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Action Research Series

Message from Director

Welcome to the volume 2 of the action research series of Phnom Penh Teacher Education College. It is my great pleasure and honor to celebrate the launch of the second volume of the research publication at PTEC. Our action research series, which constitutes the first attempt to promote a sharing of knowledge, mainly focuses on teaching and learning in different disciplines as a means to share knowledge with student teachers and teacher educators not only in PTEC but also in other educational institutions.

As a teacher education institution with the vision to become the leading teacher education institution in the 21st century, PTEC aims to promote a research culture to contribute to the quality improvement of teaching and learning within the institution, which is one of our core missions besides the provision of quality teacher education and community service. Notably, raising the quality and relevance of teaching and learning through action research has become one of our priorities to ensure quality education for our student teachers. This is also certainly in line with the education reform of the Ministry of Education, Youth and Sport, whereby research has been emphasized in educational institutions to ensure quality education.

I would like to take this opportunity to congratulate the authors on their achievements in the second publication of our action research series. I would like to express my appreciation to the active cooperation and technical support from the Japanese professors and coordinators in the JICA project of Establishing Foundations of Teacher Education College (E-TEC). My sincere thanks will go to the authors, PTEC management team, and Department of Educational Research and Library to make the publication of this series happen.

Last but not least, PTEC is committed to an annual publication of the action research series so that an academic community can be initially created and sustainably developed, as a means to contribute to the quality improvement of education in Cambodia.

Set Seng, Ph.D.
Director
Phnom Penh Teacher Education College

Contents

Exploring the Effects of Augmented Reality on the Teaching and Learning Process: A Case Study of Biology Lessons

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Abstract

This research explored the effects of using Augmented Reality (AR) on teaching and learning by comparing the significant difference between the test score of students from three classes at Phnom Penh Teacher Education College. The classes were taught and tested two times using regular teaching methods and the Augmented Reality content accordingly. The collected data from the tests, questionnaires and observations were analyzed using two tails of Paired-sample t-test to compare the significance of different scores of the two groups by checking the value of p (T <= t) two tails in the confidence interval of 95%. The results demonstrated the positive impacts of using AR on teaching and learning Biology. The knowledge acquisition of student teachers was improved, and they also expressed their interests and high-level satisfaction of using AR. The study also showed that the use of AR in Biology classes is an affordable way of information and communications technology integration and helps student teachers gain meaningful learning of the content subject of Biology. On this basis, the concept of Augmented Reality should be taken into account when designing instructional material for education in the 21st century.

Keywords: Augmented Reality; mobile technology; biology; teacher education

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1. Introduction

According to the Education Strategic Plan 2019-2023 published by the Ministry of Education, Youth and Sport (MoEYS, 2019)Teacher Training Reform at Teacher Education Institutions and Promotion of Digital Education are the two out of 10 main points under the Education Strategy Reforms in the strategic plan. The first priority to achieve under the Promotion of Digital Education is to "integrate ICT (information and communications technology) into a tool for teaching and learning to share knowledge across the whole education sector and to equip students with knowledge and skills on ICT to transition into 21st century employment" (MoEYS, 2019, p. 60). As a result, Phnom Penh and Battambang Teacher Education Colleges (PTEC & BTEC) are transformed from Regional Teacher Training Colleges (MoEYS, 2019). In addition to the Promotion of Digital Education and to strengthen the performance of all education programmes, MoEYS also highlights the importance of using ICT tools and e-resources to improve the efficiency and effectiveness of teaching and learning in the teacher training center, schools and other educational institutions (MoEYS, 2019). This will also encourage teacher educators at Teacher Education Colleges (TECs) to start using different and relevant technology and ICT tools including software and hardware within classrooms, so students can understand the benefits of these technologies and tools as well as applying and demonstrating the usages of these technologies and tools in their teaching and learning environment.

Besides the education strategy, there are still several factors that affect the performance of the promotion of digital education. Findings in a study conducted by Richardson (2011) revealed that the biggest challenges to adopting the use of new technologies in Cambodia were hardware incompatibility; complexity; language barriers; the lack of electricity, computers, internet access, and of practice for trainees; and the inability to understand the advantages of these technologies. Research also shows that simply putting computers into schools is not enough to impact student learning (Wagner et al., 2005). Another study by Seng et al. (2014) showed similar barriers, that is, "although the teachers have positive perception and belief towards ICT-integrated education, their usage of ICT in the classroom is notably limited.

