Mining and Analysis of Organizational Characteristics of English Language Skills Teaching in Primary Schools

MengJin Xiao, Yunnan Normal University, China

Juxiang Zhou, Yunnan Normal University, China*

Minghong Yang, Yunnan Normal University, China

Xiaoyu Han, Yunnan Normal University, China

ABSTRACT

Language skills are an important factor affecting students' language application. The cultivation of students' language skills depends on teacher-led daily classroom teaching. In view of the importance of language skills in English teaching, to explore the teachers' organizational characteristics of language skills in teaching, based on the "English Curriculum Standards for Compulsory Education" issued by the Ministry of Education of China, this paper divides the teaching activities into six dimensions. Lag sequential analysis and a clustering algorithm were used to analyze and explore the organizational characteristics of language skills teaching of primary school English teachers in Yunnan Province. According to the comprehensiveness and the overall coherence of language skills in teaching organization, the hierarchical evaluation method of language skills teaching organization ability is developed. Finally, referring to the language skills teaching suggestions of the new curriculum standards, the paper puts forward suggestions for improving the classroom teaching organization.

KEYWORDS

Cluster Analysis, Lag Sequential Analysis, Language Skills, Primary School English, Teaching Organization

INTRODUCTION

When learning English, language skills are a main manifestation of student communicative competence. Therefore, the teaching of language skills should pay equal attention to knowledge and skills by integrating the teaching of language skills into knowledge teaching (Klimova, 2014). Main language skills can be divided into receptive language skills like listening and reading and productive language skills like speaking and writing (Bozdoan & Karlda, 2013; Golkova & Hubackova, 2014; Pladevall-Ballester & Vallbona, 2016). However, the skills are not independent of each other (Öztürk & Çakıroğlu, 2021). Receptive language skills are the basis of productive language skills (Duke & Cartwright, 2021; Kim et al., 2015). Productive language skills can strengthen receptive language

*Corresponding Author

skills (Jiang et al., 2018; Kittredge & Dell, 2016). Additionally, there is an interaction between the learning of skills (Celik & Yavuz, 2015; Lonigan et al., 2018; Tavil, 2010).

In the process of language teaching, however, teachers often neglect various language skills. For example, some teachers insufficiently implement productive language skills or students have fewer opportunities to learn how to speak and write (Mihaljević Djigunović, 2006; Weshah & Tomok, 2011). Hulstijn (2007) noted that listening is the most implicit language skill. Yet some teachers teach grammar, ignoring pronunciation and listening (Sohrabi, 2012). Alternatively, teachers put effort into reading, writing, and speaking rather than teaching (Mante-Estacio et al., 2018).

Based on the background of online language courses, scholars have proposed strengthening reading comprehension, listening, and writing through various combinations of exercises (Hercik et al., 2015; Milková & Hercik, 2014). Some scholars also use comparative experiments to verify the effectiveness of learning activity design in improving students' language skills under mixed learning (Xu et al., 2020). Students' language skills learning depends on face-to-face classroom teaching by teachers. Therefore, promoting the development students' language skills takes place by analyzing the language skills organization of classroom teaching and providing suggestions for improvement.

The artificial intelligence (AI) and data driven "InteliClass" English discipline innovation application project, led by the Yunnan Center for Educational Technology, introduced the Superfish InteliClass teaching platform into Yunnan Primary School English classroom teaching. Its use alleviated the shortage of English teachers in some areas of Yunnan Province, altering traditional teaching modes for English courses in Yunnan primary schools.

It is difficult for teachers to understand the organization of language skills in the teaching process. Therefore, this article studies teaching process data based on a teaching platform, analyzes the characteristics of language skills teaching organization, and suggests improvements to language skills teaching organization in primary English teaching in Yunnan Province.

DATA AND METHODS

Data

The analysis sample of the study is the sequence data of teaching activities generated by teachers who use Superfish InteliClass in the first semester of the 2020-2021 academic year. This sample was supported by the InteliClass project, led by the Yunnan Center for Educational Technology. This study follows third- and fourth-grade teachers who must complete the first-level language skills curriculum objectives in the English Curriculum Standards for Compulsory Education (hereinafter referred to as the Standards). It selects 50 teachers as research data sources. A total of 1,914 teaching activity sequence lessons were obtained.

