Digital Signal Processing of Rise-fall Intonation
A Bridge Across Online Distance to Approach the ZPD in the Future

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Abstract

With the concern about the sense of distance brought by online teaching and learning, the main focus of this article is to study the impacts of teacher's rise-fall intonation on students' feelings of online distance and willingness to approach the Zone of Proximal Development (ZPD). Through observing and micro-analyzing a video of online English speaking course, some impacts of the rise-fall intonation on the student's interaction are found as follows: 1) Teacher's rise-fall intonation can attract students' attention, bring a sense of friendliness, and subconsciously decrease the sense of online distance and increase their willingness to approach the ZPD. 2) Students will lose attention, feel tedious, and become less interactive to approach the ZPD if the teacher keeps using the same rise-fall intonation pattern. On this basis, there are three suggestions for researchers in the future: 1) Different teachers' intonation pattern can be transformed into digital signal through Fourier Transform and Laplace Transform and then stored in a database. 2) The digital signal of flat intonation can be transformed and finally output as a rise-fall intonation. 3) Some software are needed in the future development of online education. They can constantly monitor teacher's intonation pattern and give a hint for teacher when the prolonged use of the same intonation pattern occurs.

Keywords: Online education, Digital signal processing, Rise-fall intonation, ZPD

1 INTRODUCTION

1.1 Background

Online education has flourished in recent years, especially in the fight against COVID-19. Johnson (2017) suggests that teachers' pedagogy will change as face-to-face instruction shifts to online instruction. Fast-developing as it is, one of the biggest challenges that most online learning is one-way communication cannot be ignored. [10] In other words, lack of effective interaction between teachers and learners is obvious. It can be attributed to the sense of distance brought by the Internet, such as unfamiliarity with teacher and lack of mutual trust. Compared with offline education, there is less opportunities for teachers to build up a friendly teacher-student relationship online, let alone create and maintain a harmonious atmosphere where students can actively express themselves. Thus, further study is required to give more suggestions on how to improve the effectiveness of online interaction in terms of

pedagogy. Since the main stimulus for students during online teaching is visual and auditory, the researchers suppose intonation can impact learners' attention from the perspective of auditory. Just as some psychological researches demonstrate that stimulus can attract and maintain attention. The change of intonation can be easily utilized as a stimulus in teaching [20]. Also, intonation plays an indispensable role in communicative interaction, through which teachers can build a friendly teacher-student relationship to increase the student's willingness to approach the Zone of Proximal Development (ZPD). Therefore, it is especially important and necessary for online teachers to relieve the sense of distance brought by the Internet. And coincidentally, the researchers find an English teacher who loves to use rise-fall intonation to have the up and down of the language during her online English speaking course with a boy. Through observing and micro-analyzing, it is surprisingly found that the rise-fall intonation may not only attract the learner's attention, but also have the function of generating his communicative potential and willingness to interact with the teacher. As all these above are also very important

factors related to students' willingness to approach the ZPD, the researchers propose a hypothesis: rise-fall intonation can reduce the online distance and increase the effectiveness of guiding students to approach the ZPD.

1.2 Literature Review

Online education offers a lot of flexibility in terms of people's choice of teaching formats. Miltiadou and Savenye (2003) suggests that online education overcomes the time and place constraints that restrict access to instruction in traditional educational settings. [16] As online education continues to gain widespread attention and thrive as a legitimate alternative to classroom instruction, educational institutions and online instructors face the challenge of building and sustaining students' trust in online learning environments [17]. If students just sit in front of a screen, they tend to feel distant and unfamiliar because the person on the screen seems irrelevant. And this sense of distance between teachers and students affects students' learning negatively [9]. Thus creating a friendly, building trust and harmonious atmosphere to make students feel closer to the teachers is of great importance.