With the support of technology, teachers keep trying to explore new ways to provide their students with meaningful learning. As mobile technology emerges, teachers need opportunities to use mobile technology for personal learning and preparation of teaching materials and to share resources and practical case studies (Kukulska-Hulme, 2010). Augmented Reality provides interactive content as well as what teachers require for digital education that will inevitably replace regular teaching tools. As mentioned by Tsinakos and Ally (2013), a

whole new set of pedagogical theories in instructional design guidelines and teaching and learning practices will emerge in the near future, pointing to more skilled and effective tutors and students who will use Augmented Reality in the same way that overhead projectors are currently used in the classrooms.

Augmented Reality will not replace the textbook and regular ways of teaching student teachers, but it is designed for blended education. AR creates a 3D animated environment where student teachers can interact and learn the movement of the subject they learn.

According to a report entitled Digital 2020: Cambodia, Cambodia has 21.24 million mobile connections, which is equal to 128% of the total population. In addition, the scoring of the affordability of devices and services is 55.24 and the consumer readiness is 56.97 out of the maximum 100 (Kemp, 2020). Based on the report, the significant growth of smartphone usage and the advancement of mobile technology in Cambodia enabled people to usually use their smartphones as part of their work and education.

In order to thrive in the twenty-first century, all levels within institutions of higher education need to accept and leverage digital and mobile technologies to transform the way instructors engage with their students and how they provide innovative educational experiences and deliver content (Kraglund-Gauthier, 2019).

Hun et al. (2021) found that most teacher educators of both PTEC and BTEC perceived that the use of ICT in teaching and learning process is very important to enhance the quality of their teaching and learning process. Interestingly, teacher educators seemed to have positive attitudes. It was also found that teacher educators had strong intentions to learn more about computer skills as well as attend training courses so that they are able to integrate into the teaching and learning process.

Digital education will be a big investment for educational institutions. This is where mobile technology in education comes in and makes it easily accessible for learners. As mobile technologies emerge, teachers have to keep up with the changes so that they can take advantage of the power of the technology already used for informal learning to design and deliver education (Ally et al., 2014).

As research conducted by the Educause Center for Applied Research on mobile technologies in higher education has revealed, students are driving the adoption of mobile devices such as smartphones and tablet computers, with 67% of the surveyed students believing that their mobile devices were important to their academic success and used them for academic purposes (Gikas & Grant, 2013).

Against this background, the primary purposes of this research are as follows:

1. To find out how Augmented Reality (AR) technology can be used to improve the teaching and learning of Biology lessons.

2. To compare the effectiveness of teaching and learning with and without AR technology.

Hypothesis

The test score of student teachers taught by using Augmented Reality is better than that of student teachers taught by using the regular approach.

2. Methodology

2.1. Pedagogical Design

The Augmented Reality content that was carried out in the lesson for this research was the Integumentary System from the Augmented Reality search result of Google. The Biology teacher was requested to teach the class two times. For the first time, she taught the class using the regular teaching method that uses only the textbook for students to read and investigate the images of the lesson, and then, they answer the questions. For the second time, with the support from an ICT teacher educator, she taught her students the same lesson with Augmented Reality content integration to support the knowledge and content delivery.

2.2. Research Participants

The class was randomly selected from the three classes of lower secondary education student teachers (12+4, Year 2) during the second semester of the academic year (MoEYS, 2015) as the participants of the research. The class consists of a Biology teacher educator and 25 preservice student teachers. Firstly, the class was taught and learnt in the regular way and then tested for the first score and secondly, the same class was taught and learnt with the support of 3D and Augmented Reality contents which can be found for free in Google Search and the biodigital.com website.

2.3. Data Collection Instruments

Two tests were conducted as data collection instruments: the test for the regular teaching method (Appendix A) and a questionnaire (Appendix B) after the application of the Augmented Reality method.

Using Google Forms, the tests include eight multiple choice questions and two open questions. The multiple-choice answers were scored automatically by Google Forms and the open ones were corrected by the Biology teacher educator. The questionnaires consist of two sections. The first section focuses on their genders, the devices they own, and some ICT tools that have been introduced in their classes. Their level of satisfaction of using Augmented Reality that reflected the lesson were included in the second section.

2.4. Data Collection Procedure

Before starting on the research, researchers had conducted a meeting with the Biology teacher educator for an agreement of doing the research with her class and to choose which lesson to teach for the data collection. After the meeting, we agreed to choose one part of five from lesson 2 entitled "Spiritual Organ", "Integumentary System". Then, the teacher educator prepared the test shown in Appendix A, and she started teaching her class on the lesson chosen as normal. A test was then placed for her preservice student teachers with the test prepared. Next, the researchers met up with her again to discuss the re-teaching of the same lesson using the new teaching approach with support from researchers. After the new method was applied, we placed the same test for the preservice student teachers and got the score the same way the teacher educator did in round one.