The platform defines the purpose and implementation steps of teaching activities. Then, the research classifies teaching activities into five language skills: (1) listening and doing; (2) speaking and singing; (3) playing and acting; (4) reading and writing; and (5) audio-visual. If the purpose and implementation steps of the teaching activity do not involve the teaching of specific language skills, it will be placed under the "other" custom category. The teaching activities are divided into six categories. According to the classification results of teaching activities, the study replaced the teaching activities in the teaching data of 50 teachers with corresponding language skills to obtain the teaching sequence of teachers' language skills.

Methods

Lag sequential analysis (LSA) and a clustering algorithm were used to analyze and explore the organizational characteristics of language skills teaching of primary school English teachers in Yunnan Province. PyCharm Community Edition 2021.2 x64 is the editing and running software of the algorithm.

LSA, proposed by Sackett (1978), analyzes the probability of one behavior followed by another. It also looks at its statistical significance. In teaching behavior analysis research, LSA can compensate for the lack of analysis on the mining of meaningful connections between behaviors. It can also solve the problem of mining the contextual relationship between activity sequences (Hao et al., 2019).

In this study, LSA explores the organization of teachers' language skills teaching by analyzing the correlation between the "before" and "after" conversion of teaching activities. The LSA of the teaching activity sequences of 50 teachers was carried out to explore the characteristics of various language skills organizations in classroom teaching. After the LSA, each teacher obtains 36 adjusted residual values (Z-score). These serve as the basis for judging the jump relationship between six types of language skills teaching activities: (1) listening and doing; (2) speaking and singing; (3) playing and acting; (4) reading and writing; (5) audio-visual; and (6) other. A Z-score > 1.96 indicates a significant correlation between the sequences of the two kinds of activities. Pseudo codes for LSA are as follows:
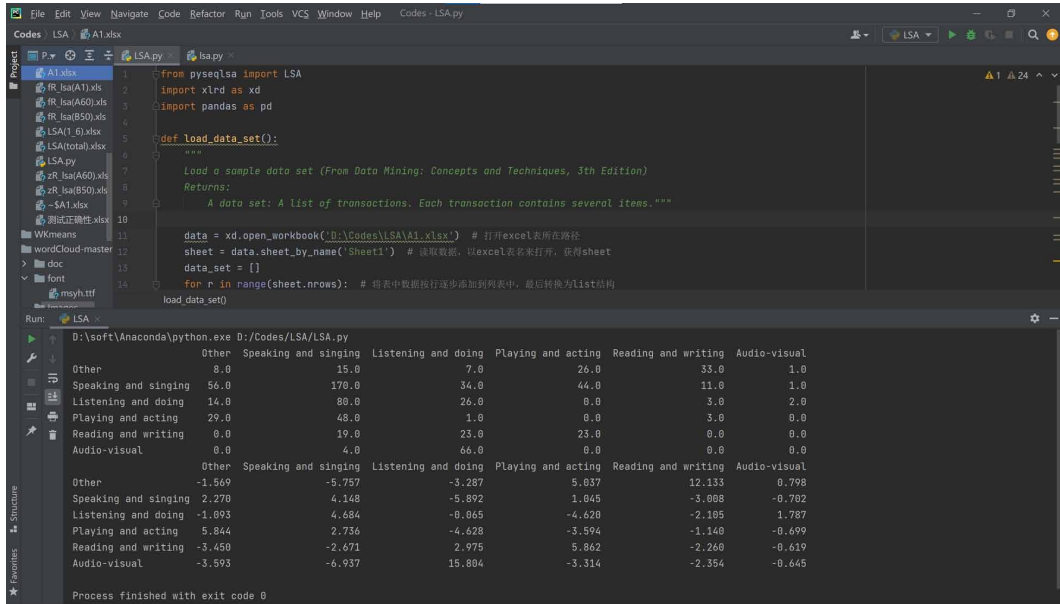
Algorithm: LSA algorithm

```
Input: Seqs -- Teacher language skill activity sequence dataset
Code_set -- Collection of language skill categories
Output: The conversion frequency matrix Transform and adjusted
residual Z matrix between various teaching activities
for seq in Seqs:
    if seq is not empty
        last_code is assigned to the first element of seq
        for act in seq[1:]:
            get last_code index an in Code_set
            get index b of act in Code_set
            add one to the position of the frequency matrix
Transform[a,b]
            last_code = act
        end for
    end if
end for
the matrix i is the sum of each row of the Transform
the matrix j is the sum of each column of the Transform
N is the sum of Transform
Eij is the matrix i dot the matrix j divided by N
i_m is equal to 1 minus(i/N)
j_m is equal to 1 minus(j/N)
Cij is equal to the square root of the product of the row matrix
i_m dot column matrix j_m times Eij
Z is equal to the difference between Transform and Eij divided by
Cij
```

