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Developing Medical Learning Materials to Promote Learners' Creativity: A Corpus-based Case Study

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Abstract
For a long time in Mainland China, there exists a need for authentic supplementary materials and an extensive native speaker environment in courses like English as a Foreign Language and English for Specific Purposes. Yet, how to promote learners' creativity in the process of developing medical learning materials practice? This study aims to develop certain medical learning materials as an Enriched Corpus-Based English Supplement. Developing those proper medical learning materials for medical learners can help them to develop relevant strategies of corpus-based learning creatively. It had been conducted from December 2016 to November 2019 with four teachers and 180 third-year medical students at Xinxiang Medical University in the Medical English course. Mixed methods were chosen to observe and investigate the use of ECBES among third-year medical students. Both quantitative and qualitative data in the learning process and the outcome had been collected and analyzed. The practice showed that more than 60% of the learners thought they were language learners; their needs were the starting point of enriching creative supplementary materials. Quantitative data of learners' production after the practice were displayed, which implied that the ECBES practice of four skills was practical and useful. Then it discussed several aspects of qualitative indexes for the learners' creative production, such as their choosing autonomy opportunities, practice opportunities from the learners' views. The findings suggested that certain corpus-based materials could be developed to promote learners' creativity in ESP learning.

Keywords: Corpus-based study, creativity, learners, materials development, medical learning materials, Xinxiang Medical University

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Introduction

Nowadays, more and more learning materials have been enriched for learners according to certain corpus-based principles. In some way, corpus linguistics is the path to gather, organize, and analyze language. As one of the most important key terms, concordance is the "collected word-forms" (Flowerdew, 2015; Lamy & Mortensen, 2017; Sinclair, 1991) that existed in their surroundings. There is a consensus of academic and specialized processes in learning or teaching Medical English (ME) such as information summary, perspectives estimation, and conclusions' drawing is required. Are third-year medical students (in other word, 'learners' in this study) in medical college or university need a healthy repertoire of ME skills or just concentrate on significant conflict (the traditional pedagogy of emphasizing medical terminology)? There are few authentic large-scale native speaker contexts in English as a Foreign Language (EFL) school setting in mainland China. Professional and academic expressions are usually challenging for those learners who are beginning to acquire much medical knowledge, as well as ME tasks that require medical terminology, professional usage, and related lexical chunks, which is quite different from an informal conversation. It approved that corpus-based context is one of the most critical factors in understanding the ME curriculum.

This study depicts a perspective of many supplementary materials, and corpus-based products, for example, frequency tokens, concordance (Özbay & Kayaoglu, 2015). It should be deliberated before any English for Specific Purposes (ESP) courses are arranged. However, if they do not consider those corpora use skills and additional facts, such prepared courses may lack pedagogical attention to corpus-based materials and data with affluent language items. "Why do we need supplementary materials to use?" This question is the real research gap in materials use, which has vital implications in materials development (Graves, 2019, p. 337). Many studies (Bale, 2013; Bunting, 2013; Chai, Wannaruk, & Lian, 2015; Cheung, 2014; Edwin Ko, 2016; Flowerdew, 2015; Storjohann, 2005; Yang, 2014) have concerned about the investigation of corpus-based pedagogy in Second Language (L2) acquisition and ESP context. However, there are less investigation of EFL and ESP teaching of Corpus-Based Approach (CBA). From pedagogy and Corpus Linguistics (CL) aspects, suitable medical learning materials have gradually become an active study focus. Thus, developing proper medical learning materials in practice can help teachers to develop relevant strategies of corpus-based teaching creatively. It was mainly distinct from the traditional exam-oriented curriculum. The medical learning materials are especially crucial for medical learners to enhance ME meaning, clarification of confusing concepts, and lesson-learning relevance.

This study aims to develop certain medical learning materials as an Enriched Corpus-Based English Supplement (ECBES) comprising a selected unit from a textbook in current use as the contents for third-year medical students in their fifth semester Xinxiang Medical University (XXMU) China. Hence, the research question is: How to promote the learners' creativity in the process of medical learning materials practice that based on the case at XXMU?