To achieve this goal, Yi (2017) argues from a new perspective that intonation affects teaching effectiveness to a great extent. It can enhance attractiveness and teachers' relatedness with students in classroom teaching. It is reasonable as intonation plays an indispensable role in language. Kingdon (1985) points out that intonation is the soul of a language, while the pronunciation of its sounds is its body. [11] And according to 7-38-55 rule of communication or Mehrabian Communication Theory by Mehrabian (1971) [15], interpersonal communication regarding the communication model consists of three elements: words spoken (verbal), the tone of voice (vocal) and facial expression (facial), taking up 7%, 38% and 55% respectively (p.43). This 7-38-55 rule of communication also demonstrates the significance of intonation: without intonation, communicative interaction would be much more difficult.

Defined by Celce-Murcia, et al (1996), intonation is "the rising and falling of the voice to various pitch levels during the articulation of an utterance" (p.184). [3] And Chinese linguists Dai and He (2018) classify the English intonation into four basic types: the falling tone, the rising tone, the fall-rise tone and the rise-fall tone (p.29). [6] Among them, the rise-fall intonation is prone to be used as an emphasis to language, expressing a strong emotion such as approval, disapproval or surprise etc. [14].

Accordingly, in the field of Linguistics, English intonation has been a hot research topic for quite a long time. But as for the functions of intonation, almost all of the previous researches discuss it in the context of daily conversations. Only a few scholars have paid attention to the functions of teacher's intonation in the educational field. Since the rise-fall intonation is commonly used by many English teachers during online teaching, it is meaningful to study the impacts of teacher's intonation on learners from the perspective of the ZPD.

The concept of the ZPD is introduced by Vygotsky (2011). [19] He defines that it is the distance between the actual developmental level as determined by independent problems solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (2011). In other words, this developmental area can be entered with the help of teachers and peers. Cole and Cole (2001) suggest that the assistance provided goes just slightly beyond the learners current competence complementing and building on their existing abilities. [5] Wass and Golding (2014) indicate that teacher should assess what tasks are easy for students to do and what tasks are near the limits of their capability. On this basis, it is very important to understand the students' capacity.

Another aspect referred to the ZPD is the role of teacher. Numerous studies on how teachers guide students into the ZPD. Bruner (1961) develops the theory of the Zone of Proximal Development, which recognizes the creativity of the student, emphasizes discovery in learning, and believes that the teacher's goal is to make the student as autonomous and self-propelled a thinker as possible. [1] Fani and Ghaemi (2011) discuss the philosophical and historical foundation of the ZPD. [8] Some researchers believe that teachers can be helpful in teaching process, especially when it comes to helping students develop the ability to solve problems in the ZPD. Providing sufficient support can enable the student to perform challenging tasks successfully and gradually withdraw support as the student becomes more skilled [7]. Teachers can maximize students' learning by assigning them tasks that are near the border of what they can do with assistance, and by providing them with the appropriate scaffolding to complete these tasks [18]. To some extent, most of the researches focus on the teacher's perspective, but ignore the students' willingness to follow the teacher's instruction to approach their ZPD.

In a nutshell, researches about the function of intonation and the ZPD is respectively abundant. However, they focus so much on scaffolding that pays little attention the students' sense of distance, shyness and reluctance to approach the ZPD. Given that the researches about the impacts of teacher's intonation on students' willingness to approach the ZPD lack evidence, it is of great importance to study from the students' perspective and figure out the factors related to learners' feelings and emotions. And the theoretical assumption of this thesis is that the rise-fall intonation can be one of the factors.

1.3 Significance

Theoretically speaking, this study is a relatively new perspective in the research area of intonation and it broadens the scope of intonation research to some extent. Researches of the impacts of English teacher's intonation from a student's aspect are in extreme scarcity. Previous intonation researches mainly focus on the classification of intonation and their different functions in daily life. And although a few scholars relate the function of intonation to education field, they just generally explain the benefits of using proper intonation in class without analyzing any example in detail. For instance, Kong (2017) argues that using intonation properly can improve the quality of teaching, increase the interaction and build better teacher-student relationship. [12] But they do not explain which kind of intonation is proper and what specific effects it has on students. To fill the research gap, this thesis makes a theoretical assumption by focusing on the rise-fall intonation and analyzing an online English class in detail.