The study used samples to compare the analysis results of the algorithm and GSEQ 5.1. The results were consistent. Due to the large amount of data analyzed in this article, the algorithm is selected for analysis. One of the teachers' analysis results is shown in Figure 1. The results include the frequency of activity conversion and the calculated Z-score.

The cluster analysis method divides research samples into categories according to clustering indicators. The differences between samples and categories are as large as possible. The differences between samples within categories are as small as possible. In this study, K-Means ++ was chosen

Figure 1. Example Interface of Lag Sequential Analysis Results

as the cluster analysis method (Arthur & Vassilvitskii, 2007). It is statistically significant only when Z-score > 1.96; therefore, it reduces the effect of the adjusted residual value on the cluster analysis for the absence of correlated activity series. The study will be a value less than or equal to 1.96 replace with 0. According to the characteristics of language skills teaching organizations, teachers are clustered. The organizational characteristics possessed by more than two-thirds of all teachers are taken as the representative characteristics of language skills teaching organizations of this type of teacher and analyzed. The pseudocode of K-means++ is as follows:

Algorithm: K-means++

```
Input: U -- dataset containing data on the 36-dimensional
organizational characteristics of language skills for 50 teachers
(consisting of the result Z of the LSA algorithm)
     K -- number of target clusters, set to 5
     Max_iter -- maximum number of iterations
Output: cluster center Q:{q₁, q₂,…,qₖ}
     cluster tag for 50 teachers
  The language skill organization characteristic data of one
  teacher was randomly selected as the first initial clustering
  center q₁ and stored in Q
  for i in range(0, K):
    for u in U:
       calculate the distance from u to the existing cluster
       center in Q and store it in D(x)
    end for
    calculate the probability that each point becomes the next
    cluster center
```

```
    select the new cluster center and store it in Q
  end for
  for j in range(0, max_iter):
    for u in U:
      for q in Q:
          calculate the distance between u and all the cluster
          center in Q
      end for
      u was allocated to the nearest cluster, attaching cluster tag
      recalculate the cluster center of each cluster
    end for
  end for
```

Results

Through LSA and cluster analysis of teaching activity data, each teacher finally gets the category code. Teachers can be divided into five categories (Clu-A, Clu-B, Clu-C, Clu-D, and Clu-E, respectively) for differentiation.

Organizational Characteristics of Clu-A Language Skills Teaching

Twelve teachers belong to Clu-A. When the LSA results of these 12 teachers are analyzed, it is found that their language skills organization characteristics are scattered. There are no same language skills teaching organization characteristics. Therefore, it is difficult to present and analyze the organization of language skills teaching.
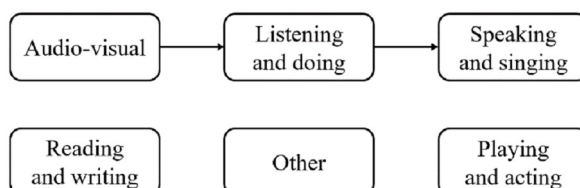
Organizational Characteristics of Clu-B Language Skills Teaching

There are eight Clu-B teachers. After analyzing the LSA results of such teachers, the study found two organizational characteristics of representative language skills teaching of teachers (audio-visual → listening and doing, listening and doing → speaking and singing). See Figure 2.

It can be seen from the figure that "three" is the longest sequence length formed by teachers in English language skills teaching. First, teachers cultivate students' auditory perception of teaching content through "audio-visual" activities. Second, after the students obtain hearing perception, the related teaching activities of the "listening and doing" dimension are carried out immediately to guide the students to respond to the content they hear. Finally, the students' speech expressions are trained from listening learning to speaking learning.

