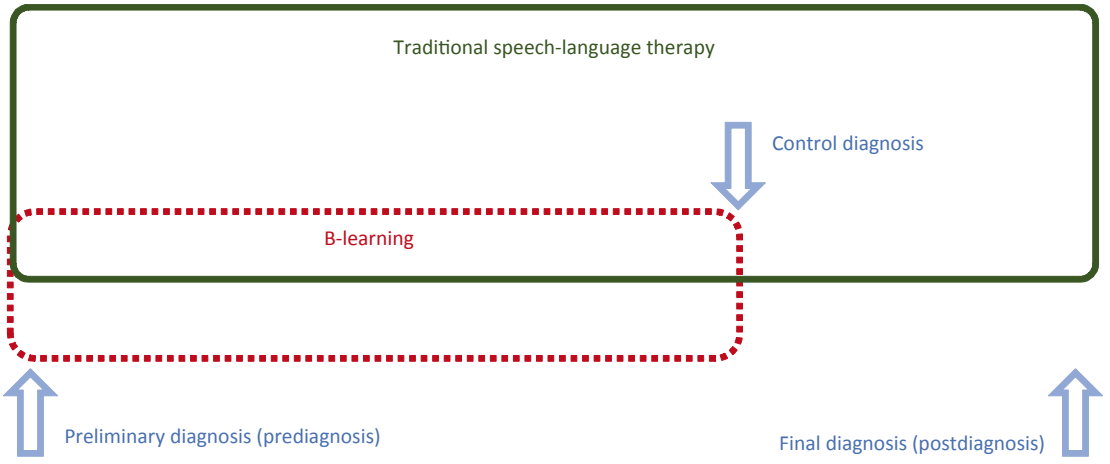


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Figure 3. B-learning, Model 3

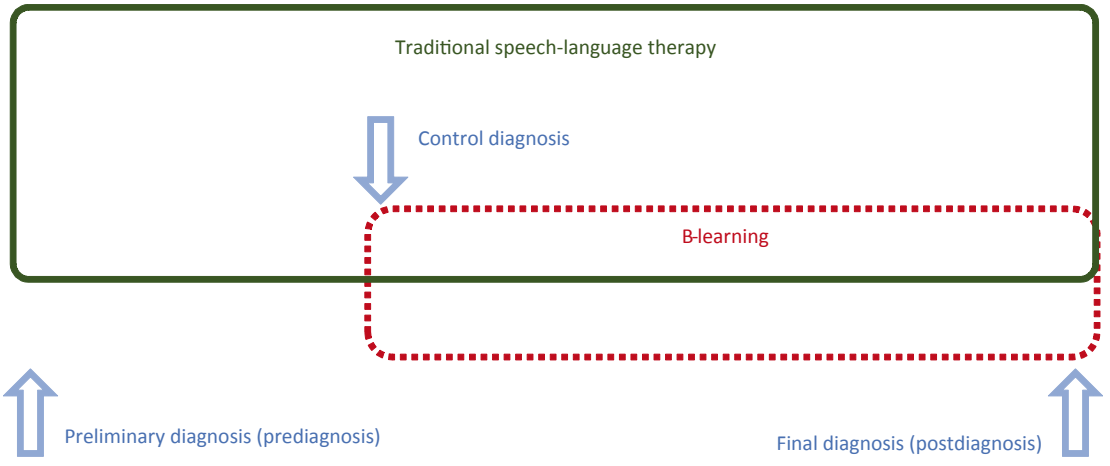

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Figure 4. B-learning, Model 4

Source: author's own work.

with the most severe speech impediments, who not only require preparation to use the platform, but also need to continue with traditional therapy after the b-learning component finishes.

These b-learning models were studied empirically in order to verify which of them was the most effective in children's speech-language therapy. The results of the analyses are presented in the following sections.