Literature Review

Materials

Krashen thought that materials facilitated "acquisition" rather than "learning" (Krashen, 1981, p. 114). Numan (2004) indicated that six elements such as "content, materials, activities,

goals, students, and social community" should be considered in the process of task design, among which materials are developed for learners to "observe/manipulate" (Nunan, 2004, p. 40). In developing such materials, "grammatical variants" (Conrad, 2004, p. 67) should also be considered for the auxiliary functions.

Due to the development in teaching and by using reference Medical English (ME) materials, learners' learning difficulties can be solved by using supplementary materials such as "monolingual learners' dictionaries, grammars or textbooks" (Cock, 2010, p. 129). If the adapted text has been diluted too much, then the concepts and facts in the content would easily be ignored by the educator or the learners. Moreover, it is impractical to expect third-year medical students to grab all detailed information through classroom lectures. Echevarría, Vogt, Short (2010) had stated that texts and supplementary materials should and could be integrated, adapting them with principles of keeping intact content concepts for suitable graded learners. As an ESP subject, Medical English (ME) has many reasons for focusing on medical terminology. For example, medical texts (both the related textbook and ECBES) contain very complicated professional vocabulary.

Enriched Corpus-Based English Supplement (ECBES)

One of the most significant benefits of Enriched Corpus-Based English Supplement (ECBES) is the large-scale, authentic verbal data. Just like Christoph Rühlemann (2008) commented, textual materials traditionally used are so strictly controlled that they would limit the learners' activities, particularly in hugely populated Medical English (ME) classrooms in China. It would lead to the difficulty of improving the learners' abilities in real language complexity, focusing on the "understanding of developmental patterns" (Yoo & Shin, 2020, p. 93).

The nature of ECBES development focuses on comprehensible input. Corpus-based "supplementary teaching materials" are the pedagogy-based process of materials development (Coxhead, 2010, p. 466; Kawaguchi, 2006, p. 17). As to the materials development, some researchers (Lin & Lee, 2015) reflected that the teachers compiled their corpus-based supplementary materials for the grammar units scheduled for teaching. To teach the target rules, teachers drew on sample sentences from the British National Corpus (corpus.byu.edu/bnc), which is a free-to-access online database containing 10 million English words collected from the late twentieth century. When developing Enriched Corpus-Based English Supplement (ECBES) for teaching, experienced teachers had focused on comprehensible input, which may have "a sense of what to use and what not to use, what to adapt and where to supplement" (McGrath, 2016, p. 4). In many cases, less adaptation and supplementation would be necessary if the ECBES has been selected more carefully as the comprehensible input. However, there is no such supplementary material that suits everyone at all times.

Medical learners and Medical English (ME) curriculum

There is an apt description of the overburdening curriculum in the medical school: "Middle school is like a lawn sprinkler. College is like a garden hose, while medical school is like a fire hose of information," says Bennett (Smith-Barrow, 2014, para. 2). He completed medical school at Ohio State University's College of Medicine. It is the plight of the medical learners in Mainland China too. For the third-year medical school curriculum (XXMU, 2017), it usually begins with the

study of processes at the molecular and cellular levels in the normal human body. Biochemistry, genetics, anatomy, and embryology are taught concurrently for the third-year medical students, building together with the concepts of macromolecular and cellular interactions within tissues. The curriculum comprises interdisciplinary courses in physiology and neuroscience, as well as courses in cell biology and human behavior and psychopathology. Furthermore, Medical English (ME) course has a close relation with clinical linguistics, which focuses on "clinical treatment problems of language disorders" (D. Li & Li, 2020, p.402).

From the feedback, one can find that there are several basic types of ECBES activities which can facilitate the learners' academic achievements in ME despite the lack of linguistic experience and resources (Leshchenko, Lavrysh, & Halatsyn, 2018).