The Standards make recommendations for the teaching of language skills at level one and level two. It is suggested that students in the listening teaching portion of the course should be "familiar with the topic." In addition, students should have "input intuitive background information" before listening. During the listening activities, students should "listen to information, choose pictures" and "TPR activities (listen to instructions to do actions)," "listen and draw," "listen and match," and other

Figure 2. Organizational Characteristics of Clu-B Language Skills Teaching

activities. In the post-listening activities, students should be guided to "role play," "outline the main points," "orally answer questions," and other activities.

This type of teacher organization of after-listening activities is simple. However, the teaching of speaking has similar problems. For example, the task of "inputting background information" in pre-speaking activities may be completed. Still, the activities of speaking are not fully carried out. In addition, the development of post-speaking activities has not been reflected.

Regarding Clu-B teachers in the teaching of language skills, organization tends to involve two language skills, listening, and speaking. These are based on the teaching of listening skills. However, in the teaching organization of listening and speaking ability, the organization of relevant teaching activities are neglected after the listening and speaking activities. Therefore, the implementation suggestions for post-listening and post-speaking activities in the Standard are not met. In the teaching organization of listening and speaking skills, teachers follow each step within the principle. However, the teaching organization form of language skills is single, and the training of students' "reading and writing" skills is very inadequate. Regarding daily teaching design, Clu-B teachers should enhance the strength of "reading and writing" skills teaching activities, carry out more "playing and acting" activities, strengthen listening skills teaching, increase their interest in teaching, and enrich the organizational forms of various language skills activities.
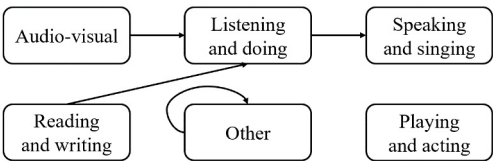
Organizational Characteristics of Clu-C Language Skills Teaching

Clu-C contains three teachers. The language skills teaching organization features of this kind of teacher have four sequences (other → other, audio-visual → listening and doing, listening and doing → speaking and singing, reading and writing → listening and doing). The language skills teaching organization features drawn according to the feature sequence are shown in Figure 3.

The longest sequence length of the Clu-C teacher's language skills teaching organization is 3. Clu-C teachers have richer organizational characteristics of language skills teaching than Clu-B teachers. Based on the organizational characteristics of language skills teaching of Clu-B teachers, Clu-C teachers add the interaction between "Reading and writing" activities and "Listening and doing" activities. However, Clu-C teachers did not improve the two language skills teaching organization of Clu-B teachers: listening and speaking. In language skills, listening and speaking are the basis of "Reading and writing", and "Reading and writing" is the basis of strengthening listening and speaking. After "Reading and writing" teaching, such teachers teach listening and speaking skills to consolidate the foundation of students' language skills, but the organization of activities before and after "Reading and writing" teaching is also not reflected.

Although Clu-C teachers have more complete coverage than Clu-B teachers in the teaching organization of language skills, they have insufficient organization of play activities and spend too much energy in other activities that are not related to language skills teaching. Therefore, teachers of this type need to enhance the development of play activities and the organization of other language skills teaching activities in their daily teaching and pay attention to the preparation and transition before the reading and writing activities and the necessity of other activities in teaching. In addition, according to the teaching suggestions in the "Standard", Clu-C teachers need to improve the organization of activities before and after the teaching of various skills.

Figure 3. Organizational Characteristics of Clu-C Language Skills Teaching

Organizational Characteristics of Clu-D Language Skills Teaching

There were 21 Clu-D teachers, accounting for the largest proportion among the five categories of teachers. This category of teachers has four representative organizational characteristics of language skills teaching (audio-visual → listening and doing, listening and doing → speaking and singing, playing and acting → other, other → reading and writing). See Figure 4.

The longest sequence of Clu-D teachers' language skills teaching organization is three. The organization of language skills teaching activities is divided into two parts, showing a certain degree of dispersion. The organizational form of the teaching activities of these teachers is the same as that of Clu-B. The other is composed of the following language skills: (1) audio-visual; (2) listening and doing; and (3) speaking and singing. Teachers use "other" teaching activities to connect play teaching and reading and writing teaching from the teaching of highly applicable play and acting skills to the teaching of higher-level reading and writing skills through the transition of other teaching activities. The two parts of language skills teaching (from the simple to the deep) guide students to listen, speak, read and write language skills to perceive and learn.