2.5. Data Analysis

The data collected was analyzed in a quantitative way, and some built-in functions of Microsoft Excel also became a required tool in this research to find the compare means with the two tails of Paired-sample T test analysis in order to compare the significantly different scores of the two groups by checking the value of p ($T <= t$) two tails in the confidence interval of 95%.

3. Findings

After the implementation of teaching by integrating AR technology, test scores were evaluated and compared by using independent samples t-test. As seen in Table 1, there was a statistically significant difference between the experimental and control group scores ($p < 0.05$). The main aim of the present study was to investigate the effect of integrating AR technology in teaching the Biology subject in specialized science classes. The statistical results showed that using AR technology to help improve biology subjects in the experimental group was more effective on students' achievement than regular teaching methods used in the control group.

Table 1

The results of the t-test comparison on pre- and post-test scores of both groups

Test	Group	N	Mean	df	S.D	t	P
test	Regular Method	25	73.20	24	9.23	- 4.18	0.00
	With the AR support	25	85.92	10.76			

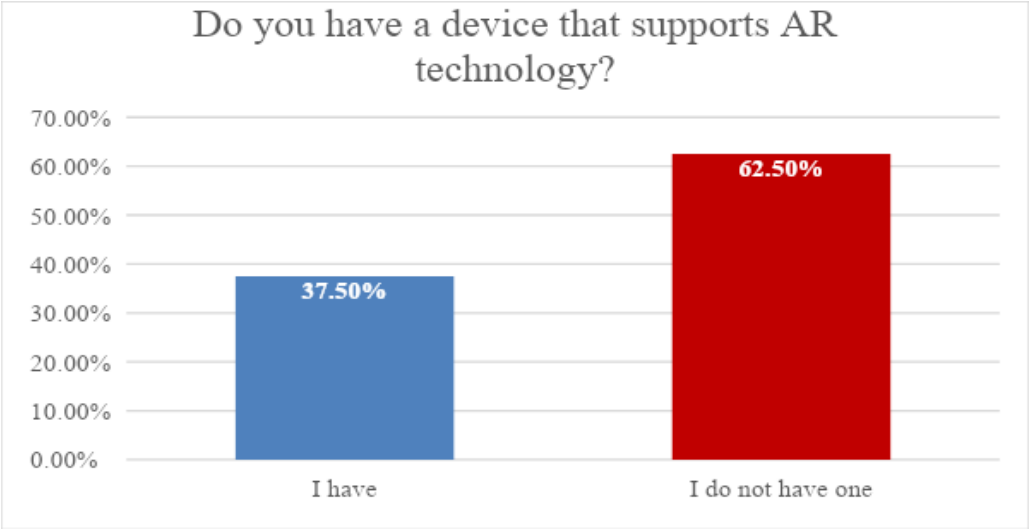
Satisfaction of Using Augmented Reality to Reflect on Lessons

When asked about their perceptions on using Augmented Reality to reflect on today's lesson, the experimental group has answered the following:

When the question "Do you have a device that supports AR technology?" was raised, 37.50% of student teachers said that they have, and 62.50% don't (see Figure 1).

Figure 1

The answer of "Do you have a device that supports AR technology?"



When the question "Do you think AR technology should be incorporated into your lesson plan or teaching process?" was raised, a total of 37.50% of student teachers said that they totally agreed, and some 62.50% disagreed (Figure 2).

Figure 2

The answer of "Do you think AR technology should be incorporated into your lesson plan or teaching process?"

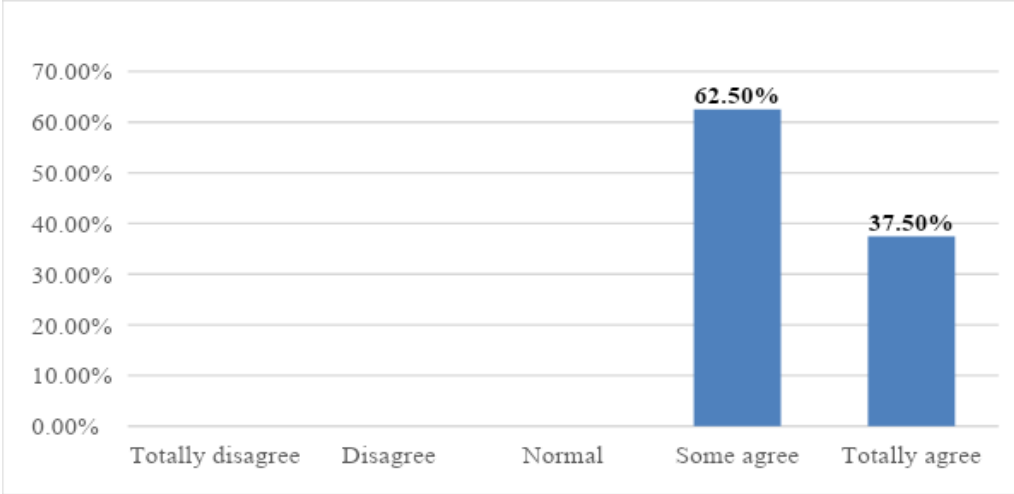


Figure 3

The answer of "I can get help about using AR technology from friends and the internet."

