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Sarab Abu-Rabia-Queder

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Effectiveness of Problem-Based Learning and Case-Based Learning Teaching Methodology in Vascular Surgery Internship

Meng Sun, Xinli Feng*

Affiliated Hospital of Hebei University, Baoding 071000, Hebei Province, China

*Corresponding author: Xinli Feng, Doctor8010@163.com

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Abstract: *Objective:* To investigate the practical effect of problem-based learning (PBL) combined with case-based learning (CBL) teaching method used in the teaching of vascular surgery internship. *Methods:* 60 clinical medical graduates who interned in vascular surgery in our hospital from June 2022 to June 2023 were divided into the control group and the observation group of 30 each by applying the random number division method. The control group adopted the traditional lecture mode, and the observation group adopted the comprehensive teaching mode of PBL + CBL teaching method. The indicators of students' job competence and teaching satisfaction scores in the two groups were compared. *Results:* The scores of students' job competence in basic theoretical knowledge of vascular surgery, basic operation, clinical analysis, medical records writing, etc. in the observation group were higher than those in the control group, and the scores of satisfaction with teaching method were higher than those in the control group, with statistically significant differences ($P < 0.01$). *Conclusion:* PBL + CBL teaching method used in vascular surgery internship teaching is effective and can significantly improve the students' basic theoretical knowledge and clinical practice skills, with a high satisfaction rating, thus it is worthwhile to promote the application in the field of clinical teaching.

Keywords: Problem-based learning; Case-based learning; Vascular surgery; Teaching and learning

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1. Introduction

Clinical internship is a key stage for medical students to shift from theoretical learning to clinical practice, which is of great practical significance for cultivating medical students to develop into qualified clinicians. In the stage of clinical internship, the main learning task of the students is to carry out systematic specialty learning under the guidance of the teaching staff and to transform the theoretical knowledge into clinical practice skills on the basis of further consolidation of the basic theoretical knowledge. The traditional clinical internship program often adopts a simple lecture mode, often focusing on the teaching of basic theoretical knowledge. During the teaching activities, students only passively accept the learning of specialized knowledge and lack clinical practice opportunities, resulting in poor clinical thinking and clinical practice skills. With the

deepening of clinical education reform in recent years, a variety of new teaching methods have been discovered one after another and have achieved good results in educational practice.

Problem-based learning (PBL) is a heuristic teaching model that emphasizes a problem-based, student-led, teacher-oriented approach, with the main goal of developing students' comprehensive abilities and enhancing their critical thinking and problem-solving skills. Complementary to this, the case-based learning (CBL) teaching method simulates real clinical scenarios, which can enable students to learn clinical skills in a safe environment and lay a solid foundation for their future clinical work. In recent years, there have been more studies on the application of PBL combined with CBL teaching method in clinical teaching. Lv *et al.* ^[1] analyzed the application of PBL combined with CBL teaching method in the residency training of child health department through clinical trials and found that this teaching mode has a significant effect in improving the clinical reasoning, critical thinking, and teamwork of medical students, which not only helps students to understand complex medical concepts but also improve their technical proficiency through practical operation. Conducting a meta-analysis, Wang *et al.* ^[2] analyzed the application effect of PBL combined with CBL method in clinical teaching and found that students' basic theoretical skills, practical operation skills, independent learning, and teamwork were better cultivated under this comprehensive teaching mode, which fully verified the effectiveness of this teaching mode in the application of clinical teaching of surgery. Based on the practical training-oriented "Seminar + PBL + CBL" multi-track teaching method practice research, Xiong *et al.* ^[3] found that through the scientific implementation of this teaching mode, the theoretical and practical assessment results of the students were effectively enhanced, and the students' self-efficacy was greatly improved.

The research results of related scholars have shown that PBL combined with CBL teaching method has shown great potential in clinical education, but its application in vascular surgery internship teaching research base is limited. Therefore, in order to deeply explore the effect of PBL + CBL teaching method used in vascular surgery internship teaching, this study innovatively applies this comprehensive teaching method in vascular surgery internship teaching practice.

2. Study subjects and methods

2.1. Study subjects

60 clinical medical graduates who interned in the vascular surgery department of our hospital during the period from June 2022 to June 2023 were divided into the control group (n = 30) and the observation group (n = 30) according to the randomized numerical table method. Both classes were fresh graduates, enrolled by the National College Entrance Examination, with a mean age of 22.14 ± 1.02 years old. They had completed the theoretical study of the prescribed subjects for clinical medical students during their study period, and their graduation test scores averaged 81.26 ± 3.18 . The two groups of students were of good character, had good psychological quality, and had the willingness and confidence to engage in clinical work.

2.2. Teaching methods

The length of the internship was the same for both groups, and both groups were uniformly led by the department leaders and associate chief physicians.

The control group adopted the traditional simple teaching mode. During the teaching, the instructors carried out systematic theoretical teaching according to the teaching syllabus and the key points of cardiovascular surgery teaching internship, and patiently explained the physiology and pathology of vascular surgery-related diseases, clinical features, diagnosis and treatment programs, and auxiliary examination means. After the class, students were asked to study relevant clinical cases on their own, and deepen their understanding of classroom

knowledge through case analysis and problem thinking.

In the observation group, the PBL combined with CBL teaching method was adopted, and the specific implementation steps were as follows:

- (1) Case introduction: Before the class, teachers consolidated and reviewed the basic knowledge related to vascular surgery, and selected typical vascular surgery-related real cases from the case bank for case introduction to stimulate students' desire for knowledge. In the process of case analysis, students were allowed to summarize the clinical manifestations, physiopathology, differential diagnosis, and other contents related to vascular surgery, which helped students deepen their understanding of the characteristics of vascular surgery, prompted them to combine theoretical knowledge of anatomy and pathology with practical skills, and learned to use auxiliary means of examination for accurate diagnosis. In addition, the introduction of cases showed students the multidisciplinary comprehensive application of vascular surgery disease diagnosis and treatment process, to enhance students' grasp of theoretical knowledge and improve their ability to apply theory to practice.
- (2) Raising questions: Teachers scientifically designed the teaching program according to the syllabus, and inspired students to master the key knowledge points of vascular surgical diseases such as etiology, pathogenesis, diagnostic criteria, symptomatic manifestations, complications, prevention, and treatment through self-exploration, discovery, and summarization. Teachers also put forward a series of reflection questions and guided students to combine clinical case data for in-depth thinking and explore the answer to deeper problems, in order to further deepen the understanding of basic knowledge and problem-solving skills.
- (3) Organizing discussions: Teachers encouraged students to speak actively, share their views and insights, and closely integrate theoretical knowledge with clinical practice to further deepen their understanding of vascular surgery diagnosis and treatment knowledge while enhancing their analytical and problem-solving skills. In this process, teachers tried to create a relaxed and inclusive atmosphere for discussion, so that students could speak boldly and express their views. Teachers only acted as the organizer and supervisor of the teaching activities, responded to the questions raised by the students in a timely manner, evaluated the solutions provided by the students, and, if necessary, made appropriate comments and corrections to the students' viewpoints to ensure that the discussion activities were scientific and practical, so as to enable the students to obtain feedback and learn from them.
- (4) Summarization: After the discussion, the teacher sorted out the various viewpoints and opinions put forward in the discussion, pointed out the important ideas and innovations, guided students to see the connections and differences between different viewpoints, deepened their understanding of the problem from multiple perspectives, and helped them master the methods and strategies for solving similar problems. After that, students were asked to reflect on what they had learned, so that they could self-assess their understanding and mastery, and propose directions for further study, which achieved further strengthening of students' memory of knowledge while fully stimulating their interest in learning, and deepening their understanding of specialized knowledge in vascular surgery and clinical practice skills.

2.3. Evaluation methodology

At the end of the internship, the department leaders organized and implemented the evaluation of students' job competence, including basic theoretical knowledge of vascular surgery, basic operation, clinical analysis, writing medical records, etc., and the assessment standard of each dimension was thus 20 points, 20 points, 30 points, and 30 points. At the same time, the questionnaire survey method was used to investigate the students'

satisfaction with the teaching method in improving learning interest, active classroom atmosphere, enhancing self-study ability, exercising clinical thinking, improving teaching effect, etc., and the scoring standard of each dimension was 20 points.

2.4. Statistical methods

SPSS22.0 statistical software was applied to analyze and process the relevant data. Measured data were expressed as mean \pm standard deviation (SD) and compared with *t*-test; count data were expressed as *n* and compared with χ^2 test. $P < 0.05$ was used to indicate that the difference was statistically significant.

3. Results

3.1. Comparison of job competencies between the two groups

The job competency scores of students in the observation group were higher than those of the control group in terms of basic theoretical knowledge of vascular surgery, basic operation, clinical analysis, and writing medical records, and the difference was statistically significant ($P < 0.01$), as shown in **Table 1**.

Table 1. Results of the job competency assessment for the two groups of students (mean \pm SD, points)

Groups	Basic theoretical knowledge scoring	Basic operation scoring	Clinical analytical skills score	Scoring of medical record writing skills
Control group (n = 30)	17.25 \pm 0.52	15.12 \pm 0.71	19.45 \pm 2.13	20.42 \pm 1.76
Observation group (n = 30)	18.65 \pm 0.61	17.69 \pm 0.65	27.84 \pm 1.69	27.03 \pm 1.81
<i>t</i>	9.5665	14.6234	16.9010	14.3406
<i>P</i>	0.0000	0.0000	0.0000	0.0000

3.2. Comparison of pedagogy satisfaction measures between the two groups

Students in the observation group had significantly higher satisfaction scores with PBL + CBL teaching method than those of the control group in terms of increasing learning interest, activating the classroom atmosphere, enhancing self-study ability, exercising clinical thinking, and improving teaching effect, and the difference was statistically significant ($P < 0.01$), as presented in **Table 2**.

Table 2. Comparison of the results of students' satisfaction with pedagogy measures of the two groups (mean \pm SD, scores)

Groups	Increasing interest in learning	Vibrant classroom atmosphere	Enhancement of self-learning skills	Exercise clinical thinking	Improving the effectiveness of teaching and learning
Control group (n = 30)	14.14 \pm 1.22	13.78 \pm 1.27	15.13 \pm 1.32	14.12 \pm 1.61	14.63 \pm 1.37
Observation group (n = 30)	16.36 \pm 1.26	17.34 \pm 1.32	17.86 \pm 1.49	17.33 \pm 1.79	16.85 \pm 1.44
<i>t</i>	6.9330	10.6450	7.5117	7.3029	6.1177
<i>P</i>	0.0000	0.0000	0.0000	0.0000	0.0000

4. Discussion

As a key stage in the development of medical students' comprehensive clinical quality, the quality of clinical internship teaching must be improved through the innovation of teaching mode, so that the comprehensive

quality of the students can be effectively enhanced, thus providing assistance for the development of their future clinical job competence. PBL + CBL teaching method is an emerging teaching mode that combines the advantages of the two teaching methods in a single entity. In this teaching mode, teachers guide students to analyze clinical cases, independently find problems, and solve problems. Throughout the teaching activities, students always occupy the leading position, the implementation of diversified teaching methods such as situational simulation, problem discussion, and case analysis effectively promotes students' independent learning and practical skill development, helps students gladly accept their future professional role, thus greatly enhancing students' learning motivation.

The results of this study showed that the scores of students in the observation and control groups on basic theoretical knowledge of vascular surgery (18.65 ± 0.61 vs. 17.25 ± 0.52), basic operation (17.69 ± 0.65 vs. 15.12 ± 0.71), clinical analytical skills (27.84 ± 1.69 vs. 19.45 ± 2.13), and medical record writing skills (27.03 ± 1.81 vs. 27.03 ± 1.81), the difference between the groups was statistically significant ($P < 0.01$); the satisfaction scores of the observation group students with the PBL + CBL teaching method were significantly higher than that of the control group in terms of improving learning interest, enlivening the classroom atmosphere, enhancing self-study ability, exercising clinical thinking, and improving the effectiveness of the teaching, the difference was statistically significant ($P < 0.01$).

The reason for this is mainly because of the following significant advantages of the PBL + CBL teaching method.