Although Clu-D teachers have organized the five dimensions of language skills per the Standards, the integration of language skills must be improved. Clu-D teachers have improved the defect that Clu-C teachers did not organize (pre-reading and writing activities). However, they did not design and implement post-reading and writing activities. Post-reading and writing should be reinforced by activities like role play and achievement presentation.

Listening, speaking, reading, and writing are not independent skills. Listening and reading are input skills; speaking and writing are output skills. Extensive practice of receptive language skills can set the foundation for productive language skills. Productive language skills can consolidate receptive language skills. In English teaching, the repetition and alternation of language skills may achieve mutual promotion among language skills. Based on the current organization of language skills teaching, teachers of this kind will achieve better teaching effects if they enrich the organization of language skills in different dimensions, pay attention to the organization of activities (before, during, and after language skills teaching), and strengthen the mutual promotion of language skills learning.

Organizational Characteristics of Clu-E Language Skills Teaching

There are six teachers in Clu-E. There are also six characteristics of language skills teaching organization for teachers (audio-visual → listening and doing, listening and doing → speaking and singing, speaking and singing → playing and acting, playing and acting → other, other → reading and writing, reading and writing → playing and acting). The language skills teaching organization of this kind of teacher, drawn according to the feature sequence, is shown in Figure 5.

The language skills teaching organization of Clu-E teachers appears in a ring. The longest sequence of language skills organization of Clu-E teachers was seven, in which the feature sequence was not repeated. Regarding the language skills teaching organization characteristics of Clu-D teachers, Clu-E teachers add the organization between "speaking and singing" and "playing and acting" activities, as well "reading and writing" and "playing and acting." Therefore, all dimensions of language skills form a coherent whole in the teaching organization, completing the transition from simple "listening and speaking" to "reading and writing."

Figure 4. Organizational Characteristics of Clu-D Language Skills Teaching
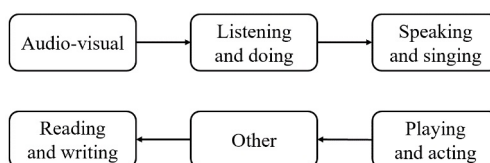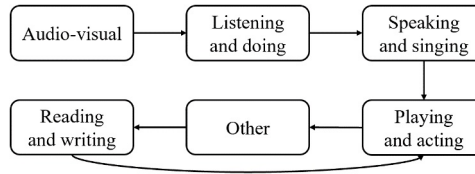
Figure 5. Organizational Characteristics of Clu-E Language Skills Teaching

First, the teacher cultivates the students' listening ability, guiding them to make corresponding responses to the listening content. By gradually carrying out the "speaking and singing" activities from listening to speaking, the students exercise their listening and speaking ability. Second, teachers carry out "playing and acting" activities after the students exercise their listening and speaking ability. This provides a situation for the training and application of students' listening and speaking language skills, which also increases the interest of the class. Finally, through the connection of activities, the teaching of language skills is upgraded to "reading and writing." "Playing and acting" activities are interspersed throughout the teaching to stimulate interest in learning. The language skills teaching organization of Clu-E teachers makes up for the development of listening activities, the "summary points" of speaking activities and post-speaking activities, and the role playing and communication activities of post-"reading and writing" activities in the previous organization.

Clu-E teachers incorporated the five first-level language skills curriculum objective dimensions formulated in the Standards into their own teaching. They were organized to better complete the language skills teaching suggestions in the Standards. Although the language skills teaching organization of Clu-E teachers is complete and organized among the five categories, the organizational form of each dimension is still unitary. Teachers can enrich the teaching organization forms among different language skills according to their own teaching conditions. This will achieve the teaching effect that listening and speaking set the foundation for reading and writing. In addition, reading and writing strengthen listening and speaking.

DISCUSSION AND CONCLUSION

Evaluation of the Organizational Ability of Language Skills Teaching

This study was based on a grade three and grade four teaching analysis of teachers' language skills and the teaching organization. The research looked at third- and fourth-grade teachers' ability to carry out the Standards set by the level of language skills course target tissue induced and summarized, combined with the analysis of the characteristics of the six kinds of language skills teaching, teachers' language skills, and teaching organization ability, was finally divided into three levels. Table 1 analyzes the organizational mode of language skills teaching at all levels from the aspects of benchmarks, cases, and corresponding improvement suggestions at all levels.