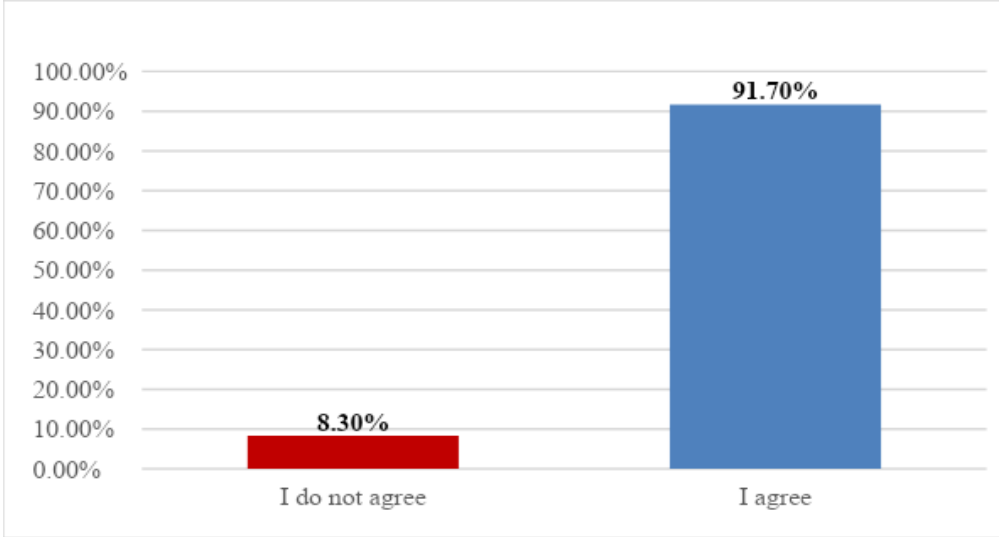


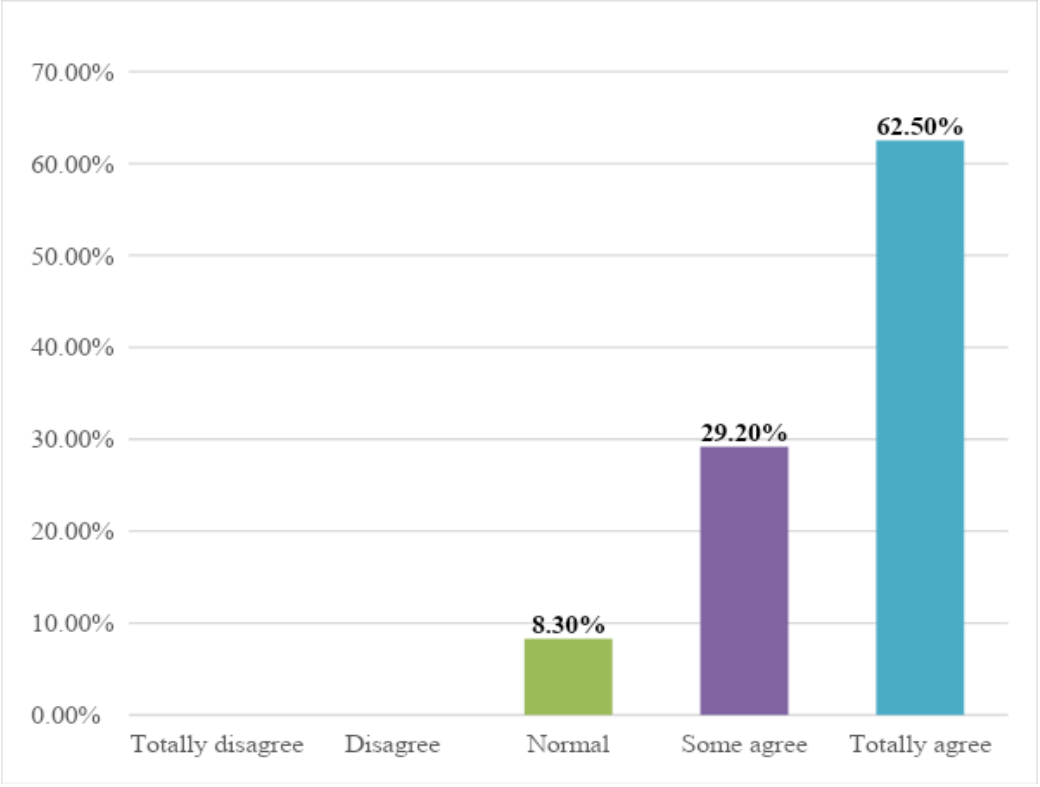
Figure 3 shows what the respondents thought to the given question. To the statement "I can learn more about using AR technology from friends and the