- (1) Enhancing the students' job competence: The combination of PBL and CBL teaching method is not only a change of teaching mode, but also a profound innovation of the traditional medical education concept. The application of PBL + CBL teaching method is mainly based on disease problems and closely linked to clinical practice, which makes the learning process more in line with the needs of actual clinical work. Under this comprehensive teaching mode, students are given more initiative and space for independent learning. By independently analyzing problems and finding solutions to them, they not only improve their learning motivation but also exercise their clinical thinking and problem-solving skills. The cases selected in the teaching activities are all from the vascular surgery case bank, the content is comprehensive and typical, covering the common diseases of vascular surgery, and most of them are mixed, complex, and critical cases. Each case involves the basic theories of the department, practical skills, and professionalism, which has a high degree of match with the professional competence of the clinicians' positions. As an enlightening mode guided by the teacher and explored by the students independently, it can fully reflect the organization and guidance function of the teacher and the subject position of the students. In the PBL teaching stage, with the specific case diagnosis and treatment process as a guide, students are guided to start from specific problems, and the whole process of teaching such as questioning, hypothesizing, collecting information, arguing hypotheses, summarizing, etc., aims at the development of the students' comprehensive ability and enhancing the students' critical thinking and problem-solving skills ^[4]. In this teaching mode, the teacher is no longer the traditional knowledge transmitter, and the role has been changed into a guide and helper, while the students become the dominant players in the learning process. In the CBL teaching stage, based on typical clinical cases, the teacher provides students with specific case scenarios around specific teaching objectives and guides students to use their mastered theoretical knowledge through independent thinking by simulating real clinical scenarios. In the process of vascular surgery clinical internship teaching, students need to apply the theoretical knowledge in the books to the clinical diagnosis and treatment situation, simulate the real diagnosis and identification of diseases through

group discussion under the guidance of the teacher, and finally formulate the treatment plan. This active learning process can fully stimulate students' interest in learning, improve their independent thinking and problem-solving skills, and make the learning process more exploratory and active.

- (2) Enhancing students' clinical thinking skills: The application of PBL + CBL teaching method in the teaching of vascular surgery clinical internship not only greatly enhances the students' learning interest, but also fully stimulates the students' subjective initiative, which plays a positive role in promoting the cultivation of students' clinical thinking ability. As most vascular surgical diseases have prolonged and comprehensive characteristics, the traditional simple lecture mode will make students feel bored and tedious, and then lose the initiative to learn, but through the implementation of the integrated teaching mode, students can observe and analyze real cases, intuitively understand the content of the study; coupled with the discussion-based cooperative teaching method, it not only enhances the relationship between teachers and students, but also greatly promotes the development of students' distributed thinking and clinical thinking skills. In addition, the combination of PBL + CBL teaching method encourages students to actively seek solutions to problems instead of passively accepting knowledge ^[5]. In dealing with real cases, students can analyze them and understand the learning content intuitively. When dealing with actual cases, students need to use critical thinking to analyze and solve problems, which not only enhances their clinical judgment but also stimulates their desire for exploration and innovation. Students learning under the combined mode of PBL + CBL teaching method for a long time will gradually develop good habits of independent thinking and exploration. With the passage of time, this habit of independent thinking and active exploration will penetrate deep into students' learning methods and working attitudes, laying a solid foundation for their later medical studies and careers ^[6].

5. Conclusion

In summary, the PBL combined with the CBL integrated teaching mode application in the teaching of vascular surgery clinical internship not only enhanced the students' mastery of theoretical knowledge but also promoted the students' clinical thinking, problem-solving, teamwork, and other aspects of clinical skills, to achieve the overall improvement of the students' comprehensive quality. Thus, it is worthwhile to be widely used in the practice of clinical education.

Disclosure statement

The authors declare no conflict of interest.

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Exploration of Teaching Styles in a Digestive System Integration Course

Xinli Feng, Meng Sun*

Affiliated Hospital of Hebei University, Baoding 071000, Hebei Province, China

*Corresponding author: Meng Sun, sunmeng135135@sina.com

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Abstract: *Purpose:* To explore the innovation of teaching methods in digestive system courses and its application effect in the context of curriculum integration. *Methods:* 60 undergraduate majors of digestive system diseases in the class of 2023 (orientation) of our hospital were divided into 30 students each in the general class and the experimental class using the random grouping method. The general class adopted the case-based learning (CBL) teaching mode, and the experimental class adopted the integrated course mode of CBL + “organ-systems-based curriculum” (OSBC). The teaching effects of the two classes were compared through basic theory and clinical five-station examination. *Results:* The differences in the basic theory scores and excellence rates of the students in the experimental class were significant ($P < 0.05$); the clinical 5-station examination suggested that there was no statistical significance in the physical examination of the two classes ($P > 0.05$); and the differences in the scores of the clinical questioning, case writing, auxiliary examination, and oral examination of the two classes were statistically significant ($P < 0.05$). *Conclusion:* The teaching method based on CBL + OSBC integrated course is effective in the teaching reform of the digestive system course and has popularization value.

Keywords: Digestive diseases; Case-based learning teaching model; Organ-systems-based curriculum teaching model; Educational reform; Clinical teaching

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1. Introduction

In the cultivation of higher medical talents in China, the “discipline-centered” three-stage teaching mode, i.e., public basic education, basic medical education, and clinical medical education, has been used for many years. However, with the development of the times and the constant change of medical knowledge, the existing education mode is obviously not adapted to the needs of the development of the new society. Therefore, it is urgent to learn from the advanced medical education reform experiences of foreign countries to realize the innovation of China’s medical education mode^[1]. Case-based learning (CBL) teaching model is a group discussion teaching method based on clinical cases, designing teaching problems related to them and guiding students to develop skills around the problems, which has now become one of the main methods of medical education in China. The “organ-systems-based curriculum” (OSBC) teaching concept was put forward by the School of Medicine of the University of the United States in 1952, aiming to break the “discipline-centered”

teaching mode and implement the organ-system-based curriculum reform, the core of which is to construct teaching content and promote curriculum integration by focusing on organs and systems, emphasizing the coherence between basic and clinical medical education curricula, and thus strengthening the comprehensive thinking training of clinical medical students^[2]. Since September 2016, our institution has tried to carry out curriculum reform with the concept of OSBC and CBL integration in the five-year undergraduate clinical medicine program, hoping to promote the comprehensive ability of students by reconstructing the teaching system, planning the teaching content, innovating the teaching methods, and continuously improving the construction of the assessment system. This study takes the digestive system integration course as an example to explore the effectiveness of the CBL teaching method in the clinical teaching of digestive system diseases in OSBC, aiming to further improve the development of our medical students' education and training system and enhance the quality of teaching and learning in clinical medical education.

2. Information and methods

2.1. Subject information

60 undergraduate students majoring in gastrointestinal diseases in the class of 2023 (orientation) of our hospital were divided into an experimental class of 30 and a general class of 30 according to the random number table method. There was no significant difference ($P > 0.05$) in the comparison of the general information of the two classes, such as the age of enrollment (17–19 years old), college entrance examination results (all of them reached the score line of the undergraduate batch), college entrance examination source, learning environment, psychological quality, and so on, and they were comparable.

2.2. Teaching methods

The general class adopted the CBL teaching mode. Representative cases of digestive system diseases, such as gastritis, gastric ulcer, liver cirrhosis, etc., were selected as teaching materials, and by guiding students to analyze, discuss, and solve problems, students' interest in learning was stimulated and their clinical practice skills were improved. During the teaching process, the teacher guided the students to analyze the cases comprehensively, including the etiology, pathophysiological process, diagnosis, and treatment methods of the diseases, so that the students could combine the theoretical knowledge with the clinical practice organically, and deepen their understanding of the theory and clinical practice of the course.

In the experimental class, an integrated curriculum model of CBL + OSBC was used. Implementation method:

- (1) Organ-systems-based curriculum integration: Teachers changed the previous “discipline-centered” mode of setting up individual disciplines, and integrated the curriculum system of internal medicine, external medicine, and other related system knowledge areas. Integration tasks were shared by the system, and each system organically integrated the teaching content, reorganized the course content, wrote relevant clinical cases, connected the internal medicine and surgery knowledge points with the case as the center, deleted the redundant and repetitive content, and added new advances and guidelines.
- (2) Implementation of modularized teaching of digestive system theory and practice: Five weeks after the start of the course integration, 30 hours in the digestive system were selected for the implementation of theory-practice modular teaching. During the teaching process, teachers guided students to analyze the cases comprehensively, including the etiology of the disease, pathophysiological process, diagnosis, and treatment methods, etc., so as to enable students to organically combine theoretical knowledge with clinical practice, and deepen their understanding of the theory and clinical practice of the course.

2.3. Evaluation of teaching and learning

(1) Theoretical examinations

After completing the course, the students were assessed according to the comprehensive course “centered on the organ system,” and on this basis, the questions were prepared by the digestive department teaching team and the papers were marked uniformly. The score of 85 or more than 85 was given to the students with the number of invigilators and the number of teachers remaining unchanged.

(2) Clinical 5-station examination

At the end of the comprehensive subject test, the two classes carried out the “5-part” gastroenterology clinical competence test, that is, “questioning,” “physical examination,” “medical record writing,” “auxiliary examination,” and “oral examination” parts; each of which was worth 20 points making a total of 100 points.

2.4. Statistical methods

The data statistics were processed by SPSS23.0, and the measurement information was expressed as mean \pm standard deviation (SD), and the comparison between groups was performed by independent samples *t*-test; the comparison of excellence rate (%) was performed by χ^2 test, and the difference was considered to be statistically significant at $P < 0.05$.

3. Results

3.1. Comparison of basic theory scores

The scores and excellence rates of the basic theory examination of the students in the experimental class were higher than those of the general class ($P < 0.05$), as shown in **Table 1**.

Table 1. Basic theory exam results and excellence rates

Evaluation projects	Experimental classes (n = 30)	General classes (n = 30)	<i>t</i> value	χ^2 value	<i>P</i> value
Basic theory (points)	86.26 \pm 5.24	81.04 \pm 6.13	3.5454	-	0.0008
Excellence rate [n (%)]	25 (93.33)	14 (46.67)	-	8.8645	0.0029

3.2. Clinical 5-station examination

The results suggested that there was no difference in the performance of the physical examination between the two classes ($P > 0.05$); the experimental class was significantly better than the general class in the four stations of examination, including questioning, medical record writing, auxiliary examination, and oral examination ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of clinical 5-station examination scores

Evaluation projects	Experimental classes (n = 30)	General classes (n = 30)	<i>t</i> value	<i>P</i> value
Medical record writing	90.36 \pm 2.25	80.45 \pm 1.68	19.3302	0.0000
Auxiliary checkup	93.45 \pm 3.31	84.02 \pm 3.37	10.9344	0.0000
Physical examination	89.53 \pm 5.32	87.51 \pm 5.34	1.4678	0.1476
Questioning	87.65 \pm 4.75	74.69 \pm 4.67	10.6565	0.0000
Oral examination	93.23 \pm 2.12	79.92 \pm 3.01	19.8014	0.0000

4. Discussion

4.1. Current status of the OSBC educational reform of the digestive system

In medical education, organ-systems-based curriculum teaching reform is gradually gaining attention, which aims to break down the disciplinary barriers of traditional medical education and organize the teaching content in a systematic way, so that students can have a more comprehensive understanding of the structure and function of the various organ systems of the human body, as well as the interconnections between them ^[3].

Traditional medical education is organized according to disciplines, which leads to the fact that students need to master the knowledge points of different disciplines in the learning process, and it is difficult to form a systematic knowledge system. The organ-systems-based curriculum teaching reform can integrate the knowledge points of different disciplines and systematically organize the teaching content so that students can better understand and master medical knowledge. Traditional medical education often focuses on the teaching of theoretical knowledge and neglects students' clinical practice skills. The organ-systems-based curriculum teaching reform allows students to practice in a simulated clinical environment, better master clinical skills, and improve clinical practice skills ^[4]. Traditional medical education lacks cooperation and communication between teachers due to the barriers between disciplines. In contrast, organ-systems-based curriculum teaching reform requires teachers from different disciplines to work together to organize teaching content and teaching plans, thus promoting cooperation and communication among teachers.

The results of this study showed that the score of the basic theory examination of digestive system diseases in the experimental class (86.26 ± 5.24) was higher than that of the general class; the rate of excellent performance (93.33%) was higher than that of the general class (46.67%) ($P < 0.05$); in the 5-station examination, except for the difference between the two classes of the physical examination which was not statistically significant, the experimental class was better than the general class in the areas of questioning, medical record writing, auxiliary examination, and oral examination ($P < 0.05$). A comparative study found that the application of CBL teaching method in undergraduate clinical teaching of digestive diseases has the following advantages:

- (1) Guiding students to learn and think independently through real clinical cases, stimulating students' interest and enthusiasm for learning, and improving students' learning effects;
- (2) Using cases as clues to guide students to analyze and discuss cases, and organically combining theoretical knowledge with clinical practice, thereby cultivating students' clinical thinking and ability to solve practical problems;
- (3) Through group discussions, student can learn and think independently, exchange opinions and experiences with each other, thereby improving their comprehensive quality and teamwork;
- (4) Students in experimental classes who apply the CBL teaching method have better scores in theoretical examinations and practical skills assessments than students in the general classes. Students said that the CBL teaching method made them more proactive in the learning process and deepened their understanding and knowledge of digestive system diseases.