Practically, this research is pedagogically significant for online teachers, especially student teachers. Since many of them focus so much on the teaching content and the design of teaching events that inevitably ignore the significance of intonation, this article can give some inspirations and a new perspective for them to better guide the students to approach the ZPD.

2 METHODOLOGY

The object of the study is mainly from a video of an English speaking course on YouTube. The frequent use of rise-fall intonation by teachers in teaching process has attracted the attention of researchers. This is an online one-on-one class with a boy, a beginner in English around 8 years old. The whole lesson lasted 23 minutes in total. We select some clips for our analysis based on the research objectives. The study data and results were mainly derived from the micro-analysis of their conversations with each other. Here are the technical support they use during the class:

Equipment: laptop, computer

Teaching Software: Zoom, PowerPoint, Google

Class format: one-on-one online teaching

Qualitative method is used in this research. This research method is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem [2]. Among them, interaction analysis and CA transcripts are the main analysis method. We transcript the screen recording of this online English course in detail and find evidence from it to support our study in order to collect the document data and audiovisual data. In addition, observation and comparison will also be used. We

explore the role of rise-fall intonation in the online classroom by observing different actions and expressions of the teacher and the student.

3 RESULTS

3.1 Using rise-fall intonation to draw the student's attention

It is an online English speaking class. After greetings, the teacher begins to bring up the first topic bout the animals.

```
["TEA" stands for "Teacher"]
["STU" stands for "Student"]

01  TEA: -> .hh tell=me ↗what ↘animals
02           do ↗you: [↘li:ke.(0.8)
03  TEA:              [((Thumbs up to
04                      help the STU
05                      understand))
06  TEA: -> [↗What ↘animals do ↗you
07           ↘li:ke((winks and then
08           drinks some water))
09           [((moves her right hand
10             from  the middle to the
11             left side of the screen
12             and then thumbs up))
13  STU: -> ((stares at the screen and
14             thinks))(3.3)
15  STU: -> I li::ke(0.5)^fish.
16           ((puckers his face in a
17             smile))
```

At the start of the excerpt, the teacher uses rise-fall tone in the middle of the sentence twice to ask the student about his favorite animal. It generates more ups and downs of the language. This kind of exaggerated intonation draws the student 's attention. As is shown in line 13, the student stares at the screen and thinks for a few seconds. Yi (2017) points out that changes of the tone, stress and speed of teacher talk are all important factors that affect students' attention. Beautiful and harmonious intonation can make students feel the beauty of language and be attracted. Therefore, using intonation properly can enhance the attractiveness of teaching and help students concentrate. Also, we suppose that using rise-fall tone twice in the middle of the sentence also slows down the speed of speech, which gives more time for the student to think about the question and avoid embarrassment.

3.2 Using rise-fall intonation to relieve shyness and boost interaction

As it is at the beginning of this online class, the boy is unfamiliar with the teacher. So he is a bit shy and uncertain when saying that he likes fish). He puckers his face in a smile(line 16&17), turns his face to his mother

to seek recognition and leans back with a smile(line 20-22). Then, the boy surprisingly relieves his shyness to a large extent just after the teacher uses rise-fall intonation to say "good".

```
18  TEA: -> You=[like fish?(0.9)Oh:=

19           ↗goo:↘d.

20  STU:        [((turns his face to

21                 his mother and leans

22                 back with a smile))

23  TEA: ->  ↗Gol:d[↘fi:sh.

24  STU:          [I have ^many fi:sh
25                 (1.7)in my house.

26                 (0.3) And I buy:,

27                 (0.6) An::d I put
28                 some in::(o.7)in:=
29                 the schoo:l.
```