internet", a total of 91.70% of student teachers agreed, and only 8.30% disagreed.

When asked "Can using AR technology help me gain information and in-depth knowledge of today's lesson content?", a total of 62.50% of student teachers answered "totally agree", 29.20% answered "some agree", and 8.30% answered "normal" (Figure 4).

Figure 4

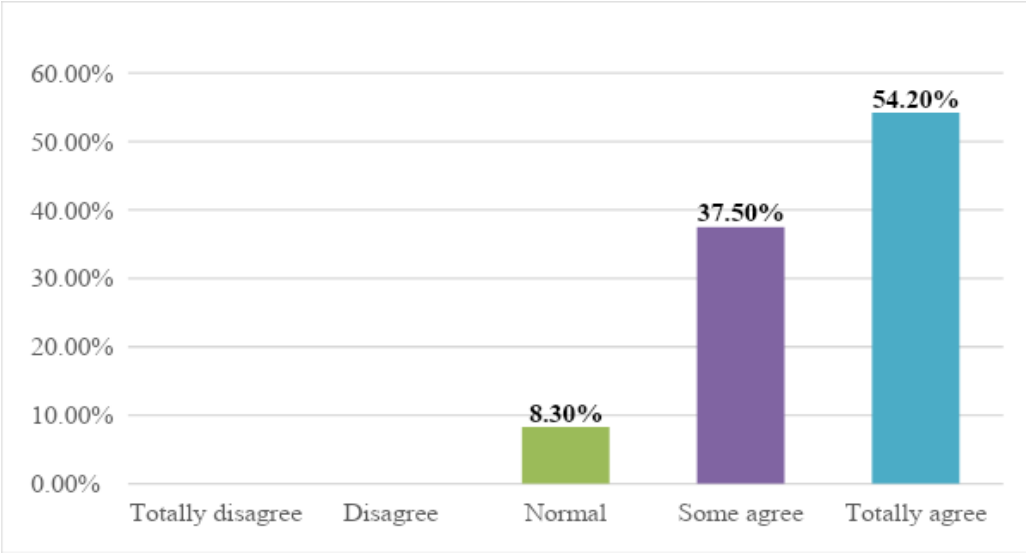
The answer of "Using AR technology can help me gain information and in-depth knowledge of today's lesson content?"



When the statement "Using AR can help me get quick information and knowledge about today's lesson content" was raised, 54.20% of student teachers answered "totally agree", 37.50% answered "some agree", and 8.30% answered "normal" (Figure 5).

Figure 5

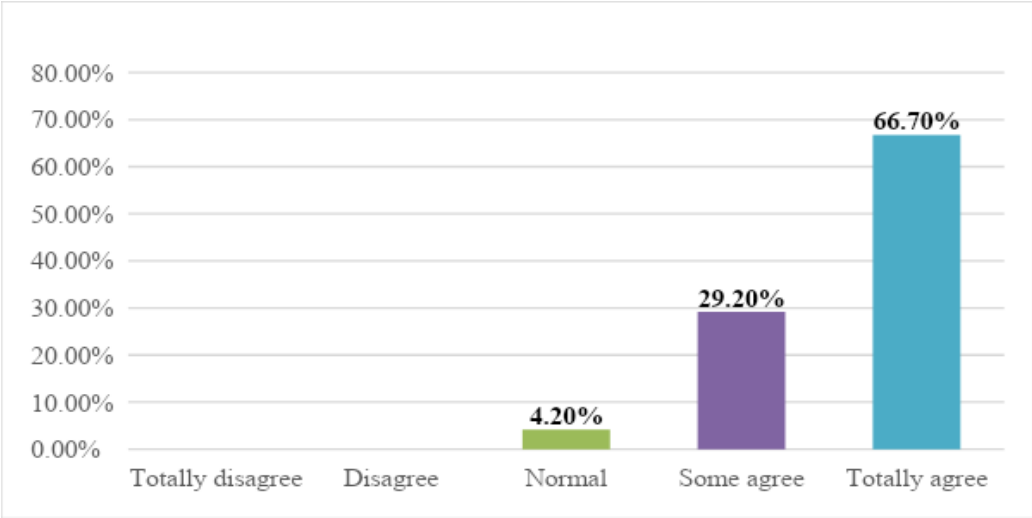
The answer of "Using AR can help me get quick information and knowledge about today's lesson content."