CBL teaching method in the organ-systems-based curriculum teaching reform of digestive system diseases emphasizes students' active participation and cooperative learning and improves their clinical thinking and practical skills by guiding them to solve practical problems. Specifically, the CBL + OSBC integrated curriculum teaching mode has the following significant advantages:

- (1) Improving students' clinical thinking skills: By introducing real cases, students are guided to analyze and discuss, helping them better understand the occurrence and development process of the disease and improve their clinical thinking skills ^[5].

- (2) Enhancing students' practical skills: In teaching practice, students need to simulate the diagnosis and treatment process in the clinical environment and master clinical skills through personal practice, which can help students better master various diagnosis and treatment skills and improve their practical skills.
- (3) Improving students' independent learning: During the learning process, students need to find information, analyze, and think on their own, and solve problems through independent learning. This learning method can help students develop the habit of independent learning and improve their independent learning ability. At the same time, this teaching method can also help students better understand the etiology, pathology, and clinical manifestations of digestive system diseases, and improve their interest in learning.

4.2. Problems and prospects

Although the integration of teaching and learning in the digestive system curriculum is imperative, the challenges faced in its implementation should not be overlooked.

- (1) The integration of some knowledge points is not in-depth, and it is only a simple splicing of knowledge from different disciplines rather than in-depth integration. For example, in the process of clinical internship, due to time constraints, students can only learn the knowledge of some diseases, resulting in a lack of learning comprehensiveness.
- (2) Although clinical teachers from multiple departments are involved in teaching the integrated curriculum, the limitations of their teaching skills and knowledge level may affect the systematic nature of the curriculum ^[6].

To address these problems, first of all, it is necessary to strengthen the professional training of the faculty team to improve their teaching skills and knowledge level, especially in teaching aspects such as CBL. We can try to introduce more real cases into the teaching process to make the teaching content richer and more realistic; at the same time, we can combine with other teaching methods and technologies to form a diversified teaching mode to better meet the learning needs of students. For example, combining CBL teaching method with PBL teaching method can bring the advantages of the two teaching methods and improve the teaching effect. Secondly, well-known experts in the field of the digestive system are invited to give lectures every semester, and team teaching and research activities are held regularly, so that teachers of various disciplines can discuss how to realize the articulation of content among different disciplines. This interdisciplinary collaboration is utilized to promote deeper integration of teaching content in order to provide a richer and more meaningful teaching experience. In addition, teachers should actively participate in thematic training and teaching competitions inside and outside the institution and the university in order to master and apply various teaching applications (e.g., Rain Classroom, Blue Ink Cloud Class, Learning Pass, etc.) and build a blended teaching model that combines both online and offline so as to ensure that teaching is student-centered and more focused on active learning and participation of students. At the student level, teachers need to focus on intrinsic reflection on their own teaching ability. For example, using the statistical function of the SPOC platform, to understand the performance of students in the learning process from a group perspective, including knowledge mastery before the class, the absorption and application of new knowledge during the class, and the completion of homework after the class; from an individual point of view, to provide individual guidance to individual students to implement tailored teaching with the aim of improving the overall quality of teaching and learning to ensure that each student learns and progresses in a way that suits them. Curriculum integration is a complex process. If integration only remains on the surface without focusing on the in-depth integration

of knowledge, the real purpose of integrating the curriculum cannot be achieved. Teachers also need to sum up their experiences in the process of continuous practice and innovation, and make adequate preparations in terms of teaching concepts, teaching conditions, organizational structures as well as teachers' qualifications. Through such efforts, the integrated mode of teaching will be able to better meet the needs of modern education and provide students with a more comprehensive and in-depth learning experience.

5. Conclusion

In summary, the CBL-based OSBC integrated curriculum model has significant advantages in undergraduate clinical teaching of digestive diseases, which not only leads to a significant improvement in students' academic performance but also enhances students' interest in learning and independent learning. Thus, it is recommended to be widely used in undergraduate clinical teaching of digestive diseases.

Disclosure statement

The authors declare no conflict of interest.

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A Preliminary Study on the Application of Step-By-Step Case Teaching in Gastroenterology Ward Rounds

Yalan Chen¹, Jia'an Pei², Yan Chen^{1*}, Jingwei Kou^{1*}

¹Department of Gastroenterology, Affiliated Hospital of Hebei University, Baoding 071000, Hebei Province, China

²Department of Gastrointestinal Endoscopy Centre, Affiliated Hospital of Hebei University, Baoding 071000, Hebei Province, China

*Corresponding authors: Yan Chen, toaco85@126.com; Jingwei Kou, jingwei_kou@163.com

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Abstract: *Purpose:* To analyze the practical effect of applying step-by-step case teaching in gastroenterology ward rounds. *Methods:* 72 clinical medical students interned in the Gastroenterology Department of our hospital from February to October 2023 were divided into the control group and the observation group according to the mean score method, with each group having 36 students. The control group adopted the traditional clinical teaching mode and the observation group implemented the step-by-step case teaching mode. The teaching effect and teaching method were evaluated through the theoretical knowledge test, the clinical skills examination, and the teaching method recognition survey after the end of the teaching. *Results:* Students in the observation group scored higher than those in the control group in the examination of theoretical knowledge and clinical skills in gastroenterology ($P < 0.05$); students in the observation group recognized the step-by-step case teaching method more than those in the control group in terms of improving motivation and initiative in learning, consolidating theoretical knowledge, improving clinical skills, and fostering team spirit and clinical thinking ($P < 0.05$). *Conclusion:* The application of step-by-step case teaching in gastroenterology ward rounds can significantly enhance students' learning motivation, enable students to have a deeper understanding of the basic theories of gastroenterology, and better master the practical skills of history taking, physical examination, diagnosis, and the development and implementation of treatment plans in gastroenterology, which is worth to be widely used in clinical education.

Keywords: Gastroenterology; Step-by-step case teaching; Ward rounds; Recognition

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1. Introduction

Globally, the incidence of gastrointestinal diseases is showing a continuous upward trend, especially in the context of population aging and lifestyle changes, and the spectrum of gastrointestinal diseases is characterized by diversification. Common gastrointestinal diseases, including gastrointestinal diseases, liver diseases, pancreatic diseases, etc., constitute a significant burden on individual health and the social healthcare

system. Therefore, optimizing clinical education in gastroenterology is of great significance in enhancing the professionalism of future physicians and improving the quality and outcome of patient care. In the clinical education of gastroenterology, traditional teaching methods often focus on the teaching of theoretical medical knowledge and neglect the cultivation of students' practical skills, so when facing the increasingly complex clinical diagnosis and treatment of digestive diseases, it is difficult to make an accurate judgment and effective treatment due to the lack of sufficient practical skills and experience ^[1]. For this reason, it is particularly urgent to actively explore a new teaching mode that combines theoretical teaching and practical skills training. Step-by-step case teaching is an innovative clinical teaching mode, which aims to cultivate the clinical thinking and practical skills of medical students through hierarchical and gradual in-depth case analysis. The teaching method is from simple to complex, from single disease to multi-system disease, step-by-step to guide students to deeply understand the clinical problems and improve their ability to solve complex cases. In the implementation of the step-by-step case teaching ward rounds, we first start with the explanation of basic knowledge, and then introduce simple clinical cases related to them, so that students can apply what they have learned in specific, practical situations and carry out preliminary clinical thinking and diagnostic and treatment plan design ^[2]. As the teaching progresses, the cases gradually involve more complexity, such as the management of disease complications and treatment strategies for multi-disease coexistence, etc., which require students to synthesize and apply interdisciplinary knowledge to deal with more complex clinical scenarios. In addition, through interactive forms such as simulated ward rounds and role-playing, the teacher guides students to think actively, ask questions, and share their views in group discussions, which promotes the exchange of knowledge and collision of ideas among students and effectively develops their clinical thinking and problem-solving skills.

In order to evaluate the actual effect and effectiveness of the step-by-step case teaching applied in the clinical teaching of gastroenterology, this study was conducted to carry out a clinical education trial, aiming to further improve the development of the clinical medical education system in our hospital, promote the effective improvement of the quality of the clinical education and teaching of the interns in our hospital, and contribute to the cultivation of more modernized clinical medical talents.

2. Study subjects and methods

2.1. Study subjects

72 clinical medical students interning in our gastroenterology department from February to October 2023 were divided into the control group and the observation group of 36 students each according to the mean score method. In the control group, there were 20 males and 16 females, with an age range of 21–24 years, a mean of 22.35 ± 1.26 years, and a score of 70.29 ± 5.12 in theoretical knowledge of admission, implementing the traditional clinical teaching method. In the observation group, there were 19 males and 17 females, with an age range of 21–25 years, a mean of 22.45 ± 1.17 years, and a score of 69.87 ± 5.48 in theoretical knowledge of admission, and a step-by-step case teaching and ward rounds were used. Both groups of students voluntarily participated in this study, and the difference in general information was not statistically significant ($P > 0.05$).

2.2. Teaching methods

Both groups of trainees were taught by the chief and deputy chief physicians of the Department of Gastroenterology after admission to the department, with the Clinical Diagnostic and Treatment Guidelines of Gastroenterology as the training materials for theoretical and practical teaching, and the duration of the course was 90 sessions.

The traditional clinical teaching method was implemented in the control group, i.e., theoretical knowledge

teaching and observation of clinical practice activities. The instructor designed the teaching program according to the clinical syllabus of gastroenterology and explained the theoretical knowledge of gastroenterology in accordance with the established process and the safety of the class time, the students took notes carefully, and completed the exercises according to the requirements of the class, so as to achieve the effect of literacy; when the students mastered a certain amount of basic theoretical knowledge, they were led to conduct ward rounds by observing the actual clinical operations of the teachers in order to further deepen the understanding of theoretical knowledge and to master practical operation skills.

The observation group adopted the step-by-step case teaching method, which was mainly divided into four steps to gradually deepen the depth and difficulty of teaching, as follows:

- (1) Basic knowledge and case introduction: In the early stage of teaching, the teacher explained the basic knowledge of gastroenterology to students through PowerPoint lectures, including the anatomy and physiology of the digestive system, the pathophysiology of common diseases, and the principles of diagnosis and treatment. Subsequently, clinical cases related to the content of the lecture were introduced, so that students could familiarize themselves with the routine clinical operation points such as history taking, examination of signs and symptoms, preliminary diagnosis, and treatment planning in the clinical diagnosis and treatment activities of gastroenterology through analyzing the cases, helping students to establish a correct clinical thinking mode and guiding them to learn to apply the theoretical knowledge to the actual clinical scenarios.
- (2) In-depth case analysis and discussion: Based on the efficient completion of the first step of the learning program by all students, more complex clinical cases were introduced, such as multi-system involvement, cross-disease, and other broader digestive system diseases. Under the guidance of the instructor, students analyzed the cases in depth through group discussions, exploring the pathological mechanisms, diagnostic process, and the selection of treatment options, in order to effectively enhance their practical skills and teamwork spirit.
- (3) Comprehensive case practice and simulation: In the middle and late stages of teaching, the instructor designed more comprehensive and challenging cases, requiring students to synthesize and apply the knowledge and skills learned in the first two steps to solve problems that are more complex and closer to real clinical situations. At this stage, students completed history taking, physical examination, and other operations through simulated ward rounds, role-playing, clinical simulation, and other activities, and then proposed a diagnosis and treatment plan based on the information obtained, in order to fully improve students' clinical reasoning, decision-making, and communication skills.
- (4) Feedback and self-reflection: After completing the teaching of each case, the teacher conducted a professional evaluation of the students' enthusiasm for participating in group discussion activities, the effectiveness of the content and effect of the discussion, and the scientificity of handling the case, correcting the deficiencies, and affirming the good performance. At the same time, students were encouraged to conduct self-reflection and think about the gains and losses and room for improvement in the process of case handling, aiming to help students identify their knowledge and skill blind spots, promote the cultivation of their comprehensive clinical literacy, and lay a solid foundation for their future clinical work.

2.3. Evaluation indicators

- (1) Learning achievement test: At the end of teaching, the theoretical knowledge and clinical skills of the two groups of students were assessed. The theoretical knowledge assessment mainly contains basic

theories of digestive internal medicine, principles of diagnosis and treatment of common diseases, and the latest research results. The assessment was conducted in the form of a written examination, online test, or oral examination, with a total score of 100 points. Clinical skills assessment focuses on students' practical operation skills and clinical decision-making skills assessment, including history taking, physical examination, diagnostic thinking process, development and implementation of treatment plan, and other practical operations. The total score is 100 points.