Corpus-based learning and Critical Thinking (CT)

According to Tomlinson's view of 'informative base', the prerequisite for acquisition could be learners are "exposed to a rich, meaningful and comprehensible input of language in use" (Tomlinson, 2011, p. 7); in other words, exposure stimulus is a critical factor for them to learn in an immersion context and promote their creativity in "a meticulous and deep-going way" (Xu, 2004, p. 59) in ESP learning. Learners should maximize their exposure to more native speaker contexts. They could "engaged both affectively and cognitively in the language experience" (Mishan & Timmis, 2015, p. 26). Learners' corpus-based learning process is the nature of pursuing Data Mining Teaching (DMT) in exploring creative medical learning materials. It can represent one's teaching cognition. In other words, corpus-driving teaching beliefs, corpus-based material base, and corpus-informed context practices are all useful to promote ESP learners' creativity (Bunting, 2013). As to the literary gap, despite the constant use of corpus-driven materials in the field of research, few studies have focused on how to develop a corpus-based supplement for non-native English learners and English for Medical Purposes (EMP) courses.

From a view of Critical Thinking (CT), corpus-based learning materials and activities have more than 15 aspects of practical features for the learners' creativity promotion, such as helping learners to develop confidence, providing opportunities for outcome feedback. (Tomlinson, 2011) It is the way that learners use such supplementary knowledge for more successful language development. It is useful for ESP teachers and learners, reflecting in practicing corporate communication, knowing effective strategies of teaching and learning would improve discursive ability and systematic way of deciphering and deploying language (Rajandran, 2016).

Methods

This study had been conducted from December 2016 to November 2019 with four teachers, who had taught for third-year medical students at XXMU in the ME course. The research methodology in this study was a mixed-method, whereby both quantitative and qualitative data were collected.

Population

A total of six standard classes (180 third-year medical students) were selected randomly from a group class of ME course at Xinxiang Medical University (XXMU). Meanwhile, four teachers were involved in the corpus-based supplement enrichment and semi-structured interview.

A pilot study was also conducted to enhance the validity and reliability of the questionnaires, observation checklist, and interview guidelines. A panel of experts (materials reviewers) helped to validate the supplement for content validation.

Every big class was divided into eight small classes consisting of about 30 students in the Medical English (ME) course of Xinxiang Medical University (XXMU). Three steps were adapted in the process of selecting the student participants. The first step was to explain the research background of the participant teacher. The second step was to let the learners in the eight small classes to decide if they wanted to participate in this program voluntarily. The third step was to let the teachers choose three small classes according to the of the student participants' willingness. Considering the setting of the ME course at XXMU, each small class (a cluster) is heterogeneous internally, while homogeneity exists between the small classes in a big class (Karpusenko, 2015).

Instruments

Several instruments have been used for collecting data, such as questionnaire, focus group interviews, pre- and post-test, and so on.

In the concrete process of collecting the Enriched Corpus-Based English Supplement (ECBES) practice data, the instrument used was the semi-structured interview. One-to-one interviews were used to collect details of the teachers' practice experience and views. Focus group interviews were used to collect the data of learners' participation experience, opinions, and thoughts. There were several advantages in using the semi-structured interview. They were flexible, providing insights and a degree of understanding of the topical issues in the form of face-to-face, oral, open-ended questions. Uniform or similar items had been put forward in a friendly atmosphere during each interview, ensuring validity and reliability. Meanwhile, the length of the answers to the questions in the interview was appropriately controlled for a convenient transcription. Workshops were extracurricular activities to train the participant teachers and the 180 participant learners to enrich or evaluate the hands-on ECBES.

A WeChat Subscription Account called CBA4ME (Corpus-Based Approach 4 (for) Medical English) also be used as a training and delivery platform to deliver the supplementary materials outside the classroom. In the classroom, the ECBES, including both supplementary materials and activities) had been implemented through additional classes and workshops such as lectures and hands-on activities (Creswell, 2014).

Findings

Learners' status of language using in practice

The learners' status of language using in practice is one of the main factors in the selected unit's enriching process. The learners' status of language using were listed in five aspects: Six learners thought they were language learners, which accounted for 42.86% of all the 14 students of the 1st focus group interview. Two learners thought they were language learners now and might be language users in the future when they were more practical, which accounted for 14.20%. Three students thought they were both language learners and users, which accounted for 21.43%. Only one student felt that he was both a language learner and co-worker of the language practice teachers. One student thought she was a language user, learner, and co-worker of the language

practice teachers. There was only one student who thought he was a co-worker of the participant teachers.