When the statement "Using AR technology makes me more interested in learning" was raised, 66.70% of student teachers answered "totally agree", 29.20% answered "some agree", and 4,20% answered "normal" (Figure 6).

Figure 6

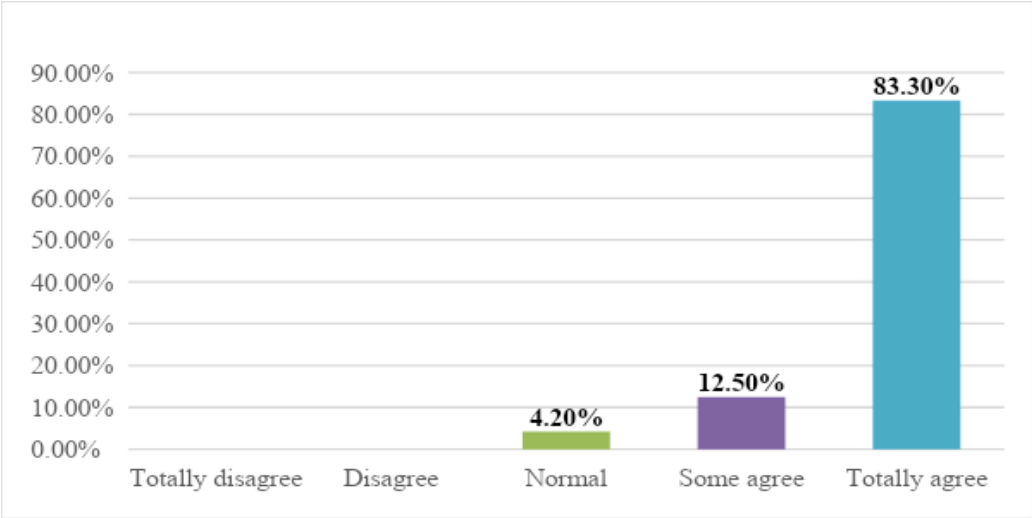
The answer of "Using AR technology makes me more interested in learning."



When the question "Will you introduce AR technology to other classmates?" was raised, 83.30% of student teachers answered "totally agree", 12.50% answered "some agree", and 4,20% "normal" (Figure 7).

Figure 7

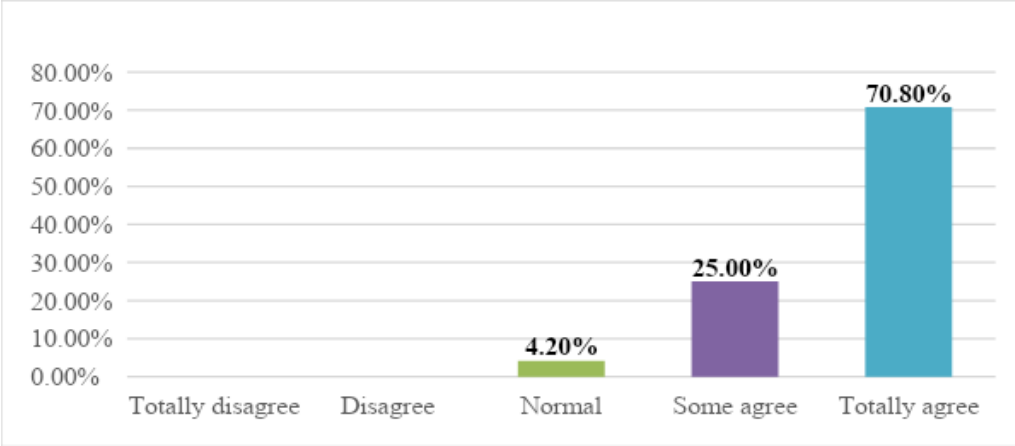
The answer of "Will you introduce AR technology to other classmates?"



When the statement "AR technology is really desirable to use." was raised, 70.80% of student teachers answered "totally agree", 25.00% answered "some agree", and 4.20% answered "normal" (Figure 8).