- (2) Teaching recognition survey: The hospital's own questionnaire was used to investigate the students' recognition of the teaching method, which mainly includes the teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating teamwork and clinical thinking. Students filled in the form according to their real feelings. Recognition = Number of students / Total number of students \times 100%.

3. Results

3.1. Comparison of learning achievement of the two groups of participants

Students in the observation group had higher scores in the examination of theoretical knowledge and clinical skills in gastroenterology than those in the control group, and the difference was statistically significant ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of the academic performance of the two groups of participants (mean \pm standard deviation [SD], points)

Assessment program	Control group (n = 36)	Observation group (n = 36)	<i>t</i>	<i>P</i>
Theoretical knowledge	82.24 \pm 3.75	89.76 \pm 4.63	7.5728	0.0000
Clinical skill	80.17 \pm 3.53	87.61 \pm 4.25	8.0799	0.0000

3.2. Comparison of recognition of teaching methods in the two groups of participants

As for the recognition of teaching, the observation group trainees' recognition of the teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating teamwork and clinical thinking was significantly higher than that of the control group ($P < 0.05$), as presented in **Table 2**.

Table 2. Comparison of recognition of teaching methods between the two groups of participants [n (%)]

Assessment program	Control group (n = 36)	Observation group (n = 36)	χ^2	<i>P</i>
Increasing motivation and initiative in learning	27 (75.00)	35 (97.22)	7.4323	0.0064
Consolidation of theoretical knowledge	25 (69.44)	34 (94.44)	7.6037	0.0058
Improvement of clinical practice skills	24 (66.67)	36 (100.00)	14.4000	0.0001
Fostering teamwork	26 (72.22)	35 (97.22)	8.6915	0.0032
Developing clinical thinking	21 (58.33)	33 (91.67)	10.6667	0.0011

4. Discussion

4.1. Overview of gastroenterology

Gastroenterology is an important discipline in the field of modern medicine, which mainly focuses on the

diagnosis, treatment, and prevention of digestive system-related diseases, involving multiple organs such as the esophagus, stomach, small intestine, large intestine, liver, pancreas, and gallbladder. Common diseases in gastroenterology mainly include gastritis, gastric ulcer, enteritis, hepatitis, cirrhosis, pancreatitis cholelithiasis, etc., which not only affect the quality of life of the patients but also may threaten their lives. With the development of society, especially the aging of the population and changes in lifestyle, such as unhealthy dietary habits and lack of exercise, the incidence of digestive diseases has shown a significant upward trend, which not only increases the pressure on the demand for medical resources, but also puts higher requirements on the professional skills of doctors, especially in the early diagnosis of diseases, the choice of therapeutic strategies, and the management of chronic diseases ^[3]. Therefore, strengthening clinical research, education and training, and public health education in gastroenterology can improve the prevention, control, and treatment of these diseases.

4.2. The need for teaching innovation in clinical gastroenterology education in the context of educational reforms

With the rapid development of medical science and technology, new therapeutic techniques and drugs are constantly emerging, and the knowledge systems and skills required of doctors are continuously improving. The diagnosis and treatment of gastroenterology diseases are becoming more complex and involve more interdisciplinary knowledge, such as molecular biology, genetics, the recently emerging precision medicine, etc., which require medical education to keep up with the times and constantly adapt to the new changes in the medical field ^[4].

In the face of these challenges, the traditional lecture-based teaching mode is no longer able to meet students' needs for in-depth, practical knowledge. Educational reform requires the adoption of more flexible and diversified teaching methods, such as case teaching, simulation training, group discussion, etc. in order to improve students' clinical thinking and practical problem-solving skills. At the same time, it is also necessary to strengthen the cultivation of students' independent and lifelong learning abilities and to encourage students to take the initiative to explore and learn the latest medical knowledge and technology in order to adapt to the rapidly changing healthcare environment. In addition, education reform should also emphasize the cultivation of students' ethical and moral outlook and the spirit of humanistic care, which is of great significance to the improvement of the quality of medical services and the establishment of a harmonious relationship between doctors and patients. Through these teaching innovations and reform measures, the professional skills and overall quality of gastroenterologists can be effectively improved, and more high-quality medical talents can be cultivated for future medical development.

4.3. Advantageous features of step-by-step case teaching

Step-by-step case teaching is an advanced medical education model. It aims to combine actual checkup practice with gradual escalation of clinical case teaching so that students can be guided by teachers, and the teaching content is divided into different stages according to the degree of difficulty and complexity, and each stage is designed with a clinical case that meets the level. Students need to gradually improve their clinical competence through analyzing cases, discussing treatment plans, and participating in activities such as ward rounds under the guidance of the instructor ^[5]. Compared with the traditional clinical teaching method, the step-by-step case teaching has obvious advantages:

- (1) Practice-oriented: The practice-oriented feature of the step-by-step case teaching provides students with a close-to-realistic learning environment by simulating real clinical scenarios, which not only enables students to apply what they have learned and deal with complex clinical situations under safe and risk-

free conditions, but also enhances their clinical operation and decision-making skills and provides them with a better opportunity to improve their clinical skills, laying a solid foundation for their future clinical work.

- (2) Step-by-step: The teaching mode organizes the teaching content according to the principle of simple to difficult, from shallow to deep, to ensure that students can be exposed to the knowledge and skills of corresponding difficulty at the appropriate learning stage. This step-by-step learning approach helps students gradually build a complete knowledge system and avoids the frustration that may be brought about by facing difficult problems directly. Through hierarchical and escalating case studies and practical exercises, students are able to consolidate their knowledge and improve their skills at each stage, thereby effectively enhancing their learning efficiency and self-confidence.
- (3) Reinforcement of thinking training: Through continuous case analysis and discussion, the step-by-step case teaching encourages students to take the initiative to think, ask questions, and solve problems, so as to encourage them to be able to independently carry out clinical reasoning in the face of disease diagnosis and treatment. Meanwhile, through repeated thinking training, students are encouraged to learn how to quickly and accurately analyze problems and formulate reasonable diagnostic and treatment plans in complex and changing clinical situations, so as to improve their independent problem-solving skills.
- (4) Promoting teacher-student interaction: Immediate feedback and discussion during the step-by-step case teaching not only increases the interactivity of teaching but also provides students with immediate learning feedback, helping them to find and correct their mistakes in time ^[6]. In addition, this teaching mode encourages students to express their views and doubts, promotes communication and understanding between teachers and students, and better meets students' individualized and diversified learning needs, thus improving the teaching effect.

4.4. Practical effects of applying step-by-step case teaching in gastroenterology ward rounds

The results of this study showed that the application of step-by-step case teaching in the clinical education of gastroenterology achieved significant teaching effects. The scores of the students in the observation group on the assessment of theoretical knowledge of gastroenterology (89.76 ± 4.63) and the scores of the clinical skills assessment (87.61 ± 4.25) were higher than those of the control group, which were 82.24 ± 3.75 and 80.17 ± 3.53 , respectively. The difference was statistically significant ($P < 0.05$). The observation group students' degree of recognition of the step-by-step case teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating team spirit and clinical thinking was 97.22%, 94.44%, 100%, 97.22%, and 91.67% in order, which was correspondingly higher than that of the control group (75.00%, 69.44%, 66.67%, 72.22%, and 58.33%, respectively), and the difference was statistically significant ($P < 0.05$). Further analysis revealed that under this teaching mode, students were able to apply theoretical knowledge to actual clinical situations, thus gaining a deeper understanding and mastery of the diagnosis and treatment of digestive system diseases. Meanwhile, through different levels of case analysis, students' clinical thinking skills were significantly improved, which stimulated students' interest in learning, improved learning initiative, and promoted students' self-learning and exploration. In addition, through the application of this teaching mode, the interaction between teachers and students is enhanced, and teachers can adjust the teaching content and methods in time according to students' feedback, so that the teaching is closer to the actual needs of students.

5. Conclusion

In conclusion, the application of step-by-step case teaching in gastroenterology education not only enhances the clinical ability of students but also promotes the innovation of education and teaching methods, which helps to cultivate high-quality medical talents adapted to the needs of modern medical treatment. The successful practice of this model provides useful reference and inspiration for educational reform in other medical fields.

Disclosure statement

The authors declare no conflict of interest.

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Education Choice, Cultural Practice, and Personal Growth of Music Examinees from the Perspective of Chinese Art College Entrance Examination

Xiao Xiao*

St. Paul University Manila (St. Paul University System), Malate, Manila 1004, Philippines

*Corresponding author: Xiao Xiao, 442716332@qq.com

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Abstract: From the perspective of the Chinese art college entrance examination, this research examines the education choice, cultural practice, and personal growth of music examinees, and expounds that the art examination is not only a unique way to enter higher education in China but also an important cultural phenomenon. The aim is to deeply explore the multi-dimensional influence of art examination and its practice in private art education institutions. By applying a combination of quantitative and qualitative research methods, this study provides insights into understanding the experience of music examinees, improving the quality of arts examination and cultural practices, and optimizing the management and teaching practices of private art training institutions. It can also provide a valuable reference for relevant decision-makers, practitioners, students, and their families in the choice and practice of music education.

Keywords: Art examination; Music examinee; Education choice; Cultural practice; Personal growth; Music education

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1. Introduction

Music education is a vital aspect of human social life, crucial for the inheritance of music culture, and a means for countries to elevate their citizens' quality. Reflecting on John Dewey's perspective in his *Democracy and Education: An Introduction to the Philosophy of Education*, "the process of education is a process of gradual growth, and the growth of each stage is to enhance the comprehensive ability of learners"^[1]. China's music education pathway, particularly the art college entrance examination, is a formidable yet significant journey for high school students aspiring to pursue art majors. This examination not only advances music education and invigorates the art market but also serves as a pivotal channel for many to pursue their dreams and alter their destinies, highlighting its profound influence on the study of higher music education.

With the public high school music curriculum falling short of national art examination standards, a substantial art examination training market has arisen to address this gap^[2]. This necessitates a study into the learning motivations, status, satisfaction, and needs of music examinees to aid in better industry regulation and informed decision-making for examinees and their families. This research focuses on a private training school

in Jinan, Shandong Province, which stands out as a standardized, large-scale, and influential institution, offering a representative case for examining the interplay between individual student development and educational policies. The insights gained aim to assist Chinese music colleges and universities in refining their enrollment and talent selection processes and to contribute to the enhancement of Chinese music education through an analysis of the teaching characteristics, methods, and outcomes provided by private music schools.

2. Research methodology

2.1. Questionnaire and data analysis

In order to get a deeper understanding of the students' real thoughts and experiences, the researcher distributed questionnaires across the school. A total of 181 filled questionnaires were successfully collected. The survey was designed to be anonymous, ensuring that participants' privacy was strictly protected. The survey featured three types of questions: 28 Likert scale items to assess reliability and validity, 12 choice questions (single and multiple-choice) to determine specific preferences, and an open-ended question for detailed personal feedback. This approach aimed to capture a holistic view of the students' backgrounds, educational choices, cultural involvement, and mental health, providing a nuanced understanding to inform educational recommendations and enhancements.

Descriptive statistical analysis was applied to the scale questions, utilizing SPSS26 software for data analysis (**Table 1**), which indicated that the majority of respondents resonated strongly with the given options, suggesting reliable and valuable questionnaire feedback for policy and educational practice improvement.