Level 1

The language skills teaching organization of this level is one-sided (like Clu-A, Clu-B, and Clu-C teachers in the language skills organization category). The teaching organization of such language skills organizes regular teaching for part of the dimensions of language skills. The organization mode of language skills teaching activities is single or irregular. The language skills teaching organization at this level does not cover the language skills teaching dimension proposed in the Standards. Therefore, it is difficult to complete the language skills curriculum objectives proposed in the Standards. It impossible for students to complete the learning and exercises of various language skills in the teaching. Teachers at this level should carry out more language skills teaching activities, actively

learn and refer to the existing language skills teaching model, and establish connections between language skills activities. Managers can carry out professional training to solve common teaching organization defects.

Level 2

The language skills teaching organizations of this level meet the requirements of the Standards in terms of dimensions, but the teaching organizations of each dimension have not formed a complete logical system, such as Clu-D teachers. Such teaching organization tends to lead to the closure of students' language skills learning, which is not conducive to the transfer of language skills and the systematic learning and application of English as an applied language. The language skills teaching suggestions of the Standards separates the teaching of each language skill, putting forward corresponding suggestions on the organization of teaching activities. However, the role of language skills activities in other dimensions is still mentioned before and after the language skills activities. Therefore, language skills training for the purpose of language learning must be integrated from independent dimensions into a whole that promotes each other in learning. The deficiency of language skills teaching organization at this level mainly lies in the dispersion of teaching organization. The effective measures to improve the teaching organization are to analyze the causes of the dispersion and to increase the organizational relationship between language skills that can promote each other. If a certain language skills teaching activity is not organized as a whole, the language skills teaching model and organization method in the Standards teaching suggestions can be added.

Level 3

Language skills teaching at this level is relatively well organized, such as Clu-E teachers. All language skills are organized at this level, and the organization of all kinds of language skills can form a whole. The organizational relationship also conforms to the teaching logic and teaching suggestions in the Standards. The requirement of this level is the basic requirement of the language teaching organization. To achieve good effect of language skills teaching, teachers need to constantly innovate the way of language skills teaching organization according to theory and practice and find a better way of language skills teaching organization.

Suggestions for Improving the Organization of Language Skills Teaching

The study found that the teaching organization of "audio-visual" and "listening and doing" related to listening ability in English language skills teaching of primary schools in Yunnan Province was more common and less likely to be ignored by teachers. "Audio-visual" teaching activities are more common at the beginning of teaching activities organization. "Speaking and singing" teaching activities are carried out vigorously; however, the organization between "speaking and singing" teaching activities and other language skills teaching activities is too simple. In addition, the development of other language skills and the richness of their organization have been neglected to varying degrees in different types of teaching organizations. Based on the analysis results of the study, this article puts forward several suggestions for the improvement of English language skills teaching in primary school grades three and four.

First, the development of "playing and acting" teaching activities should be strengthened to link with other language skills activities. "Playing and acting" is mentioned in the Standards for first- and second-level language skills curriculum. It is an independent dimension in the first-level curriculum Standards, which shows its important role in the teaching of English in primary schools. The Standards offer suggestions on the teaching of language skills in levels 1 and 2. This occurs during and after the organization of listening, speaking, reading and writing to stimulate learning interest and role play, and "playing and acting" teaching activities. However, in the research results, teachers often ignore the "playing and acting" teaching activities. The intensity of "playing and acting" is not reflected in the analysis results, which also diminishes the organization mode between "playing and acting" teaching