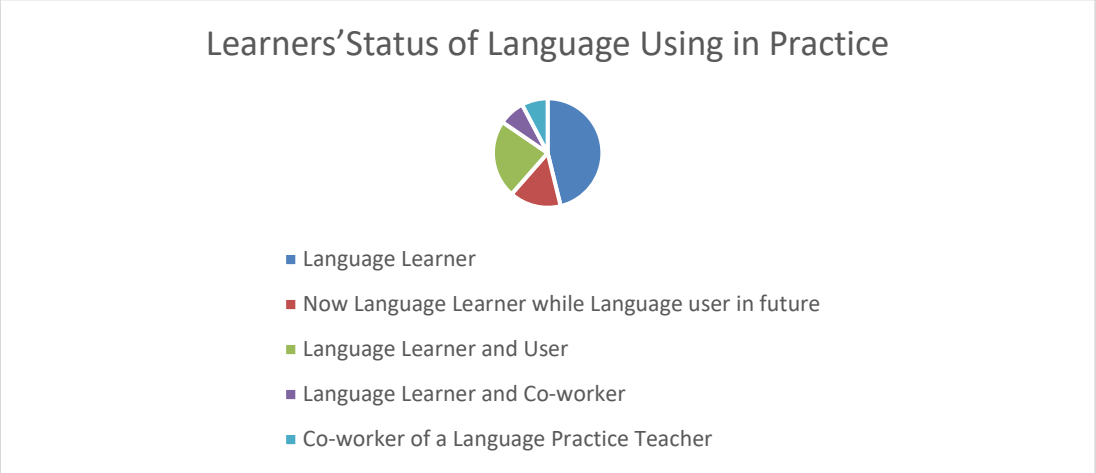

Figure 1. The learners' view of their status in the ECBES practice

Learners' Needs

Learners' needs were the starting point of enriching creative supplementary materials for the selected unit of the textbook in current use used by the third-year medical students in XXMU. Their needs fell into the following 11 aspects based on their feedback:

(1) Meeting practical needs in three parts:

1) Meeting needs of improving ME ability. 1P1 ((The code name of student interviewee in the focus group interview, the same below)) felt unfamiliar but very interested in the ECBES initially. It can meet his needs and improve ME ability through learning corpus-based words and sentences.

2) Meeting needs of systematically summarizing and applying word cluster. 1P10 thought the ECBES meets her needs much. It reflected in better learning and application languages as the systematically translating and using of word cluster.

3) Meeting current learning needs of fast searching. 1P11 felt the searching speed ran fast, and many ECBES words meet her current learning needs.

(2) Meeting specific needs. 1P3 indicated her particular needs were ME discipline, medicine work such as foreign medical literature reading materials, and her interest and purpose in using the ME in the study and work environment.

(3) Meeting current demand. 1P4 felt the current need of the ECBES is ME or language learning, all aspects of which are helpful for ME learning.

(4) Meeting word meaning understanding needs. 1P5 thinks the word meaning understanding is the key when she was first accessing ME and the ECBES exactly meets her needs.

(5) Facilitating further learning. 1P6 did not know much about the ECBES initially as he had not used it himself, but he was interested and felt it facilitating learning later in the ECBES practice.

(6) Meeting user-friendly needs. 1P7 indicated the practice of using corpus was exciting and felt good when searched and compared the corpus-based materials, then found corresponding needs such as summarized his associations and references.

(7) Meeting more affluent ECBES needs. 1P8 thought the ECBES was more affluent and could meet her needs. She was more interested in it and wished to learn ME better.

(8) Meeting attractive and comfortable needs. 1P9 was interested in using the ECBES and worked harder to explore after class. She indicated the all-English ECBES materials are slightly more difficult for learners.

(9) Satisfying the needs of ME and related English learning. It reflected in the professional explanations and answers. 1P12 felt the ECBES satisfied her ME and connected English learning because of the more professional explanations and answers than search engines such as Baidu.

(10) Providing large vocabulary. But it was not suitable for beginners.1P13 indicated the ECBES provided a large productive vocabulary but not ideal for beginners as the all-English.

(11) Satisfying deepening understanding needs. 1P14 thought the ECBES could satisfy his needs better than the dictionary but should get with it. He was interested in it and needed to deepen his understanding of the ECBES.