B-learning research process organization

The b-learning research process was organized according to the principles of scientific description and comprised two stages: concept and research. The process began with the development of a concept which specified the subject and purpose of the research, as well as the formulation of the research problems and the hypotheses. Research methods and tools were developed, the research area was selected, pilot research was conducted and two groups were selected: experimental and control. This was followed by actual study, after which the data was organized and analyzed using statistical methods (Pilch, 1977). The stages of scientific cognition are shown in Table 2.

Table 2. Stages of scientific cognition

Concept stage	
2009–2011	Development of the www.elogo.edu.pl e-learning platform.
2010–2011	Testing of the e-learning platform: training parents, acquiring opinions from subject matter experts, pilot studies and observing children's behavior, development of the b-learning concept and its four models.
2011–2012	Development of educational innovations.
Research stage	
2011–2014	Educational experiment implementation: commencement with the actual study and collection of research material.
2015–2016	Organization, analysis and description of the research material collected.

Source: author's own work.

Actual study

The author conducted an experiment on two groups: experimental and control, between 2011 and 2014. The experimental group originally numbered 52 children, but no suitable control group could be assembled for several reasons:

– 6 children stopped participating in b-learning (mainly due to chronic illness, technical difficulties resulting from a slow Internet connection at home and insufficient computer literacy of the parents),
– no pairs in the control group could be assigned to 11 children due to significant age differences and complex speech impediments, e.g. oligophasia, audiogenic dyslalia, or palatine dysglossia.[4]

Ultimately, each group comprised 35 children (21 boys and 14 girls) with speech disorders (simple and multiple dyslalia, motor alalia[5]). The control group participated exclusively in traditional speech therapy classes at the Tczew Psychological and Pedagogical Counselling Center. The experimental group participated in traditional in-office therapy and e-learning therapy at www.elogo.edu.pl.

Nonprobability and proportionate sampling was used to achieve a representative group. The main factors which influenced the selection process were age and type of speech impediment. The children selected were aged between 4 and 9 years, were all residents of Tczew County and attended the Tczew Psychological and Pedagogical Counselling Center for diagnosis. An important and fixed premise of the experiment was that the children should be treated by a single speech-language pathologist at one counselling center. To avoid heterogeneous therapeutic influences, such as using different methods or different meeting frequencies, impacting the reliability of the results, the author established all diagnoses and conducted the therapy in both groups personally. The same research tools were used in both groups: parent interview sheets and speech-language evaluation templates, as well as phonemic awareness and motor skill examinations. The stages of the study proper are shown in Table 3.

The main research problem was formulated as follows: is b-learning an effective alternative to traditional children's speech disorder diagnosis and therapy? Six detailed hypotheses were then formulated:[6]

[4] Even though no pairs could be found for those children in the control group, they still participated in the b-learning. This enabled the author to assess which speech impediments were treated particularly effectively using the b-learning method (Jatkowska, 2019).
[5] Kaczmarek's (1977, p. 102) symptomatic classification was used.
[6] A detailed description of the results of the study can be found in the book *B-learning w diagnozie i terapii logopedycznej dzieci* (Jatkowska, 2019).

Table 3. Stages of the actual study

No.	Stages of the study	Methods and tools
1.	Selection of children for the experimental and control group.	– observation, observation sheet – interview, parent interview sheet
2.	Preliminary diagnosis of the experimental and control group.	– interview with one parent, parent interview sheet – tests, questionnaires, samples, scales – child examination sheet
3.	Training session for parents: *E-learning speech therapy using the elogo.edu.pl platform.*	– workshop – presentation
4.	Assignment of individual online accounts to children and commencement with e-lessons.	– individual e-learning online journals
5.	Traditional speech-language therapy in both groups at the counselling center.	– individual speech therapy exercise sheet
6.	Commencement with b-learning in the experimental group.	– individual e-learning online journals – documentation of e-mails exchanged with parents
7.	Control diagnosis of the experimental group.	– child examination sheet
8.	Final diagnosis (postdiagnosis) in the experimental and control groups.	– child examination sheet
9.	Questionnaire study conducted in the experimental group.	– questionnaire, questionnaire form
10.	Experiment summary.	– report – result analysis

Source: author's own work.