Figure 8

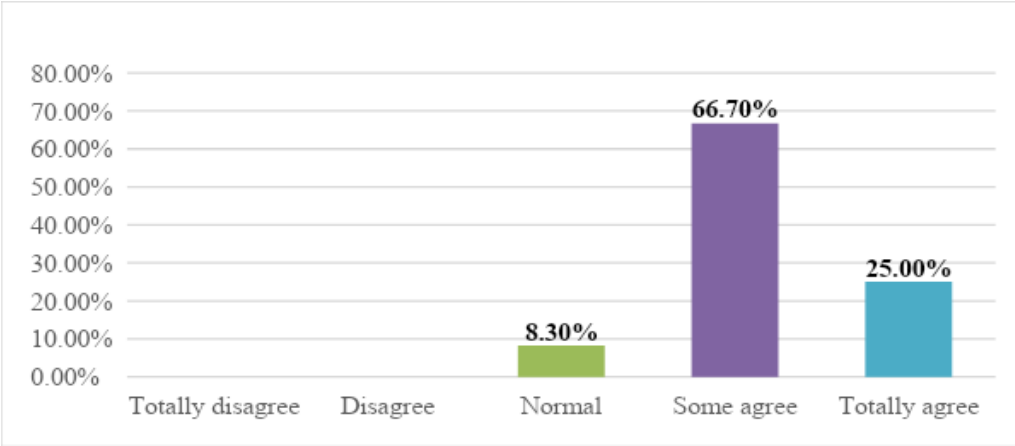
The answer of "AR technology is really desirable to use."



When the statement "I have high confidence with experience in using AR technology." was raised, 25.00% of student teachers answered "totally agree", 66.70% answered "some agree", and 8.30% answered "normal" (Figure 9).

Figure 9

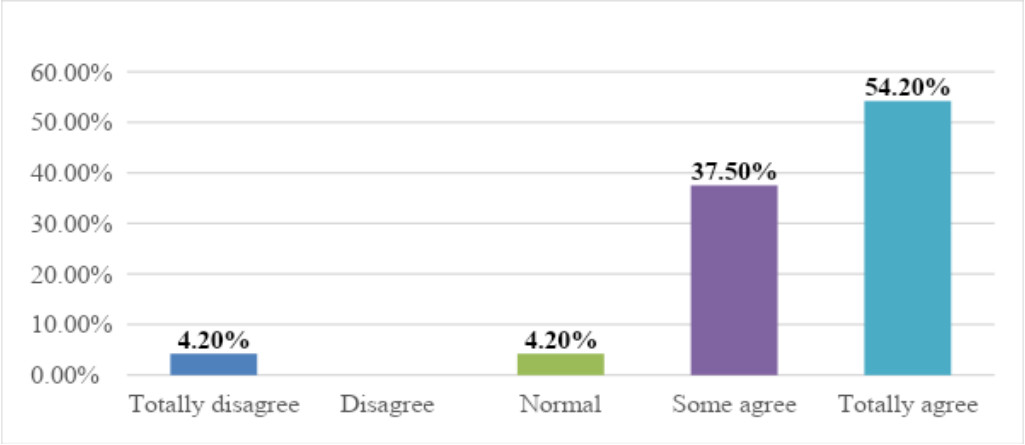
The answer of "I have high confidence with experience in using AR technology"



When the statement "I think AR technology content is reliable" was raised, 54.20% of student teachers answered "totally agree", 37.50% answered "some agree", 4.20% answered "normal", 0.00 answered "disagree", and 4.20% answered "totally disagree" (Figure 10).

Figure 10

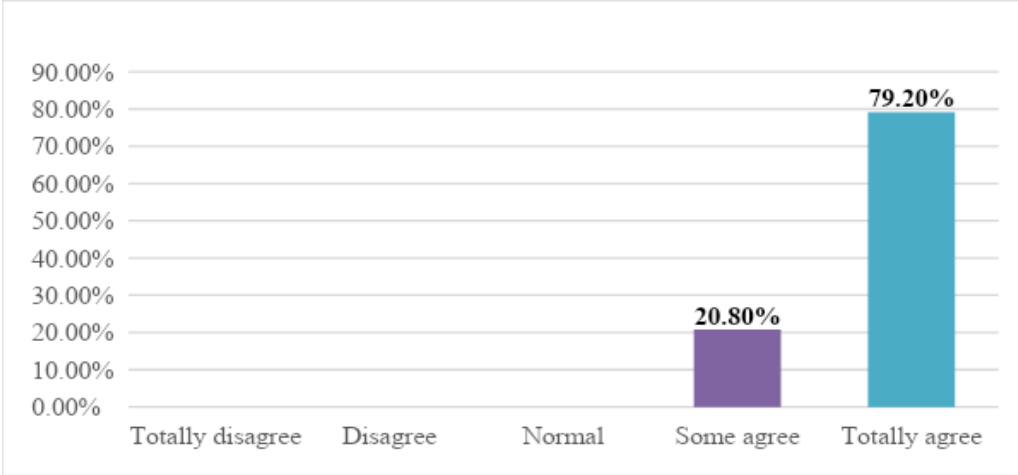
The answer of "I think AR technology content is reliable."