Table 1. Descriptive statistics of scale data

Item number	N	Min	Max	Mean	SD	Variance	Skewness		Kurtosis	
							Statistic	SE	Statistic	SE
6	181	1	5	4.02	0.894	0.8	-0.468	0.181	-0.527	0.359
7	181	3	5	4.44	0.709	0.503	-0.86	0.181	-0.547	0.359
13	181	1	5	4.4	0.829	0.686	-1.643	0.181	3.045	0.359
14	181	1	5	4.34	0.833	0.693	-1.475	0.181	2.822	0.359
15	181	1	5	4.36	0.789	0.622	-1.435	0.181	2.804	0.359
16	181	1	5	4.19	1.021	1.042	-1.525	0.181	2.211	0.359
17	181	1	5	4.49	0.735	0.54	-1.565	0.181	2.918	0.359
19	181	1	5	4.27	0.807	0.652	-1.417	0.181	3.179	0.359
20	181	1	5	4.27	0.881	0.776	-1.349	0.181	1.441	0.359
21	181	1	5	4.29	0.766	0.586	-1.23	0.181	2.577	0.359
22	181	1	5	4.48	0.637	0.406	-1.338	0.181	3.73	0.359
23	181	1	5	4.38	0.733	0.537	-1.164	0.181	1.792	0.359
24	181	1	5	4.41	0.682	0.465	-1.152	0.181	2 ⁻³⁴⁶	0.359
25	181	1	5	4.42	0.692	0.478	-1.288	0.181	2.792	0.359
26	181	1	5	4.17	1.003	1.006	-1.408	0.181	1.786	0.359
27	181	1	5	4.21	0.983	0.967	-1.497	0.181	2.187	0.359
29	181	1	5	4.46	0.749	0.561	-1.64	0.181	3.312	0.359
30	181	1	5	4.35	0.834	0.695	-1.603	0.181	3.32	0.359
31	181	1	5	4.34	0.864	0.747	-1.391	0.181	1.897	0.359

Table 1 (Continued)

Item number	N	Min	Max	Mean	SD	Variance	Skewness		Kurtosis	
							Statistic	SE	Statistic	SE
32	181	1	5	4.28	0.782	0.612	-1.092	0.181	1.477	0.359
33	181	1	5	4.49	0.712	0.507	-1.679	0.181	3.934	0.359
34	181	2	5	4.45	0.703	0.494	-1.192	0.181	1.153	0.359
35	181	1	5	3.97	1.074	1.154	-0.885	0.181	-0.048	0.359
36	181	1	5	4.13	1.006	1.012	-1.12	0.181	0.623	0.359
37	181	2	5	4.38	0.769	0.591	-1.279	0.181	1.513	0.359
38	181	1	5	3.61	1.393	1.94	-0.568	0.181	-1.063	0.359
39	181	1	5	4.38	0.748	0.559	-1.479	0.181	3.105	0.359
40	181	1	5	4.23	0.918	0.843	-1.294	0.181	1.795	0.359

Item number = Question number in the questionnaire; N = Sample size; Min = Minimum; Max = Maximum; SD = Standard deviation; SE = Standard error

In the feasibility analysis, the 28 scale questions were divided into four dimensions: educational choice, educational demand, cultural practice, and physical and mental health, and the data were analyzed on this basis. The Cronbach reliability analysis of the questionnaire data was carried out using SPSS26 (**Table 2**), and the results show that the questionnaire has high reliability.

Table 2. Cronbach reliability analysis results of questionnaire data

Dimension	Number of items	Overall Cronbach's α	Cronbach's α based on standardized items	Cronbach's α after item deletion
Overall	28	0.945	0.949	0.659
	6	0.675	50.681	0.637
Educational choice				0.614
				0.624
				0.626
				0.642
	4	10.826	0.827	0.788
Educational demand				0.814
				0.754
				0.756
	8	0.933	0.937	0.93
Cultural practice				0.931
				0.918
				0.921
				0.922
				0.919
				0.921
				0.93

Table 2 (Continued)				
Dimension	Number of items	Overall Cronbach's α	Cronbach's α based on standardized items	Cronbach's α after item deletion
Physical and mental health	10	0.868	0.882	0.859
				0.847
				0.849
				0.846
				0.854
				0.855
				0.857
				0.856
				0.87
				0.862

Based on the data obtained from the questionnaire, SPSS26 was used to analyze the validity of the questionnaire data (**Table 3**). The overall KMO indicates high validity and good effectiveness.

Table 3. KMO and Bartlett's tests

KMO sampling adequacy measure		Overall	Educational choice	Educational demand	Cultural practice	Physical and mental health
		0.898	0.719	0.631	0.907	0.863
Bartlett's test of sphericity	Approximate chi-square	3545.637	153.478	375.742	1195.467	786.030
	Degree of freedom	378.000	15.000	6.000	28.000	45.000
	Significance	0.000	0.000	0.000	0.000	0.000

2.2. Semi-structured interview

In the study, semi-structured interviews with 12 teachers were conducted, involving 11 questions about demographics, their perspective on student participation in art examinations, teaching challenges, support for their children's participation, and the perceived impact of their work.

Teachers expressed a strong belief in the societal and cultural importance of their role, noting their contribution to student development and the broader musical culture. They emphasized their support in both academic and emotional aspects, guiding students toward their musical aspirations. The teachers' passion for education and their dedication to students underscored a student-centered approach, reflecting their professional responsibility and commitment to art education.

2.3. Fieldwork

In order to have a more intuitive and in-depth understanding of the actual situation, fieldwork was carried out for 6 months in the selected private art school. Through daily interactions with students and faculty, the researcher was able to observe firsthand the specific process of students' training and exam preparation, and how that process shaped their personal growth. This practice of fieldwork not only enriches the research data but also provides a solid basis for putting forward targeted education suggestions and improvement measures.

3. Results and discussion

3.1. Influencing factors and educational choices in art examination

The art examination phenomenon reveals that educational choices are driven by self-realization, strategic planning, and the influence of family and societal connections, according to student surveys and teacher interviews. This process not only allows students to cultivate their interests and talents, highlighting the personalized nature of educational decisions but also emphasizes the critical role of family support and social culture. These choices are influenced by both individual aspirations and societal expectations, showing the intertwined relationship between personal choice and social structure. While the art examination represents a strategic route for students, emphasizing the value of cultural and musical education and the development of personal talents, it also underscores the need for rational consideration of personal circumstances and market demands, reflecting the intricacies and diversities of educational choices and the dynamic interplay between individuals, families, and society.

3.2. Perceptions and cultural significance in art examination

Survey data indicates that both students and parents view the art exam as a strategic avenue for musically talented individuals to access quality higher education and elevate their social status, highlighting an acute awareness of educational resource distribution and aspirations for social mobility. Culturally, the art examination is recognized by the education system as an affirmation of individual talent and effort, serving as an egalitarian platform for students of varied backgrounds and symbolizing the inclusivity of the educational assessment system. Moreover, societal perceptions of the art examination acknowledge the value of a pluralistic education system that nurtures diverse talents and meets different student needs, thereby reflecting societal endorsement of educational diversity and the support for multiple pathways of learning and achievement.

3.3. Achievement and cultural practices in art examination

The art examination is an important milestone for many students aspiring to the music field, not only because it is part of their professional development, but also because it plays a key role in personal growth and psychological improvement. In order to achieve their learning goals, students need to attend professional training and intensive training courses to improve their skills and performance ability. The professional training environment also provides students with the opportunity to interact with their peers, thereby promoting mutual learning and growth. Although the training and preparation in the process are full of hard work, it is this experience that gives students a firm will and the courage to pursue their dreams. Regular self-reflection is essential to a student's musical growth path. Self-reflection encourages students to remain thoughtful about music, while also cultivating habits of continuous learning and self-improvement.

3.4. Improvement strategies for private art schools

From the survey results, it can be seen that the career planning and educational counseling services provided by private art schools can help students and parents better understand the value of music education and future career paths, and ensure that schools enroll high-quality students who choose rationally and have a genuine love for music.

It can be seen from the questionnaire survey that students highly recognize the importance of participating in cultural practice activities such as concert performances and competitions. The closed campus management, tests, and examinations will bring great pressure to the students. In the interviews, teachers generally reflect that there are some difficulties in teaching research and management of students, such as students' learning attitude and time management. By establishing a more standardized management system, training schools can help

students improve their self-management ability and enhance mutual understanding and support among students, thus creating a more harmonious and favorable learning environment.

3.5. Educational and cultural influence on art examination

The art examination phenomenon in Chinese music education reflects its educational achievements, popularizing and deepening music education, and serving as a crucial step for students aiming for music specialization. Early initiation in music education and career planning is common among art examinees, highlighting the importance of thorough preparation. Training institutions adapt their teaching and support to meet diverse student needs, indicating innovative responses to art examination demands and a focus on individual student needs.

4. Conclusion and recommendations

4.1. Conclusion

In China's music education field, the art examination represents a critical challenge, intertwining skill assessment with educational, developmental, and cultural factors. Students navigate complex educational choices, balancing personal interests, career goals, family expectations, and exam difficulty, against a backdrop of social and national policy influences. Parental support, financial considerations, and teaching resources have a great impact on student's educational choices.

The high demand for quality music education has spurred the growth of the training market, with choices driven by course quality, teacher expertise, success rates, and personalized support. This dynamic interaction between educational choices, market forces, and the Chinese music education system offers insights for refining teaching strategies and advancing high school music education.

4.2. Recommendations

This study offers improvement suggestions for the music education model across individual, family, school, and societal levels. Individually, aspiring music students must cultivate self-awareness, match their interests and abilities with their educational and career goals, and prepare for the competitive nature of music examinations with passion and resilience. Family support is crucial, with emphasis on communication and the creation of a stress-free environment, alongside financial investment in music education tailored to their means.

The training schools play a critical role in guiding students through art examination preparation by innovating curricula, incorporating practical teaching methods, and fostering a supportive and collaborative environment. Professional development for teachers is essential to effectively address student and parental concerns. A flexible and personalized assessment system is recommended to optimize the learning experience.

At the societal level, promoting the value of music education is essential through varied communication strategies and redefining success to create an inclusive environment for music examinees. Government support through subsidies and career guidance is vital for alleviating financial strains and aiding career development.

Overall, the research underscores the sociocultural importance of music education and provides actionable strategies for educators, highlighting the need for ongoing research to refine our understanding and implementation of music teaching practices.

Disclosure statement

The author declares no conflict of interest.

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The Relationship Between Learner Beliefs and Foreign Language Anxiety of Chinese EFL International Students

Shan Wang*

School of Foreign Languages, Harbin University of Commerce, Harbin 150028, Heilongjiang Province, China

*Corresponding author: Shan Wang, wangshancarrie@163.com

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Abstract: The research purpose of this study is to measure Chinese EFL (English as a Foreign Language) international students' learner beliefs and foreign language anxiety and explore the underlying relationship between their beliefs and foreign language anxiety. The study found that learners' beliefs about the difficulty of language learning are positively related to confidence about their English proficiency, and the more learners pay attention to linguistic accuracy, the higher their foreign language anxiety. When learners believe they can learn English well, their anxiety level could be low, and if they are anxious about English learning, they will adopt practicing methods to deal with their anxiety.

Keywords: Learner beliefs; Foreign language anxiety; Study abroad; Chinese EFL students

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1. Introduction

There are many terms used to describe education taking place outside a student's home country or region such as "study abroad," "student mobility," and so on. The term "study abroad" is defined as "a temporary sojourn of pre-defined duration, undertaken for educational purposes"^[1]. The main modality of cross-border education for students from the Asia-Pacific region including China is the acquisition of a full degree on a fee-paying basis. This means they go abroad for one year or several years and aim to gain degrees that are recognized and valued in their home country. These degrees may be important as part of capacity building or to join the workforce^[1]. The number of Chinese international students in English-speaking countries such as the United States (US), the United Kingdom (UK), and Australia has increased. Recently, the UK has become the second most popular country for overseas students. In the year 2014, there were 437,000 international students studying in the UK^[2].

Due to this large group of international students, research into studying abroad has drawn attention to the field of language learning. For researchers who are concerned with language learning, studying abroad is important because the experience is regarded as a crucial step in the development of the ability to communicate in the target language^[1]. Students studying abroad may unconsciously acquire the foreign language through

observation and communication in classrooms and dormitories, and social and commercial interactions. Although such students may or may not regard themselves wholly or partially as language learners, language education and applied linguistics researchers have demonstrated considerable interest in studying abroad ^[1].

Scholars have analyzed the effect of individual differences on foreign language learning since the 1960s. A lot of evidence has been provided for the influence of individual differences on instructing adult language learning, with most studies focusing on cognitive and affective factors such as aptitude and motivation ^[3]. However, foreign language anxiety and learner beliefs have recently received increasing attention from scholars. Scholars not only link these two factors to language achievement or performance but also claim that they are related to each other ^[4,5]. Indeed, a research gap can be identified by directly examining their relationship ^[6], especially in the context of Chinese students studying in English-speaking countries who are considered to be the largest group of overseas students in the world ^[2].

Therefore, considering the background and research gap stated, the purpose of this study is to measure Chinese EFL (English as a Foreign Language) international students' learner beliefs and foreign language anxiety (FLA) and to explore the underlying relationship between their learner beliefs and FLA.

2. Literature review

The literature review provides a brief introduction to the previous research on the relationship between learner beliefs in language learning and foreign language anxiety in the foreign language education field. The literature ranges from the last century when the basic theories were published to recent research in order to ensure the reliability of this review.