The Improvement and Creativity in Learners' Production after the Implementation

The first part of the quantitative data of the improvement in learners' production focused on the participant learners' feedback based on the questionnaire. From the collected data, the reliability statistics results, one-sample statistics scores, and one-sample test results are analyzed. The learners' opinions about the 21 closed questions and two open-ended questions in the questionnaire are explicit. The mean scores of their feedback about the 21 closed questions were from 3.29 to 3.98. All of the items had a significant difference as the $p < .05$.

The following two tables (from Table 1 to Table 2) reflected the T-test group statistics scores and independent samples test results for the learners' pre- and post-test in the ECBES practice, showing the improvement in their production after the ECBES implementation. As a list in the tables, the treatments of the experimental and control groups were different. The performance of the experimental group is reflected in the test scores of each week.

Table 1. *T-Test Group statistics scores of the learners' Pre- and Post-Test in the ECBES Practice*

	Group	Mean	Std. Deviation	Std. Error Mean
Pre-test One	Experimental Group	28.3111	11.49855	1.21205
	Control Group	24.4889	10.32205	1.08804
Post-test One	Experimental Group	39.0222	12.72084	1.34089
	Control Group	34.0000	14.11669	1.48803
Pre-test Two	Experimental Group	39.8000	10.51505	1.10838
	Control Group	39.5222	11.04966	1.16474
Post-test Two	Experimental Group	47.2333	11.46666	1.20869
	Control Group	42.8444	12.45027	1.31237
Pre-test Three	Experimental Group	6.9333	3.54996	.37420
	Control Group	6.6667	3.75664	.39598
Post-test Three	Experimental Group	8.8000	3.25404	.34301

Control Group	7.6667	3.83069	.40379

* N of Experimental Group is 90, N of Control Group is 90.

From the mean scores of Pre- and Post-tests in Table 1, the improvement of the experimental group's mean in the 1st stage is 39.0222 – 28.3111=10.7111, while the control group is 9.5111; the progress of the experimental group's mean in the 2nd stage is 7.4333, while the control group is 3.3222; the advancement of the experimental group's mean in the 3rd stage is 1.8667; while the control group is 1.0000. There was a general advancement after the ECBES implementation while the experimental group was more outstanding. It shows a useful practice of developing corpus-based medical learning materials.

Table 2. *Independent samples test results for the learners' pre- and post-test in the ECBES Practice*

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Pr. 1	E1	.112	.738	2.347	178	.020	3.82222	1.62877	.60803	7.03641
	E2	/	/	2.347	175.966	.020	3.82222	1.62877	.60778	7.03667
Po. 1	E1	1.644	.201	2.507	178	.013	5.02222	2.00305	1.06943	8.97501
	E2	/	/	2.507	176.105	.013	5.02222	2.00305	1.06943	8.97530
Pr. 2	E1	.001	.977	.173	178	.863	.27778	1.60783	-2.89509	3.45064
	E2	/	/	.173	177.564	.863	.27778	1.60783	-2.89514	3.45070
Po. 2	E1	.582	.446	2.460	178	.015	4.38889	1.78417	.86804	7.90974
	E2	/	/	2.460	176.808	.015	4.38889	1.78417	.86788	7.90990
Pr. 3	E1	.006	.936	.489	178	.625	.26667	.54482	-.80847	1.34180
	E2	/	/	.489	177.433	.625	.26667	.54482	-.80847	1.34183
Po. 3	E1	.676	.412	2.139	178	.034	1.13333	.52981	.08782	2.17885
	E2	/	/	2.139	173.464	.034	1.13333	.52981	.08763	2.17904

* $p < .05$. Pr. Represents Pre-Test, Po. Represents Post-Test. E1 Represents Equal Variances assumed, E2 Represents Equal Variances not assumed.

The results of Pre-test One and Post-test One (This part focus on the content of 'medical terminology') had the value of $p < 0.05$ (Pre-test One was p.020, and Post-test One was p.013), which indicates that both of them had significant differences. There was an improvement (p.020 – p.013 = p.007) in the ECBES medical terminology learning after the additional class for the first week. As to the second and third test, both of the Post-test Two and Post-test Three had significant differences ($p < 0.05$, Post-test Two was p.015, and post-test 3 was p.034), while the Pre-test Two (This part focus on the contents of ME reading and speaking skills) and Pre-test Three (This part focus on the contents of ME listening and writing skills) did not have significant differences ($p > 0.05$, Pre-test Two was p.863, Pre-test Three was p.625), which implied that to some extent the ECBES practice of four skills was practical and useful.