1. B-learning expedites traditional speech-language therapy in children with simple and multiple dyslalia.
2. B-learning decreases the number of face-to-face (traditional) sessions for children with simple or multiple dyslalia.
3. B-learning reduces the number of sounds pronounced incorrectly by children.
4. B-learning is particularly effective in treating children with simple and multiple dyslalia.
5. The effectiveness of b-learning is determined by the following factors: age of the child, type of speech impediment, **selection of the appropriate b-learning model**, time spent by the child performing the e-learning exercises and the number of recordings made by the child.
6. B-learning, as a new form of speech-language therapy, increases parent involvement and supports them in conducting exercises at home, primarily by making them more attractive, increasing child motivation and exercise frequency, which translates to higher effectiveness.

For the purpose of this article, only those analysis results are presented which relate to the relationship between the b-learning model used and its effectiveness (hypothesis 5).

Effectiveness of b-learning and its models

The statistical data acquired from the original group of 52 children were used to calculate the effectiveness of the four b-learning models. In order to determine the therapy effectiveness distribution according to the b-learning model used, cross tables and a chi-squared test were used.[7] The results of the analysis demonstrated that the effectiveness of therapy varied significantly according to the b-learning model used – $\chi^2(9) = 30.18$; $p < 0.001$; $\eta = 0.51$; $V = 0.44$. The majority of Model 1 and 3 users were children where b-learning proved to be very effective. Based on the η value, it was observed that 51% of the b-learning model variance could be explained through the variance of therapy effectiveness. The relation between these variables was moderate (Table 4, Figure 5).

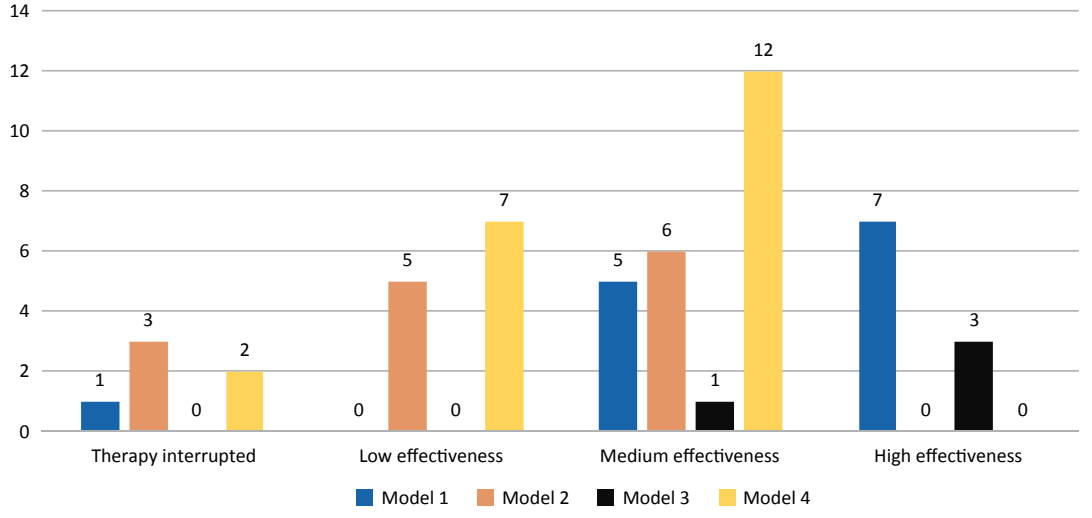
[7] Pearson's chi-squared test "is also known as the chi-squared test of independence, and its standard version is used to verify if two characteristics are independent of each other. The test involves comparing the identified frequency distribution of a phenomenon with a random distribution of these frequencies. The test can be administered even if the data are collected on a nominal scale" (Francuz & Mackiewicz, 2005, p. 412–413). It is a nonparametric test which verifies the null hypothesis, according to which there is no relationship between any of the variables. A χ^2 statistic is provided along with the significance level (p). If $p < 0.05$, the null hypothesis is rejected in favor of the alternative hypothesis, according to which there is a relationship between the variables. In addition, the η (eta) coefficient is given, which is used to measure relationships. It helps assess the extent to which the variance in the independent variable is explained through the dependent variable. Additional coefficients given include φ (phi) or V (Cramer's V), which are used to measure the correlation between two qualitative variables measured at the nominal level (<0.3 – weak, 0.3–0.5 – moderate, >0.5 – strong). The *phi* coefficient is used for 2x2 tables, and Cramer's V is used for larger tables (Francuz & Mackiewicz, 2005).