Horwitz *et al.* ^[7] pointed out that there is a relationship between language anxiety and learner beliefs. The authors explained that learners' beliefs lean towards perfectionism, and setting high personal performance standards may cause their FLA. Recently, several studies have been conducted in different contexts to investigate learner beliefs and language anxiety ^[5,6].

From the perspective of English as a Foreign Language (EFL), Zhang ^[5] and Aslan and Thompson ^[6] analyzed the relationship between language anxiety and learner beliefs respectively in Chinese, Turkish, and Indonesian contexts. Aslan and Thompson ^[6] adopted a quantitative approach through a modified version of BALLI and FLCAS questionnaires to find answers to the research question "What is the relationship between the underlying factors in the language learning beliefs and foreign language anxiety of Turkish EFL learners?" Based on the research data of 153 university-level EFL learners, the authors concluded that both learners' beliefs and foreign language anxiety consist of several constructs that interact with one another. Positive learner beliefs can reduce foreign language anxiety and increase learners' confidence in language learning. Specifically, fear of ambiguity is positively linked to language anxiety, while the more confident learners are, the more likely they are to communicate with native speakers. However, the findings of this study do not establish causal claims about the relationships. For example, the existence of a relationship between fear of ambiguity and FLA in this study could not be demonstrated as the former causes the latter.

In the Chinese EFL context, Zhang ^[5] conducted research to investigate what beliefs and anxiety levels Chinese university English major students have, and whether there is a relationship between their beliefs and language anxiety. The author adopted a quantitative approach using two questionnaires FLACS and Tanaka's Learner Beliefs Questionnaire, with 151 first-year undergraduate students majoring in English. The result indicated that respondents held a strong belief in the importance of vocabulary learning, while their anxiety level was lower than those in the previous research. More importantly, this study found that there was no

significant relationship between participants' beliefs and their language anxiety; only two factors of learner beliefs were weakly correlated with anxiety. This result is opposed to the findings of Aslan and Thompson ^[6] who found that learner beliefs and language anxiety interact with one another. Given that different contexts may lead to a mismatch in findings, research in the missing context of Chinese international students is necessary.

In short, this literature review gives a brief introduction to previous research concerning the relationship between learner beliefs and foreign language anxiety. The topic has been studied in different contexts, and the findings can be conflicted. Most scholars believe that these two factors are related to each other, but others find that there is no significant relationship.

3. Discussion

This section discusses how the studying abroad experience could change learners' beliefs, their foreign language anxiety, and their relationships.

A significant change appears in the participants' attitude towards the nature of language learning after studying abroad. Before learning in the English-speaking context, participants were focused on the accuracy of the target language and avoided making mistakes, which could have caused their foreign language anxiety. However, after studying abroad, participants' attitudes towards making mistakes changed. They now are more tolerant towards mistakes, and try to find a balance between accuracy and fluency. Their FLA levels have fallen, possibly because they are less worried and embarrassed when they make mistakes in English. These changes caused by the studying abroad experience are also evident in other studies ^[8-11].

One possible explanation proposed by participants is that different methods of assessment could cause a change in learner beliefs. This view matches the findings in previous research. As discussed in the literature review, Li and Ruan ^[8] pointed out that assessment methods are found to have influenced the development of language learners' beliefs. The participants, Chinese EFL learners in an EMI (English as the Medium of Instruction) context, are similar to this present study, Chinese EFL students studying abroad. It is reported in the present study that examinations in China are mostly gap-fill or objective questions without subjective expression so at that time they were not worried about expressing their ideas and focused little on the communicative function of the foreign language. This finding is supported by previous research that language tests in China are highly focused on linguistic accuracy including grammar, vocabulary, and reading, but attach less importance to listening and speaking. Testing focuses predominantly on what can be tested reliably and accurately and with maximum objectivity ^[10].

The dominant English test is the College English Test (CET); however, this test is reported to cause worry and anxiety among Chinese university students. Also, it is considered that multiple-choice testing is overused in the CET and that accuracy is the predominant focus of the exam ^[12]. Thus, Chinese EFL learners could develop a belief that learning English is mainly about acquiring linguistic knowledge rather than developing communication skills. This kind of exam made them more focused on grammar and linguistic accuracy than on communication and expression. This idea could be in line with the findings in previous research that high-stakes examinations in China tend to significantly influence learners' beliefs about the primacy of grammar and vocabulary in English study ^[8].

However, after studying abroad, most Chinese EFL learners indicated that their assessments were essays and presentations, which require them to use the foreign language to express their ideas and ensure fluency as well as accuracy. In other words, they are required to adapt from a test system where summative assessment (end-of-course exams and tests) plays a leading role, to one where formative assessment (written coursework

assignments, oral presentations, and discussion-based tasks) and summative assessment are equally important ^[10]. When the participants were studying abroad, the process-based writing tasks may have led learners to become more pragmatic and skills-based, as mentioned in the results. Other studies have also shown that after studying abroad, students' attention increasingly becomes focused on how to write an effective piece of academic writing rather than excessive attention to the correct use of grammar or vocabulary ^[8].

Another explanation for the change could be the influence of extracurricular activities. It is worth noting that Chinese EFL international students not only need to use English in the classroom but also in their daily communications in English-speaking countries. According to sociocultural theory, learners' use of English is viewed both as a tool for mediating learning and as an object to be acquired ^[13]. While English is an academic subject for students in China, English becomes a survival tool in everyday life for study-abroad students and relates to their overall academic achievement and social accomplishment ^[14]. Participation in extracurricular activities in an English-speaking environment could mediate learners' beliefs and FLA ^[8]. While studying abroad, there could be more opportunities for learners to engage in different English-speaking communications and extracurricular activities. In the English-speaking context, learners could encounter English speakers from different countries with varying accents. Thus, they need to adapt their speaking, listening, and beliefs about language learning in order to communicate. Meanwhile, it could make learners pay more attention to the communication function of language ^[8,14]. The result of this study is in line with the findings of Li ^[11] that English accents and grammatical mistakes have little effect on Chinese EFL international students' oral communication in extracurricular activities. As a result, they become less focused on the primacy of accuracy and native-like accent, which they used to focus on when in China. As learners' beliefs change, their FLA decreases accordingly. They could be less anxious about their accents and become more confident when they realize there are multiple accents in English. Therefore, English use outside the classroom could be one reason for Chinese international students' changed beliefs and FLA.

Additionally, the different roles of teachers as well as teaching activities could cause a change in learners' beliefs and FLA because teaching practices could make students hold particular sets of learning beliefs ^[15]. Most of the participants in this research learned English in teacher-centered classrooms that predominately used grammar translation and audiolingual methods ^[8]. In this kind of class, teachers are often viewed as authority figures rather than facilitators of learning ^[16]. This traditional type of English class may cause learners to believe that learning English is mostly about repetition and memorization.

After they had been studying abroad, Chinese EFL international students regarded the role of the teacher as a scaffolder and cooperator. Amuzie and Winke ^[15] also found that the new environment made learners believe that learning English should be a learner-centered and self-regulated process in which their proactive participation and initiative are necessary. Participants also indicated that different teaching activities could have an effect on their foreign language anxiety. Due to the fact that participants had to use English in group discussions, the anxiety level would increase when they compared themselves with other classmates. However, most of the participants viewed this kind of anxiety and comparison as a positive factor that encouraged them to think more and make improvements. This positive effect of FLA is also found in previous research ^[17,18].

In terms of the relationship between learners' beliefs and foreign language anxiety, the findings of this study could be supplemental to the previous research. In this study, a significant relationship is found to exist between learners' beliefs about linguistic accuracy and their foreign language anxiety. When the participants no longer think it is important to be accurate, they have less foreign language anxiety. This finding matches with the results of previous research by Truitt and Horwitz ^[19], which found "a positive relationship between learners' beliefs about the importance of correctness and their levels of anxiety." Similarly, this relationship is also found

in the study of Aslan and Thompson ^[6] that claimed there is a set of correlations between fear of ambiguity and foreign language anxiety. It is suggested that the more learners believe that English learning involves a lot of ambiguity in different forms, the more anxious they will get ^[6]. Participants in the present study reported a high level of anxiety when they focused on accuracy, grammar, and vocabulary rather than the communication function. However, the participants in this English-speaking context believed less in the accuracy of language and were more accepting of ambiguity after they had been living in the UK, which means their anxiety level may have decreased.

Another significant relationship exists between learners' beliefs about the difficulty of language learning and foreign language anxiety. This finding is in line with the hypothesis that a negative relationship exists between learners' beliefs about the ease of learning English and their levels of anxiety ^[19]. This finding could also be consistent with the idea that learners' desire and confidence to learn English well is related to their foreign language anxiety ^[6].

4. Conclusion

This study investigated the following research questions: What English learning beliefs do Chinese EFL international students have? What is the level of Chinese EFL international students' anxiety towards English learning? What is the relationship between learner beliefs and FLA of Chinese EFL international students?

The results indicate that participants' beliefs about English learning have changed since they studied abroad; they have become less concerned about language accuracy, grammar, and vocabulary, and instead view learning language as a medium to communicate. Studying abroad could change participants' beliefs and FLA in three aspects including different assessment forms, extracurricular activities, and the different roles of teachers and teaching activities. There are two significant relationships between learner beliefs and FLA. On the one hand, learners' beliefs about the difficulty of language learning are related to their confidence about their English proficiency. This means that the more difficult learners view learning English as being, the more anxious they may be. Also, this relationship indicates that the more learners believe that they can learn English well, the less their foreign language anxiety may be. On the other hand, the more learners pay attention to linguistic accuracy, the higher their foreign language anxiety may be. Learners' beliefs about linguistic accuracy are related to four perspectives of foreign language anxiety including anxiety about speaking, English proficiency, interacting with native speakers, and public or unfamiliar environments. The existence of this relationship also suggests that when participants are anxious about language learning, they believe more in the importance of practice.

Given the relationships stated before, it is necessary for teachers and instructors to provide a relaxed and supportive learning environment for students in order to make them feel confident, relaxed, and keen to learn English, thus reducing their anxiety levels when learning English ^[20]. Plus, it is important to provide more opportunities for learners to practice including group discussion, role play, and other activities in order to prepare learners for English communication and make them less anxious when they are in an English-speaking environment ^[21]. Not only in EAP (English for Academic Purposes) courses but also in workshops, it is important for teachers to encourage students to express their ideas in English. Rather than teacher-centered classes, students should have more opportunities and feel free to interact and discuss in English. For example, there could be more group discussions and activities that make students interested in and willing to communicate. However, this application requires a high ability of teachers and teaching material. In classes with large groups of students like lectures, it is difficult and time-limited to give every student the opportunity

to speak in English. Thus, this recommendation is only suitable for small classes.

Teachers' understanding of and introduction to global English are important as well, so that their students feel confident with their accents and less anxious when they make mistakes ^[22]. Back in China, schools and government should provide courses for teachers to learn about the global English concept and make sure they treat students with different accents equally. Students should be taught to use English with confidence no matter what accents they have. However, this understanding may cause students to feel unnecessary to ensure the accuracy of language due to the existence of global English. Thus, students should be aware of the importance of keeping a balance between language accuracy and fluency, and the methods of assessment should take both aspects into consideration. For example, there could be paper tests as well as presentations as final exams so that students' English speaking, reading, writing, and listening are all tested. In conclusion, teacher education and different assessment methods are suggested to increase the awareness of global English.

Disclosure statement

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Improvement of Comprehension Skills of Alternative Learning System (ALS) Learners Through Reading-Focused Session

Brenda C. Gregorio*

Department of Education Region IV-A Calabarzon, Division of Batangas Province, 4200 Batangas, Philippines

**Corresponding author:* Brenda C. Gregorio, brenda.gregorio@deped.gov.ph

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Abstract: Reading comprehension skills among Alternative Learning System (ALS) learners play a vital role in educational development, enabling individuals to understand various forms of written information. This study shed light on the profile of ALS Accreditation and Equivalency (A&E) learners and their reading comprehension skills. It highlighted the significant differences based on profile variables and identified their challenges in developing reading comprehension skills. The proposed project offered a comprehensive approach to enhance reading comprehension among ALS A&E learners. This study utilized a descriptive method, involving a sample of 90 ALS A&E learners from various ALS centers. Data were collected through survey questionnaires and interviews. Descriptive statistics were employed to provide statistical descriptions of the variables and indicators studied. Based on the findings, it was concluded that the study's respondents were predominantly teenagers and young adults, with a noticeable lack of middle-aged adults. Moreover, female respondents exceeded male respondents, and most of the respondents came from low-income households. The respondents agreed on the importance of further enhancing reading comprehension skills among ALS learners. Furthermore, the study indicated that factors such as age, sex, and socioeconomic status had minimal or insignificant influence on the reading comprehension skills of ALS learners. The research also identified challenges faced by ALS learners in their pursuit of improved reading comprehension skills, emphasizing the necessity for specialized reading-focused sessions to effectively address the challenges and enhance these skills.