Besides the semantic aspect of "good" which gives a positive feedback to the student to make him feel safe to express, we assume that the phonetic aspect also plays a role. This praise here with rise-fall intonation is more convincing and contagious than saying "good" with a falling intonation. As "good" with a falling intonation is prone to be said very quickly, it is toneless. By comparison, the rise-fall intonation can convey more emotions and sincerity. Thus it can be more effective to relieve the student's shyness and narrow the distance brought by online teaching between the teacher and the student. Afterwards, this surprising change of the student continues to happen.

```
42  STU:     This is the: sma:ll.=I

43            have(0.7) biggers.

44            ((leans back and smiles))

45  TEA:     ^O::kay. You have a:

46            [↗bigger [↘bow:l(0.4) a:t

47            schoo:l.
48            [((uses her hands to make

49             the shape of a bigger
50             bowl than before))

51  STU: ->          [°big big big°
52       ->           [((uses hands

53                 to make the

54                 shape of a

55                 bowl like the
```

```
56            TEA and then

57            stretches his

58            arms))
```

From the transcript above, we notice that the boy becomes more confident to express himself. When the student says "I have biggers."(line 42&43), he leans back and smiles again, but it is quite different from his reaction before(line 16&17). As the student smiles more widely and does not turn his face to his mother as before. Also, he uses body language to interact with the teacher(line 52-58). There is no denying that interaction between teacher and students is extremely important for online success. Therefore, the instructor's ability to create an interactive environment is prerequisite for effective education [13]. And we suppose that teacher's rise-fall intonation can act like a catalyst for igniting the students' communicative and interactive potential in a intangible and gradual way. Because it can embody friendliness and kindness to reduce his shyness, win the student's trust, and gradually lay a solid foundation for interaction.

3.3 Using rise-fall intonation to guide students to approach the ZPD

The teacher also uses rise-fall intonation as a signal to correct the student's oral mistakes to help them approach the ZPD. And we assume that the previous steps like attracting the student's attention and creating an interactive atmosphere plays an indispensable role before achieving this final goal: guiding the students to approach the ZPD.

```
42  STU:    This is the: sma:ll.=I

43           have(0.7) biggers.

44           ((leans back and smiles))

45  TEA: -> ^O::kay. You have a:

46           [↗bigger [↘bow:l(0.4) a:t
47            schoo:l.
48            [((uses her hands to make

49              the shape of a bigger
50              bowl than before))

51  STU:          [°big big big°
52            [((uses  hands

53                to make the

54                shape of a

55                bowl like the
```

```
56                    TEA and
then
57                    stretches his

58                    arms))

59  STU: -> ((leans forward to the

60               camera))[I have a: little
61               boon(0.2)at school.

62                         [((tilts his
head

63                         to his right

64                         side))
```

It is shown that the teacher uses the rise-fall intonation to present the correct expression of "I have a bigger bowl at school."(line 60-61). Then despite wrongly pronouncing the word "bowl" as "boon", the student naturally and willingly follows the teacher's instruction to approach his ZPD by saying "I have a little boon at school." correctly, instead of saying "I have biggers." as before. However, at the very beginning, the student refuses to substitute "fish" for "gold fish" although the teacher firstly uses the same rise-fall intonation pattern to guide the student to use the new word to approach his ZPD (line 23). Thus, we suppose that using the rise-fall intonation to relieve the sense of distance, increase closeness, overcome shyness, increase interaction and build mutual trust is an indirect, gradual but necessary process before guiding students to approach their ZPD. Otherwise, the student may just be reluctant to follow the teacher's instruction and unwilling to approach the ZPD.