Learners' Choosing Autonomy Opportunities

As to the learners' views of choosing autonomy opportunities, at least 57% of student interviewees thought they had autonomy opportunities to choose in the ECBES practice. It was useful for their creativity promotion in the process of developing corpus-based medical learning materials. However, some of them thought there was less chance for them to choose, which might be caused by the all-English materials or less teaching time.

(1) Most of the learners thought they had opportunities to choose suitable supplementary materials. The arranged time was convenient and more comfortable to learn ME. 3P2 thought as to the 'convenient time', it was agreed by everyone, which should arrange when everyone was convenient. It might be less to set the three lectures. As to the 'learning style', she was quite fond of Mr. Yong's class style in ME class, who articulated the word's etymology in medical terminology, associated with other words. She felt Mr. Yong's method was similar to how she watches American TV series to learn English, which was easier to learn medical English. It is reflected in many aspects, such as Ms. Liu's gentle teaching style, abundant retrieved cases, and most learners' language competence enhancement. 3P4 felt good of 'convenient time', the arrangement was right. She indicated that the ECBES had an improving room. 3P4 thought Ms. Liu's teaching style was gentle. It was manifested in the abundant retrieved cases, such as gastric ulcer and pictures, and the well-designed objectives that complement most learners' level. As for the 'textual participation' and 'convenient time', she felt the arrangement was right but still had plenty of room for improvement. 3P2 preferred different teachers' different lecture styles. She was very interested in Mr. Yong's divergent or CT word teaching manner but felt a little unfit if they were relatively weak in learning. She suggested adding more teaching time or expanding the ECBES additional classes to a formal course.

Meanwhile, their choosing autonomy is reflected in many aspects, such as suitable bilingual teaching, vivid teaching styles, convenient time, appropriate bilingualism, proper language level, selectable teachers' styles, and efficient and ideological learning. 3P6 thought the teachers had used bilingual teaching, which was suitable for their language level. Meanwhile, she felt the teachers' teaching styles were vivid; time was convenient. But she wondered the meaning of 'textual participation'. 3P7 thought the time was suitable for everyone. The lectures were chosen the appropriate language level of bilingualism. She indicated their participation reflected in the use of medical terminology that teachers to query in the relevant online corpus and learn from it. 3P8 thought the time was convenient to use because the teacher had repeatedly confirmed with them in class. 3P9 thought the teachers had given many opportunities in the choosing language level, suitable time, related articles, and tests of learning contents delivered in and out of class. 3P11 thought the time was appropriate, the language level was suitable, and teachers' styles were different and selectable. She illustrated Mr. Zhang's pros and cons examples as the preferred idealistic learning, which was more efficient for her.

(2) It was difficult in all-English materials. There were some reasons as pure text materials, all-English materials. As for the learning style, 3P8 preferred the class learning style with pictures as PPT (the image and its accompanying essay are both excellent) such as audio, video but didn't like the PPT materials of pure text, which could not attract her attention. As for the language level of the ECBES, it was better for teachers to choose bilingual teaching in class but could not understand the relevant articles delivered by the CBA4ME. 3P9 felt a little hard to read all-English articles and earlier to take the additional courses for the ECBES practice because of their passive learning in the classroom.

Learners' practice opportunities

The learners need opportunities to use the ME language to "try to achieve communicative purposes" (Tomlinson, 2011, p. 7) in their medical or academic life. So, the researcher observed the learners' practice opportunities in the ECBES activities; most of the learners thought that the four teachers had given enough opportunities to allow them to choose the appropriate language level, favorite learning style, text participation, everyone's convenient time. They had expressed their opinions. But some of them wondered about 'textual participation'. 'Text participation' meant that in the process of the ECBES, had learners participated in to enrich these materials? The teacher had given them some of the selected materials. The learners were also involved in the enrichment process, which could promote their creativity of developing proper supplementary materials.