Keywords: Comprehension skills; Reading-focused session; Alternative learning system; Learners

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1. Introduction

The Alternative Learning System (ALS) offered by the Department of Education (DepEd) functions as a parallel learning system, offering a practical alternative to traditional formal education. It serves as a viable option for individuals who face barriers to accessing education within formal school settings. ALS non-formal education takes place beyond the confines of a traditional classroom and is typically community-oriented, with sessions held at community learning centers, barangay multi-purpose halls, libraries, or even at home. These sessions are overseen

by ALS learning facilitators, such as mobile teachers, district ALS coordinators, and instructional managers, who coordinate agreed-upon schedules and venues for learning between the learners and facilitators. ALS encompasses a wide range of knowledge and skills, drawing from both non-formal and informal sources ^[1]. ALS offers avenues for Out-of-School Youth and Adults (OSYA) to enhance their fundamental literacy skills and acquire practical knowledge, enabling them to access comparable educational pathways ^[2]. The Accreditation and Equivalency (A&E) program stands as a significant component within the ALS framework. This program addresses the needs of individuals who seek to develop literacy skills and pursue further education at both secondary and tertiary levels.

In relation to this, the DepEd administers the Presentation Portfolio Assessment through the Curriculum and Teaching Strand and the Bureau of Alternative Education (BAE). This assessment replaces the traditional A&E test. Education Program Specialist II for ALS, along with Inter-District Validators, will conduct face-to-face evaluations that include oral reading and writing proficiency tests (in both Filipino and English), as well as interviews. Division qualifiers are required to exhibit proficiency in oral reading and writing in both Filipino and English languages ^[3].

Reading comprehension involves the act of deriving meaning from a written passage. The objective is to develop a comprehensive grasp of the content presented in the text, rather than relying solely on individual words or sentences for understanding ^[4]. Reading is an essential skill that enables learners to access and comprehend information effectively ^[5]. Children in impoverished neighborhoods, those with limited English proficiency, hearing, or language impairments, and those whose parents struggled with reading are at higher risk of starting school with deficiencies, leading to early setbacks ^[6]. Some ALS adult learners may have learning disabilities affecting their reading comprehension. Health issues or disabilities can also affect an adult learner's ability to focus or comprehend information, which can have a significant impact on their overall academic performance. According to Abadzi ^[7], illiterate adults' working memory may be too brief for efficient reading. Financial constraints are another significant challenge that prevents adult learners from pursuing further education or vocational training, which may limit their career prospects. Plus, social stigma or discrimination based on their status as adult learners can also pose a significant challenge.

ALS learners may have varying levels of literacy, which would affect their reading comprehension skills. The session should take into account the learners' existing literacy level to ensure that it is tailored to their needs. The reading-focused session should be designed to meet the specific needs of ALS learners. It should include activities that engage the learners and help them to develop their reading comprehension skills. These activities could include reading exercises, comprehension questions, and discussions.

2. Literature review

The term "Alternative Learning System" was introduced by policymakers in the Philippines to encompass a broader range of educational approaches beyond formal schooling. It incorporates elements from alternative schools, adult education, informal learning, and lifelong learning. ALS classes were held in approximately 4,467 community learning centers spread across the country. Aspiring learners, primarily out-of-school youths and adults, underwent assessments through basic and functional literacy tests. Individuals who did not pass the basic literacy test were enrolled in the Basic Literacy Program. The remaining individuals were assigned to either elementary or high school levels. The DepEd assigned mobile teachers to cater to the needs of basic literacy learners ^[8].

Over the last decade, the Philippines has made impressive strides in enhancing its public basic education system. However, approximately half of Filipino students still do not complete the full basic education. While reducing the dropout rate remains a primary focus for the Philippine DepEd, there is also a need to enhance

the educational and employment opportunities for those who have already left school. For the past fifty years, DepEd has implemented separate educational systems for young individuals and adults who have not completed formal basic education. The current iteration of this initiative, known as the ALS, consists of two main components: the Basic Literacy Program and the Accreditation and Equivalency (A&E) Program ^[9]. Educating a group of adult learners presents unique challenges and requires continuous pedagogical growth. Adult learners enter the classroom as independent individuals with their own expectations and a readiness to assess the teaching they receive. Unlike young children, adult learners often have numerous questions for the teacher, which also serves as a method to evaluate the teachers' competence ^[10]. Nonetheless, numerous ALS learners may encounter difficulties with reading comprehension attributed to various factors, including limited book accessibility, inadequate prior education, and learning disabilities. Reading comprehension comprises sub-processes and component skills, which can be expected to improve with exposure to written materials ^[11].

According to McNamara ^[12], several strategies have been developed to enhance the comprehension of local text excerpts. These strategies include bridging and connecting various components of the text, relating the text to personal experiences and everyday activities, mastering the rhetorical structure and genre of texts, engaging in social interactions with experts, tutors, and peers, and employing processes like asking questions, reflection, and summarization. Furthermore, reading-focused sessions can be designed to teach specific strategies for improving reading comprehension, such as activating prior knowledge, making predictions, and summarizing. ALS learners face unique challenges when it comes to comprehension skills, but through reading-focused sessions, these skills can be enhanced. By engaging in structured and intentional reading exercises, ALS learners can improve their ability to understand and retain information. Through reading-focused sessions, learners can also expand their vocabulary, improve their grammar, and enhance their critical thinking skills. To enhance comprehension skills through reading-focused sessions in the ALS program, educators can incorporate various strategies such as using distinct types of reading materials, providing pre-reading activities, encouraging active reading, facilitating discussions and questioning, and providing post-reading activities.

3. Research objectives

The purpose of this study was to evaluate the reading status of ALS Accreditation and Equivalency (ALS A&E) learners to enhance reading comprehension.

Specifically, this research has the following specific objectives:

- (1) To determine the profile of the respondents in terms of age, sex, and socioeconomic status.
- (2) To assess the reading comprehension of ALS A&E in terms of the ability to identify the main idea and key details, ability to sequence a passage into an ordinal series, ability to answer direct recall questions, ability to make inferences/predictions, and ability to identify unfamiliar vocabulary.
- (3) To determine the significant difference in reading comprehension when grouped according to profile variables.
- (4) To identify the issues and challenges in reading comprehension of ALS A&E learners.
- (5) To propose a project to enhance the reading comprehension of ALS A&E learners.

4. Methods

4.1. Research design

The descriptive method was utilized to establish an in-depth understanding of the respondents' perspectives, which served as the basis for the suggested reading interventions to enhance their comprehension skills.

Through the descriptive method, statistically significant data that answered the question were obtained and valid conclusions were derived from the gathered information.

4.2. Respondents and sampling

The study comprised 90 ALS A&E learners from District ALS Centers and Community Learning Centers in the Rosario West District, as shown in **Table 1**. The selection of respondents was done using a random sampling method, which ensures that each member of the population has an equal chance of being included in the sample.

Table 1. Profile of learners

Age	Number of students	Sex		Socioeconomic status		
		Male	Female	Low	Middle	High
13–20	42	24	18	40	2	0
21–28	27	15	12	27	0	0
29–36	12	3	9	12	0	0
37–44	7	1	6	7	0	0
45–52	1	0	1	1	0	0
Above 52	1	0	1	1	0	0
Total	90	43	47	88	2	0

4.3. Questionnaire

A three-part survey questionnaire checklist was created for this study. Part 1 was used to collect information about the respondents' profiles. Part 2 was used to assess the reading comprehension of ALS A&E learners. Part 3 consisted of essay questions that identified issues and challenges in the reading comprehension of ALS A&E learners.

4.4. Data collection

This research employed multiple methods of data collection, including a self-structured questionnaire and an interview guide, to assess the reading comprehension levels of ALS A&E learners and explore their difficulties in improving their skills. The questionnaire aimed to provide a detailed personal profile of the respondents while assessing their current reading comprehension levels. The interview guide helped to gather data on the challenges faced by the learners.

4.5. Data analysis

The backgrounds and experiences of students were studied by recording, tabulating, and quantitatively analyzing their profiles. Selected respondents were interviewed to collect the challenges faced in reading comprehension, and their responses were analyzed and discussed in the final analysis of the study. Descriptive statistics was employed to statistically describe the variables and their indicators in this study. Specifically, weighted mean, Kruskal-Wallis *H* Test, and Mann-Whitney *U* Test were used in most of the data analysis.

4.6. Ethical consideration

A meeting was arranged with each community learning center's respondents and their consent was obtained to ensure their willingness to participate in this study. To safeguard the confidentiality of the participants, all collected data remain confidential. Furthermore, the Data Privacy Act was complied with to ensure that the

respondents' information remains secure and private.

5. Results and discussion

The results provided an overview of the respondents' profiles and presented an assessment of the reading comprehension skills of ALS A&E learners. It further identified a significant difference in reading comprehension when learners are grouped according to profile variables. This study aimed to address the issues and challenges in reading comprehension faced by ALS A&E learners and proposed a project that seeks to enhance their reading comprehension skills, thereby offering potential solutions and improvements in their educational journey. This section presented, analyzed, and interpreted the pertinent data gathered. The data presented in the tabular analysis are supported by textual interpretations.

5.1. Profile of the respondents

5.1.1. Age

The age of the population refers to the average or range of ages within a given group, indicating the demographic composition, and serving as a key variable in analyzing and interpreting research findings. **Table 2** shows the age of the respondents in this study.

Table 2. Age of respondents

Age	Frequency	Percentage (%)
13–20	42	46.7
21–28	27	30.0
29–36	12	13.3
37–44	7	7.8
45–52	1	1.1
Above 52	1	1.1
Total	90	100.0

5.1.2. Sex

This variable is crucial for understanding potential sex-based differences and their implications in various research contexts. **Table 3** shows the profile of respondents according to sex.

The data show there are more female respondents than male respondents, indicating that there is a higher proportion of women participating compared to men. This suggests that more women were engaged in the study or data collection process than men. This coincides with the study by Rabourn *et al.* ^[13], that adult learners demonstrate higher levels of academic engagement and possess more positive perceptions of teaching practices and interactions with others. However, they tend to have limited interaction with both peers and faculty members and perceive their campuses as lacking supportiveness.

Table 3. Sex of respondents

Sex	Frequency	Percentage (%)
Male	40	44.4
Female	50	55.6
Total	90	100.0

5.1.3. Socioeconomic status

Socioeconomic status refers to an individual’s or a group’s position in society based on their economic resources, education, occupation, and social standing, which influences access to opportunities and resources. **Table 4** shows the socioeconomic status of respondents.

Table 4. Socioeconomic status of respondents

Socioeconomic status	Frequency	Percentage (%)
Low income	87	96.7
Middle income	3	3.3
Total	90	100.0

Most of the respondents came from low-income households, while only a small number of them belonged to middle-income households. This suggests that most respondents in the study were from low-income backgrounds. Out-of-school youths may be motivated to pursue education to achieve their personal and professional aspirations, particularly after experiencing difficulties in life. The findings were similar to the results of the study by Atilano *et al.* ^[14], education can equip individuals with the essential skills and knowledge needed to enhance job opportunities, boost self-confidence, and attain improved social and economic mobility.

5.2. Reading comprehension of ALS A&E

5.2.1. Ability to identify the main idea and key details

The ability to identify the main idea and key details is an essential aspect of reading comprehension. It involves understanding the central message of a text and the supporting information that helps to explain and develop it. **Table 5** shows the identification of the main idea and key details, with the mean, standard deviation (SD), and interpretation.

Table 5. Identifying the main idea and key details

Indicators	Mean	SD	Interpretation
Identify important information	3.40	0.73	Moderate
Identify the supporting details	3.38	0.68	Moderate
Summarize ideas	3.38	0.73	Moderate
State the main idea or topic sentence in a paragraph	3.27	0.78	Moderate
Distinguish between main ideas and supporting details	3.27	0.75	Moderate
Look for patterns in the details to analyze and organize information	3.21	0.81	Moderate
Look for the repetition of ideas	3.21	0.76	Moderate
Identify the central theme	3.13	0.78	Moderate
Composite mean	3.28	0.47	Moderate

The data shows that identifying important information, supporting details, and summarizing ideas had the highest mean. It suggests that learners have a good grasp of the main ideas and supporting details in the texts they read. The findings coincide with the study of Sukmawati ^[15], which entails incorporating the following elements to enhance the content: (1) Additional information to provide a thorough explanation of the main supporting details; (2) More examples to vividly illustrate the major supporting details; (3) Greater specificity

to make the material engaging and captivating for the audience.