3.4 The student's distraction and tedium

To further study the function of rise-fall intonation, the student's behavior in the middle of the course is analyzed. Researchers choose another video clip (line 65-88) from the course to compare with the previous one (line 01-64). It is apparent that the student sways his body and makes funny faces more frequently than before. When the teacher is saying, "people use air planes to help grow food (line 65&66)" and "what kind of food do they grow at on farms (line 71-74)", the student rocks back and forth, tilts his head and makes a funny face (line 67-69, 75-78). These behaviors of the student seem to indicate that he loses patience, attention and follows the teacher to approach ZPD less effectively.

```
65  TEA: -> [peo↗ple use air↘planes to
66            ↗help(0.4) hgro:w ↘food.

67  STU: -> [((Moves close to the
```

```
68            screen blew up the eyes
69            and pouted))]

70

71  TEA: -> .h[↗Tell me ↘Bill h↗what

72      [kind of ↘fo:od do they

73      ↗gro:w(0.1).hh at on

74      ↘fa::rms.(0.8)

75  STU:     [((leans back away from

76            the screen))

77      -> [((Tilts head and makes a

78            funny face))
```

The next video clip (line 80-88) seems to confirm this further. The student is continuously tilting his head and making funny faces (line 83-88). Given these behaviors presented by the student, we attempt to figure out factors affecting the student from the perspective of intonation again. We have confirmed that rise-fall intonation can attract students' attention and lead student to approach the ZPD. However, it seems to be less effective for students in this stage. Researchers speculate that this is related to the intonation used by the teacher. Hence, another hypothesis is introduced that student will feel distracted, tedious and show reluctance to approach the ZPD when the teacher keeps using a single intonation pattern for a long time.

```
80  TEA:    >↗What kind of food can

81      you grow< on a ↘fa:rm.

82      [(3.8)

83  STU: -> [((leans forward to the

84            screen and tilts his

85            head)

86  STU: -> em,↗orange.((Smiles and

87            tilts his head away from

88            the screen))
```

The comparison between two video clips in the beginning and middle of the course provides us with evidence that the teacher keeps using a single intonation pattern. As is shown in the following lines of teacher language, the teacher says in the video clip1: "What animals do you like"(line 01&02); "You have a big bowl at school"(line 45-47). The intonation pattern of these sentences is first rising and then falling. A similar pattern can be found in the video clip2. The teacher mentions:

"People use airplanes to help grow food"(line 65&66) and "Tell me Bill, what kind of food do they grow at on farms"(line 71-74). Among them, the words (people, airplanes, grow, farms) also show the same intonation pattern of rising and then falling.

video clip1:

```
01  TEA: -> .hh tell=me ↗what ↘animals
02           do ↗you: [↘li:ke.(0.8)
...

45  TEA:     ^O::kay. You have a:

46           [↗bigger [↘bow:l(0.4) a:t
47           schoo:l.
```

video clip2:

```
65  TEA: -> [peo↗ple use air↘planes to
66           ↗help(0.4) hgro:w ↘food.
...
```

```
71  TEA: -> .h[↗Tell me ↘Bill h↗what

72         [kind of ↘fo:od do they

73          ↗gro:w(0.1).hh at on

74          ↘fa::rms.(0.8)
```

From the transcript and table1 above, we can see more clearly that the teacher uses the same intonation pattern: rise-fall intonation. In contrast to the previous finding, the student shifts from being attracted by the teacher's language and even being willing to say more at the beginning of the lesson to being distracted and reluctant to follow the teacher. Thus, we infer that this rise-fall intonation pattern becomes less effective if it remains the same throughout the class. Regarding the issue of the same intonation pattern, researchers may need to conduct more research on whether different intonation patterns are effective for guiding students into ZPD.

Table 1: The similarities of the teacher's intonation

Intonation / Line	Rise ↗	Fall ↘	Rise ↗	Fall ↘	Rise ↗	Fall ↘
01-02	what	animals	you	like		
46	bigger	bowl				
65-66	people	airplanes	help	food		
71-74	tell	bill	what	food	grow	farms

4   DISCUSSION

4.1 Limitation

As it is a speaking course we found online, we lack of background information about the student's English level, interest and personality trait. We make conjectures and inference from the student's reaction and facial expressions to generate this hypothesis, mainly objectively but also subjectively to some extent. Also, the main focus of this study is on intonation. So for the student's distraction, intonation may be one of the relative factors. As for the student's making funny faces and swaying his body frequently, there may be several other factors besides the single intonation pattern.