Table 4. Contingency table for the models and effectiveness of b-learning

			Effectiveness			
			Therapy interrupted	Low effectiveness	Medium effectiveness	High effectiveness
B-learning model	1	Sample size	1	0	5	7
		% of b-learning model	8%	0%	38%	54%
	2	Sample size	3	5	6	0
		% of b-learning model	21%	36%	43%	0%
	3	Sample size	0	0	1	3
		% of b-learning model	0%	0%	25%	75%
	4	Sample size	2	7	12	0
		% of b-learning model	10%	33%	57%	0%

Source: author's own work.

Figure 5. Therapy effectiveness distribution depending on b-learning model



Source: author's own work.

The analyses indicate that Model 1, which involved the concurrent application of traditional therapeutic methods and b-learning from the preliminary to final diagnosis, was the most effective b-learning model. Studied under this model were children with less complex impediments, who were ready to perform e-learning exercises from the beginning. The effectiveness of Model 4 was moderate, though the children studied had more severe impediments and their therapy was thus longer. Models 2 and 4 were observed to be the least effective. None of the four b-learning models were observed to be ineffective.

Summary

The results presented above demonstrate that new technologies can facilitate the development of language ability in children by improving their articulation. Selecting the appropriate therapeutic tool in the form of an e-learning platform, planning the therapy and monitoring the child's activities on the platform yielded positive results. The majority of successful cases involved children with less severe speech disorders.

It should be noted that the b-learning process implemented was complex and difficult to complete, and involved numerous variables which were beyond the scope of this article.

One of the hypotheses of the article is that "the effectiveness of b-learning is determined by the following factors: age of the child, type of speech impediment, selection of the appropriate b-learning model, time spent by the child performing the e-learning exercises and the number of recordings made by the child." This hypothesis has been partially confirmed. Statistical analyses have shown that only the type of impediment and the selection of the b-learning model determine its effectiveness. However, the age of the child, the time spent performing online exercises and the number of recordings proved to be insignificant to the effectiveness of the b-learning process.

As the appropriate b-learning model was one of the two effective factors out of the many variables, the author decided that this fact should be highlighted in this article.

The analysis of the research material has identified several additional phenomena which accompany b-learning and merit mentioning.

The increased engagement of children in the therapy resulting from the use of a computer and the Internet is not constant. Engagement declines gradually over time as the material is learned, as evidenced by declining log-in rates. Children are capable of remaining engaged in the b-learning process for approximately six months, after which they become fatigued. In order to maintain child engagement, it is recommended to expand the platform's resources to involve new teaching units. This is of particular importance to more severe speech impediments, which require longer therapies. Therefore, speech-language pathology e-learning platforms should offer a wide range of educational materials which therapists can incorporate into long-term therapies.

Another important issue is the workflow organization of e-speech therapists,[8] who work not only in-office, but also on the platform as part of the b-learning process. It was necessary to determine the hours of work and how they are calculated, the location where the new tasks were to be performed and how online activities should be documented. This was and still is a considerable organizational challenge present in all attempts to implement new educational solutions in speech-language pathology, one which requires more consideration and the development of a legal framework.

As mentioned before, b-learning is a new phenomenon in children's speech-language therapy and has not yet been studied empirically. Hence, the author considers this paper to be the beginning of a discussion on the topic, and expresses the hope that more researchers will take interest in the matter.

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The full list of references is available in the online version of the journal.

[8] The term was coined by the author during the development of the speech-language pathology e-learning platform and refers to speech pathologists working remotely, listening to children's recordings, analyzing them and providing feedback for parents (Jatkowska, 2019).

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