The skills that had the lowest mean score were identifying the central theme of a text, as well as analyzing and organizing information by recognizing patterns and connections within the details. It involves understanding the main message or idea that the author is trying to convey. In correlation with the study by Malamon ^[16] for certain learners, acquiring skills related to comprehension can be more difficult. Understanding the connections between sentences within a text is crucial for comprehending the overall concept conveyed (higher-level skills).

5.2.2. Ability to sequence a passage into an ordinal series

Sequencing is an important skill in reading and writing, as it helps to clarify the relationships between ideas and to create a coherent and cohesive text. **Table 6** presents the sequence passage as an ordinal series.

Table 6. Sequencing passage into an ordinal series

Indicators	Mean	SD	Interpretation
Transition words and phrases	3.38	0.74	Moderate
Present ideas in a logical sequence based on their relationship	3.38	0.74	Moderate
Understand the structure of a text and how it is put together	3.37	0.74	Moderate
Organize information and ideas in their own writing	3.36	0.74	Moderate
Arrange ideas from macro to micro	3.31	0.73	Moderate
Organize events or ideas in the order in which they occur, from earliest to latest	3.29	0.66	Moderate
Present ideas in order of their importance, with the most important ideas presented first or last	3.22	0.68	Moderate
Sequence a passage into an ordinal series	3.19	0.69	Moderate
Composite mean	3.31	0.43	Moderate

The table shows transition words and phrases, present ideas in a logical sequence based on their relationship, and understanding the structure of a text and how it is put together had the highest mean score. The respondents recognized the value of using those items in reading comprehension skills. In line with the study of Lin ^[17], the enrichment reading program serves as a vital strategy to enhance reading comprehension, writing skills, textual analysis, and creativity skills, and to overcome challenges in reading.

The lowest mean scores were obtained in skills such as identifying the central theme of a text, analyzing information by recognizing patterns and connections, and organizing information based on patterns and connections. These findings indicate that readers may face challenges with these specific skills. It is consistent with the study of Carr and Harris upon investigating students' reading challenges ^[18], it was found that certain individuals face difficulties in comprehending texts due to their inability to identify the main idea or central theme.

5.2.3. Ability to answer direct recall questions

The ability to answer direct recall questions is a basic reading comprehension skill that involves retrieving specific information directly from the text. **Table 7** illustrates the responses to direct recall questions.

Table 7. Answering direct recall questions

Indicators	Mean	SD	Interpretation
Recall information immediately after it has been presented	3.36	0.75	Moderate
Understand and identify key concepts	3.33	0.70	Moderate
Notice the small and important details that make up a larger picture	3.26	0.86	Moderate
Ability to store new information	3.18	0.73	Moderate
Use memory techniques such as visualization, association, and repetition	3.12	0.73	Moderate
Utilize a short amount of time to answer questions	3.10	0.77	Moderate
Retrieve and organize information	3.10	0.72	Moderate
Re-access the retained events and information	3.09	0.66	Moderate
Composite mean	3.19	0.53	Moderate

The indicators that attained the highest mean scores are related to the ability to recall information right after it has been presented, understand and identify key concepts, and notice the small and important details that make up a larger picture. They had a strong capability to retain and recall information immediately after it was presented to them. In the study of Silor *et al.* ^[19], memory retention was highly sensitive to the pattern of trials used during training. Training distributed over time was superior to training presented with little or no rest intervals in generating long-term memories.

The table also presents that the average scores obtained for the abilities related to utilizing a short amount of time to answer questions and retrieve and organize information were low. These findings indicate that there may be difficulties for individuals in academic performance that require fast thinking, efficient memory retention and recall, and suitable time management skills. In support of Gipps' study ^[20], she discovered that the challenges that significantly impact reading comprehension included difficulties in grasping the central theme of the text, unfamiliarity with terminology, inadequate understanding of word functions, and insufficient knowledge of their appropriate application.

5.2.4. Ability to make inferences/predictions

This ability involves reasoning logically, considering all available information, and using this information to make informed decisions or judgments. **Table 8** presents information about the ability to make inferences or predictions.

Table 8. Making inferences/predictions

Indicators	Mean	SD	Interpretation
Draw logical conclusions based on information presented in a text	3.34	0.58	Moderate
Identify implicit ideas or themes in a text	3.30	0.63	Moderate
Evaluate information based on prior knowledge	3.23	0.69	Moderate
Reflect on and regulate one's own thinking processes	3.20	0.66	Moderate
Understand and interpret information	3.17	0.77	Moderate
Use clues from the text and what they know from previous experiences	3.14	0.77	Moderate
Make predictions about what might happen next in a text based on contextual clues	3.07	0.75	Moderate
Analyze information, evaluate evidence, and reasoning logically	3.01	0.71	Moderate
Composite mean	3.19	0.45	Moderate

The skills that received the highest mean scores in the data analysis were the ability to identify implicit ideas or themes within a text, draw logical conclusions based on the presented information, and evaluate the latest information based on prior knowledge. Those skills suggest that individuals with these abilities are in a favorable position to achieve success academically and professionally. Consistent with the study of Black ^[21], comprehension is described as a cognitive process where readers actively build understanding by engaging with the text, drawing upon their prior knowledge, past experiences, the information presented in the text itself, and the perspective they adopt in relation to the text.

It can be gleaned from the table that making predictions about what might happen next in a text based on contextual clues, analyzing information, evaluating evidence, and reasoning logically obtained a low mean score. These skills were essential for success in tasks such as critical analysis, problem-solving, decision-making, and effective communication. The study's findings were consistent with Holgado ^[22], who stated that reading comprehension refers to understanding the text that has been read, which is a complex skill that requires the use of various strategies to make inferences, conclude, and use critical thinking skills to analyze and evaluate information.

5.2.5. Ability to identify unfamiliar vocabulary

Table 9 shows information about the ability to identify unfamiliar vocabulary.

Table 9. Identifying unfamiliar vocabulary

Indicators	Mean	SD	Interpretation
Use resources such as dictionaries or glossaries to identify the meaning of unfamiliar words	3.29	0.69	Moderate
Recognize and understand a greater number of words	3.27	0.78	Moderate
Use contextual clues to identify the meaning of unfamiliar words	3.26	0.70	Moderate
Infer the meaning of the unknown words based on the surrounding context	3.23	0.72	Moderate
Identify the word or phrase that has the closest meaning or opposite meaning to the unknown word	3.21	0.74	Moderate
Identify meaning through word roots and affixes	3.18	0.79	Moderate
Identify the appropriate word or phrase that fits the pattern	3.18	0.84	Moderate
Use a graphic organizer to achieve a deeper understanding of specific vocabulary words	3.02	0.82	Moderate
Composite mean	3.21	0.52	Moderate

Based on the table, recognizing and understanding a greater number of words, using resources such as dictionaries or glossaries to identify the meaning of unfamiliar words, and using contextual clues to identify the meaning of unfamiliar words had the highest mean. This can lead to improved reading comprehension and academic or professional success. The study by Woolley found that difficulties in understanding text can be derived from the failures to know the meanings of words or concepts, capture factual information, infer about content, and form relationships among content presented in the text ^[23].

The use of a graphic organizer to achieve a deeper understanding of specific vocabulary words, identify meaning through word roots and affixes, and identify the appropriate word or phrase that fits the pattern were items that showed low scores. As a result, individuals may struggle to perform well on these tasks, leading to a lower score. According to Vaughn ^[24], graphic organizers also enhance reading comprehension by helping students to categorize information and to show the relationships among important concepts.

5.3. Significant difference in reading comprehension when grouped according to profile variables

This assessed the notable disparity in reading comprehension based on the categorization of individuals according to their profile variables. **Table 10** presents the findings on the differences in reading comprehension among individuals grouped by profile variables.

Table 10. Differences in reading comprehension among individuals grouped by profile variables

Factors	<i>P</i> value	Decision on H_0	Interpretation
Age			
Ability to identify the main idea and key details	0.428	Failed to reject	Not significant
Ability to sequence a passage into an ordinal series	0.894	Failed to reject	Not significant
Ability to answer direct recall questions	0.717	Failed to reject	Not significant
Ability to make inferences/predictions	0.223	Failed to reject	Not significant
Ability to identify unfamiliar vocabulary	0.035	Reject	Significant
	0.347	Failed to reject	Not significant
Sex			
Ability to identify the main idea and key details	0.346	Failed to reject	Not significant
Ability to sequence a passage into an ordinal series	0.495	Failed to reject	Not significant
Ability to answer direct recall questions	0.312	Failed to reject	Not significant
Ability to make inferences/predictions	0.412	Failed to reject	Not significant
Ability to identify unfamiliar vocabulary	0.221	Failed to reject	Not significant
	0.255	Failed to reject	Not significant
Socioeconomic status			
Ability to identify the main idea and key details	0.588	Failed to reject	Not significant
Ability to sequence a passage into an ordinal series	0.752	Failed to reject	Not significant
Ability to answer direct recall questions	0.542	Failed to reject	Not significant
Ability to make inferences/predictions	0.619	Failed to reject	Not significant
Ability to identify unfamiliar vocabulary	0.436	Failed to reject	Not significant
	0.805	Failed to reject	Not significant

The table shows no significant differences in reading comprehension based on age, sex, and socioeconomic status, indicating that the null hypothesis cannot be rejected for these factors. However, there was a significant difference in the ability to identify unfamiliar vocabulary among the profile variables. This suggests that age may be a significant predictor of one's ability to identify unfamiliar vocabulary in a reading passage. Additionally, the study by Esmacili suggested that age-related decreases in reading comprehension may result from declines in multiple component processes rather than a single process ^[25].

5.4. Issues and challenges in reading comprehension of ALS A&E learners

ALS A&E learners face multiple hurdles that hinder the development of their reading comprehension skills. Language barriers may exist as they may speak different languages or dialects. Another issue is cognitive

barriers, and factors such as eye issues, fatigue, time constraints, family or work responsibilities, age, and lack of support from family, peers, or teachers can hinder adult learners from improving their reading comprehension and reaching their educational objectives.

5.5. A proposed project to enhance the reading comprehension of ALS A&E learners

The proposal was grounded in the findings of assessments conducted to evaluate the reading comprehension skills and challenges faced by ALS A&E learners. Emphasizing areas with low mean scores, the proposal introduces the Reading Improvement and Skills Enhancement through Reading-Focused Sessions (RICE-FGS) project. This initiative aimed to enhance reading comprehension through a comprehensive set of activities.

6. Conclusion

Based on the findings, the following conclusions have been drawn:

- (1) The survey respondents were predominantly teenagers and young adults, with very few individuals from the middle-aged adult groups. There were more female respondents than male respondents, and most respondents came from low-income households, with only a small number belonging to middle-income households.
- (2) The respondents moderately responded that there is still a need to develop reading comprehension for ALS learners.
- (3) Reading comprehension was irrelevantly influenced by the age, sex, and socioeconomic status of ALS learners.
- (4) There were some problems encountered by ALS learners in developing reading comprehension skills.
- (5) A reading-focused session was needed to address improvement in the comprehension skills of ALS learners.

7. Recommendations

Based on the different findings and conclusions of this study, the following are the recommendations:

- (1) Reading-focused sessions for the development of reading comprehension skills must be done to address the learning or reading needs of ALS learners.
- (2) There is a need to consider the use of the proposed RICE-FGS project to help learners improve their reading comprehension skills.
- (3) Research may be conducted on the RICE-FGS project in Rosario West District ALS Center.

Disclosure statement

The author declares no conflict of interest.

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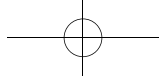
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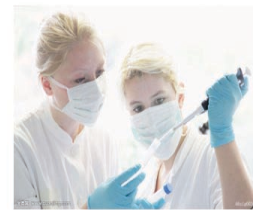
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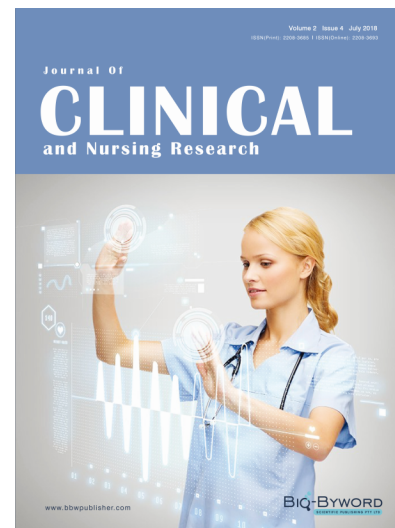
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