Table 1. Organizational Hierarchy of Language Skills Teaching

Level 1: Single or decentralized organization of incomplete skills	Benchmark	In the teaching process, language skills-related activities of the Standards are not significantly organized (or only part of the language skills is organized). There is a single way of organization among various activities.
	Case	For example, the organizational characteristics of language skills include Clu-A, Clu-B, and Clu-C of two to four language skills.
	Suggestions	One suggestion is to increase the intensity of language skills activities that are not well-organized in the current teaching. Teaching suggestions in the Standards should be followed to enrich the organization of activities.
Level 2: Decentralized organization of complete skills	Benchmark	The teaching process organized the language skills in the Standards; however, it did not form a whole to promote each other. The intensity of language skills activities should be increased because they are not organized in current teaching. Teaching suggestions should follow the Standards to enrich the organization of activities.
	Case	For example, language skills organization presents a decentralized Clu-D.
	Suggestions	One suggestion is to decentralize the organizational methods (insufficient organization of certain language skills or neglect of the cohesion of some language skills). Another suggestion is to increase the organizational strength of related language skills.
Level 3: Overall organization of complete skills	Benchmark	In the teaching process, the language skills of the Standards are organized. The forms of organization among the language skills are rich, conforming to the teaching logic.
	Case	For example, language skills organization presents decentralized Clu-D.
	Suggestions	Analyze the reasons leading to the decentralization of organizational methods (insufficient organization of certain language skills or neglect of the cohesion of some language skills) and increase the organizational strength of related language skills.

activities and other dimensions of language skills. It does not play a role in students' language skills learning. Therefore, teaching design should pay attention to the development of "playing and acting" teaching activities, increase the frequency of activities, and build a solid organizational relationship with other dimensions of language skills teaching activities.

Second, the design of "reading and writing" teaching activities should be strengthened. In the analysis of organizational characteristics of language skills teaching, most teachers did not build a strong organizational relationship with other activities before or after "reading and writing." They ignored the stimulation of students' interest and familiarity with language topics before "reading and writing," as well as the organization of consolidation, communication, and role-playing activities after "reading and writing."

Literacy teaching involves language skills within "reading and writing." However, the teaching organization form of "reading and writing" activities is lacking. The frequency of "reading and writing" teaching activities is only equal to that of other teaching activities. The organization and development of "reading and writing" teaching activities in teaching is imperfect and insufficient. Therefore, teachers should increase the organization of "reading and writing" teaching activities in the process of all language skills teaching activities. In doing so, "reading and writing" and other kinds of language skills teaching activities can strengthen the cultivation of students' English reading and writing ability.

Third, language skills teaching activities and teaching systems should align to promote language skills. Clu-E has organized the dimensions of language skills, solving problems in other types of organizations in the characteristics of language skills teaching organization. However, Clu-E is not good enough for the organization of language skills.

In language skills, listening and speaking are the basis of reading and writing. These strengthen listening and speaking capabilities. The developing forms of language skills make teaching activities more impactful than language skills teaching. Therefore, it is desirable that students' learning of different language skills can promote each other in teaching.

To achieve this goal, teachers must study the teaching principles and strategies of English language skills. They should use their teaching experience to explore the organization of integrated teaching of various language skills. Finally, teachers can form a strong teaching system and improve the teaching quality of language skills.

Research based on the data collected on the teaching platform was combined with China's Ministry of Education and the Compulsory Education English Curriculum Standards. This was used for language skills and teaching suggestions, primary school English teachers' language skills, and teaching organization in Yunnan Province. It was put forward for teachers' language skills, teaching organization ability evaluation methods, and suggestions for improvement. It is expected to provide a reference for teachers to improve teaching quality from the perspective of language skills teaching organization. The research analyzes the teaching of language skills from the level of the teachers. Subsequent research will analyze the teaching effects of teachers with different levels of organizational ability of language skills teaching, explore the influence of teachers' organizational ability of language skills on students' language skills learning, and strengthen and verify the research results.

ACKNOWLEDGMENT

CONFLICT OF INTEREST

The authors of this publication declare there is no conflict of interest.

FUNDING AGENCY

No funding information.

REFERENCES

Arthur, D., & Vassilvitskii, S. (2007). K-Means++: The advantages of careful seeding. In *Proceedings of the Eighteenth Annual ACM-SIAM Symposium on Discrete Algorithms*. ACM.

Bozdoan, D., & Karlda, B. (2013). Neglected productive skills in content-based classes-sciencedirect. *Procedia: Social and Behavioral Sciences*, *70*(1), 1152–1162. doi:10.1016/j.sbspro.2013.01.171

Celik, O., & Yavuz, F. (2015). The relationship between speaking grades and listening grades of university level preparatory students. *Procedia: Social and Behavioral Sciences*, *197*, 2137–2140. doi:10.1016/j.sbspro.2015.07.339

Duke, N. K., & Cartwright, K. B. (2021). The science of reading progresses: Communicating advances beyond the simple view of reading. *Reading Research Quarterly*, *56*(S1), S25–S44. doi:10.1002/rrq.411

Golkova, D., & Hubackova, S. (2014). Productive skills in second language learning. *Procedia: Social and Behavioral Sciences*, *143*, 477–481. doi:10.1016/j.sbspro.2014.07.520

Hao, X. J., Wang, F., Peng, Z. J., & Dong, J. Y. (2019). Group online learning process analysis: Dynamic conversion of learner roles. *Modern Distance Education*, *3*, 38–48.