(1) There were many practice opportunities. It reflected in the disadvantages of other common APPs and the corpus's benefit, not require mastering and learning all examples, thoroughly analyzing calls for higher analysis abilities. 2P11 thought there were many opportunities to practice the ECBES. For example, the meanings of new medical terms searched by YoDao or other APPs has some disadvantages, such as polysemy, the connection between the word meaning and its use in a specific context is not very clear. Based on the fact of known the word meaning, learners can retrieve proper supplementary materials in the corpus and verify the word meaning. Many examples in the corpus can provide them with a context for its full use. These examples or paragraphs can give them sufficient context and give them a better understanding of what it means. Their knowledge is more profound. They have a firmer grasp of the corpus-based medical learning materials. Meanwhile, she indicated that as the ECBES was a supplementary material, it did not require them to master and learn from all of these examples. Thoroughly analyzing them calls for higher abilities of analysis and summary judgment, which makes them good at understanding the culture of native speakers.

(2) There were more opportunities in the future. 2P13 thought the practice of developing their own corpus-based medical learning materials was beneficial for their academic exchanges, professional paper writing. It needs learners to take the initiative to learn it.

(3) It promoted active learning. It is reflected in learning desires. Meanwhile, the focus was the critical factor. 2P7 appreciated 2P5's opinion. She indicated that the ECBES promoted active learning, and learners' learning desires and stress were the keys to add opportunities for the ECBES practice.

> *(Original interview text)*
> *I think what 2P5 of Class Six said is very good. The main thing in the ECBES practice is promoting active learning. If you want to learn more and know more, there are many opportunities. But if you don't focus on it, there will be not many chances.*

(4) It was practical and conducive. The process of developing materials was consistent with current Chinese learners' English learning habits. The practice was in line with the British learning environment. 2P8 was keen on using phone APPs. She indicated that the ECBES was consistent with current Chinese learners' English learning habits, and the British learning environment. It

was more practical for preparing CET now and more conducive to their Postgraduate Entrance Examination (PEE), ME learning, and research in the long-term.

Discussion

When we focus on the improvement and creativity in learners' production after the implementation in this study, it is concerned of whether there were improvement and creativity in participant learners' output after implementing the ECBES for the selected unit. Quantitative data of the improvement in learners' output after the implementation are detailed displayed. Several aspects of qualitative indexes were shown for learners' creative output as their choosing autonomy opportunities, practice opportunities from learners' views.

From the Table 1 and Table 2, there were substantial differences in all of the three stages tests, which indicate significant differences after the practice of the ECBES. The results attest to the effectiveness and usefulness of the ECBES as the creative medical materials. Through the ECBES activities and tasks, the learners' skills and creativity of using Medical English (ME) had improved. Meanwhile, their abilities of thinking, observation, retrieval, trade-offs, arrangement, the collaboration had improved their habit of thought. It had trained in such a way that their abilities of evaluation and judgments had been enhanced.

In the part of learners' practice opportunities, some learners had mentioned 'language intuition', which could be proved or disproved by the corpus-based data or evidence. For example, 'I say' may not mean the same thing in discourse and may not be the better choice in conversation than 'I says'. All of the feedback above had reflected the learners' creativity in developing corpus-based medical learning materials in the ME course teaching and learning, which had enhanced their creativity in developing proper supplementary materials of the ME course.

Conclusion

In this study, we focus on promoting the learners' creativity in the process of medical learning materials practice. It is a corpus-based case at XXMU, which aims to understand the learners' feedback or reflection on the ECBES after initial contact and understanding. The learners' feedback focused on whether the ECBES as the supplementary medical learning materials allow learners to develop their creativity by developing the ECBES based on local conditions. The researcher had explained to them the local situation here. Some of the learners had already asked this question. The local case means that when they were going to use the ECBES in class today, they might have some common problems. The common problem might be that they did not know a word. In terms of this question, they would use some online corpora, such as the COCA. After the inquiry, the query results are based on their choice; for example, they can choose some examples to discuss together. After studying and discussing, certain corpus-based medical learning materials can be developed to promote those learners' creativity in ESP learning. They can develop it according to this situation and use it, which helps encourage their creativity in developing suitable learning materials.

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