Firstly, it may be correlated with the repetitive teaching activities and the simple teaching tasks for the student. Thus, what we call "distraction" here may also be interpreted as the student's self-confidence due to the familiarity to the teaching method, procedure and the simple tasks in some ways. When comparing the teaching activities she designed before and after, the teaching content and questions for the student is similar. Although

the student is somewhat shy to express at the beginning, his later movements can be interpreted as having been totally accustomed and even tired of the teacher's teaching style and content. That's why he sways his body and makes funny faces frequently. This is a sign that he is very confident that he can keep up with the teacher.

Secondly, the student's lack of interest may also contribute to his distraction. In our case, it is possible that the student is much more interested in the topic of animals than that of vegetables. In video clip 1, he answers a lot the teacher's first question about his favorite animals. But when the topic shifts to the vegetables grown on a farm in video clip 2, he seems to interact less actively with the teacher. We presume that the student is not interested in growing food on farms or he lacks the background knowledge of this part, so he feels distracted and tedious. In contrast, the content of "animals" is much more familiar and interesting to him. As a result, he is less energetic to follow the teacher into the ZPD when answering the question about food on farms.

Thirdly, the student's decreasing energy can also give rise to his distraction. When the topic of "animals" is discussed, it is in the first ten minutes of the lesson. The

student is in the process of exploring new knowledge, so he is attracted by the teacher's intonation and shows a willingness to follow the teacher approaching the ZPD. Whereas when talking about the food on farms, they are more than halfway through the course, where he may have lost some of his energy and interest. He can no longer concentrate as before. Therefore, if we want to further prove our hypothesis, a course with teacher firstly asking "What kind of food can you grow on a farm?" then asking about the student's favorite animal later can be a good comparison to better show the impact of teacher's unchangeable intonation pattern on the student's distraction. But unfortunately, we do not have the access at present.

4.2 Future direction

In the future, researchers expect that more research on the role of intonation in online education will be discovered. Indeed, intonation is mentioned as a form of pedagogy in online education in this research. However, more possibilities need to be found whether intonation can really be used as a pedagogical method for the development of online education. Referring to more specific studies, what can be considered is whether asking the question with rise-fall intonation in the middle of the sentence and also a rising intonation at the end of the sentence can be more effective to help the student approach their ZPD. Since Chen (2015) points out that using rising tone at the end of Wh-questions occasionally can show the speaker's euphemism, friendliness and kindness. [4] In addition, some pilot studies are also under consideration. For instance, we hope to make a better comparison between two English classes--one with the teacher's exaggerated rise-fall intonation and another with the same teacher's flat intonation, controlling the variable as much as possible.

Moreover, some technology support is needed. Teacher's intonation can be transformed into a digital signal that varies. If it is a periodic signal, it can be transcoded by the Fourier transform. If it is a non-periodic signal, it can be processed with the Laplace transform. Then the digital signal of efficient teachers' intonation patterns can be stored in a database. On this basis, a software with the following functions can be developed to help researchers further study the impacts of teacher's intonation and better decrease the sense of distance during online education. Firstly, the software can modify teacher's intonation. After inputting a flat intonation, it can instantly output an intonation with more ups and downs to attract students' attention through transforming the digital signal. Also, it can make the words sound more smooth and harmonious to boost friendliness between teacher and students and relieve the sense of distance in online classes. Secondly, it can monitor teacher's intonation pattern in case the prolonged use of the same intonation leads to students' tedium and

distraction during online courses. For instance, the software can give a hint to teacher when keeping using the same intonation for certain period of time.

This technology will make it possible for a knowledgeable teacher with a toneless voice to present an attractive and friendly online course in the future.