Hercik, P., Milkova, E., & El-Hmoudova, D. (2015). Language skills development in E-learning language courses. *Procedia: Social and Behavioral Sciences*, *182*, 653–659. doi:10.1016/j.sbspro.2015.04.803

Hulstijn, J. (2007). Psycholinguistic perspective on second language acquisition. In J. Cummins & C. Davison (Eds.), *International handbook of English Language teaching* (Vol. 11, pp. 701–713). Springer. doi:10.1007/978-0-387-46301-8_52

Jiang, D., Kalyuga, S., & Sweller, J. (2018). The curious case of improving foreign language listening skills by reading rather than listening: An expertise reversal effect. *Educational Psychology Review*, *30*(3), 1139–1165. doi:10.1007/s10648-017-9427-1

Kim, Y. S. G., Park, C., & Park, Y. (2015). Dimensions of discourse-level oral language skills and their relations to reading comprehension and written composition: An exploratory study. *Reading and Writing*, *28*(5), 633–654. doi:10.1007/s11145-015-9542-7

Kittredge, A. K., & Dell, G. S. (2016). Learning to speak by listening: Transfer of phonotactics from perception to production. *Journal of Memory and Language*, *89*, 8–22. doi:10.1016/j.jml.2015.08.001 PMID:27840556

Klimova, F. B. (2014). Detecting the development of language skills in current English language teaching in the Czech Republic. *Procedia: Social and Behavioral Sciences*, *158*, 85–92. doi:10.1016/j.sbspro.2014.12.037

Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. *Remedial and Special Education*, *39*(5), 260–273. doi:10.1177/0741932518764833

Mante-Estacio, M. J., Valdez, P. N., & Pulido, D. (2018). Effective teaching of the macro-skills: Reflections from Filipino teachers of English. *Reflective Practice*, *19*(6), 844–854. doi:10.1080/14623943.2018.1539662

Mihaljević Djigunović, J. (2006). Role of affective factors in the development of productive skills. In M. Nikolov & J. Horváth (Eds.), *UPRT 2006: Empirical studies in English applied linguistics* (pp. 9–23). Lingua Franca Csoport.

Milková, E., & Hercik, P. (2014). Possibilities of language skills development within the framework of communicative competence mastering in e-learning language courses. *Procedia: Social and Behavioral Sciences*, *131*, 182–186. doi:10.1016/j.sbspro.2014.04.101

Öztürk, M., & Çakıroğlu, Ü. (2021). Flipped learning design in ELF classrooms: Implementing self-regulated learning strategies to develop language skills. *Smart Learning Environments, 8*(2).

Pladevall-Ballester, E., & Vallbona, A. (2016). CLIL in minimal input contexts: A longitudinal study of primary school learners' receptive skills. *System*, *58*, 37–48. doi:10.1016/j.system.2016.02.009

Sackett, G. P. (Ed.). (1978). *Observing behavior: Theory and applications in mental retardation*. University Park Press.

Sohrabi, S. (2012). Teaching the four skills in Iranian preuniversity schools. *Procedia: Social and Behavioral Sciences*, *47*(1), 624–628. doi:10.1016/j.sbspro.2012.06.707

Tavil, Z. M. (2010). Integrating listening and speaking skills to facilitate English language learners' communicative competence. *Procedia: Social and Behavioral Sciences*, *9*, 765–770. doi:10.1016/j.sbspro.2010.12.231

Weshah, H. A., & Tomok, T. N. (2011). The impact of a training program based on pedagogical knowledge on improving the speaking and writing skills teaching practices of female English language teachers. *Reading Improvement*, *48*(4), 179–194.

Xu, X. L., Zhao, H., Huang, D., & Gu, X. Q. (2020). Research on the blended learning to promote English language skills. *Modern Educational Technology*, *30*(12), 76–84.