5 CONCLUSION

The development of online education has indeed provided a new form of education, but there are some problems. For instance, teachers and students are likely to feel the sense of distance due to the unfamiliarity with each other during the online teaching and learning process. Therefore, on one hand, a suggestion is made that using rise-fall intonation as a bridge can help across the online distance. In the case above, the student feels shy at the beginning of the class because he is not familiar with the teacher. Consequently, he is hesitating to express his opinion and seeking for sense of safety and recognition by turning his head to his mother. To solve this problem, it is concluded from the micro-analysis that the rise-fall intonation used as a pedagogical method by the teacher effectively attracts the student's attention, reduces his shyness, and generates a sense of friendliness between them. And all these lay a foundation for the student to accept the teacher's suggestion on changing his incorrect colloquial expression. Accordingly, using the rise-fall intonation can be an indirect and gentle process in which students are gradually willing to follow the teacher to approach the ZPD. Admittedly, the semantic aspect of language is the prerequisite of the phonetic aspect: intonation. Swearing or cursing with the rise-fall intonation definitely cannot have the same positive effect as is mentioned above. Thus teachers cannot separate the functions of the verbal and vocal aspects of communication. On the other hand, it is also reminded that students will feel distracted, tedious, and follow the teacher less effectively if teacher keep using the same rise-fall intonation pattern throughout the class.

REFERENCES

[1] Bruner, J. S. (1961). The act of discovery. *Harvard educational review*, 31, 21-32.

[2] Creswell, J. W., & Creswell, J. D. (1994). Research design.

[3] Celce-Murcia, M., Brinton, D. & Goodwin, J. (1996). *Teaching pronunciation: A reference for teachers of English to peakers of other languages.* Cambridge: Cambridge University Press.

[4] Chen, F. (2015). Brief talking the function and usage of English intonation. *Journal of Hubei University 0f Science and Technology*.(05),73-76. doi:10.16751/j.cnki.hbkj.2015.05.025.

[5] Cole, M. & Cole, S. (2001) *The Development of Children.* 4th Ed. New York: Scientific American Books. Distributed by W.N. Freeman and Company

[6] Dai, W., & He, Z. (2018). *A New Concise Course in Linguistics for Students of English*. Shanghai: Shanghai Foreign Language Education Press.

[7] Doolittle, P. E. (1995). Understanding Cooperative Learning through Vygotsky's Zone of Proximal Development.

[8] Fani, T., & Ghaemi, F. (2011). Implications of Vygotsky's zone of proximal development (ZPD) in teacher education: ZPTD and self-scaffolding. *Procedia-Social and Behavioural Sciences, 29,* 1549-1554.

[9] He, X. (2010). The influence of psychological atmosphere of Teachers and Students on English Teaching. *Teaching and management,* (24),67-68.

[10] Johnson, C. (2017). Teaching music online: Changing pedagogical approach when moving to the online environment. *London Review of Education*, 15(3), 439-456.

[11] Kingdon, R. (1985). *English Intonation Practice*. London: Longman.

[12] Kong, X. (2017). The role and application strategies of teacher's pronunciation in preschool teaching. *Gansu Education*,64(02).

[13] Li, H. (2002). Distance Education: Pros, Cons, and the Future.

[14] Li, Z. (2014). Intonation meaning interpretation of English. *Overseas English*, (15),227-228.

[15] Mehrabian, A. (1971). *Silent messages* (Vol. 8, No. 152, p. 30). Belmont, CA: Wadsworth.

[16] Miltiadou, M., & Savenye, W. C. (2003). Applying social cognitive constructs of motivation to enhance student success in online distance education. *AACE Review (formerly AACE Journal),* 11(1), 78-95.

[17] Wang, Y. D. (2014). Building student trust in online learning environments. *Distance Education*, 35(3), 345-359.

[18] Wass, R., & Golding, C. (2014). Sharpening a tool for teaching: the zone of proximal development. *Teaching in Higher Education*, 19(6), 671-684.

[19] Vygotsky, L. (2011). Interaction between learning and development. Linköpings universitet.

[20] Yi, X. (2017). Exploring strategies for young teachers to use intonation in teaching. *Journal of Suzhou Institute of Education,* (06),49-50. doi:10.13985/j.cnki.34-1227/c.2017.06.020.