When the statement "I think AR technology content has many benefits" was raised, 79.20% of student teachers answered "totally agree", and 20.80% answered "normal" (Figure 11).

Figure 11

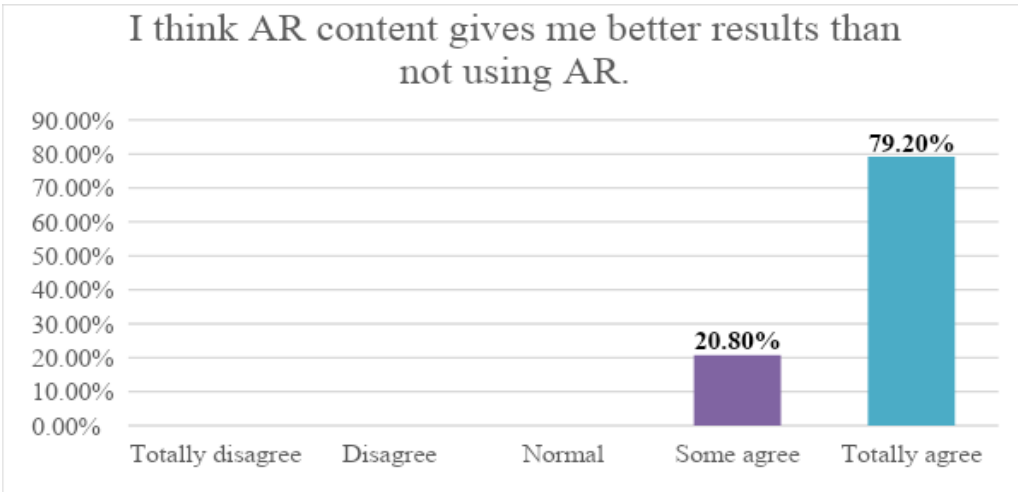
The answer of "I think AR technology content has many benefits."



When a statement "I think AR content gives me better results than not using AR" was raised, 79.20% of student teachers answered "totally agree", and 20.80% answered "normal" (Figure 12).

Figure 12

The answer of "I think AR content gives me better results than not using AR."

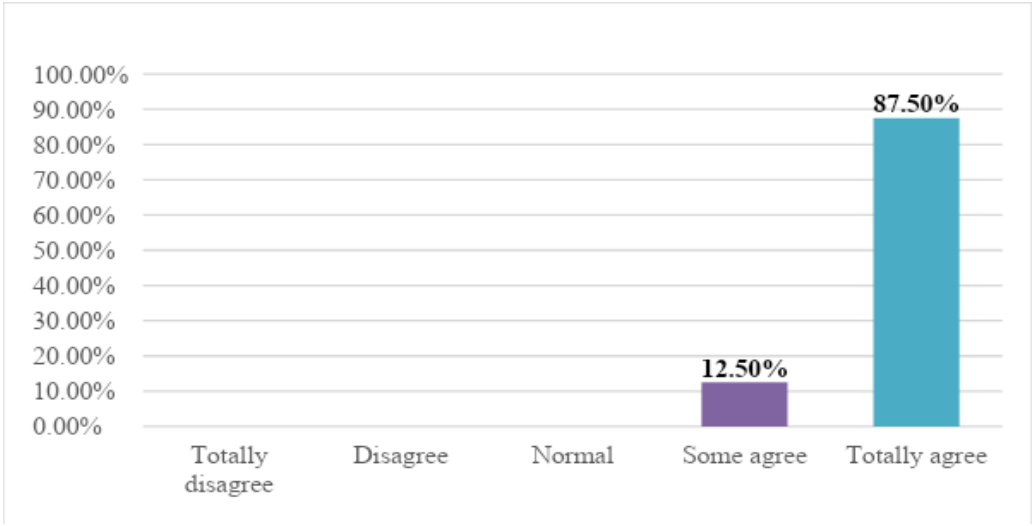


When a statement "I plan to continue using AR for my studies" was raised, 87.50% of student teachers answered "totally agree", and 12.50% answered

"some agree" (Figure 13).

Figure 13

The answer of "I plan to continue using AR for my studies."



During the observation, we found that Augmented Reality gained much student interest, so student teachers paid a lot of attention to class, and their interaction with the content and their teacher educator were also high.

4. Discussion

In this study, the use of Augmented Reality in biology class provided a new learning experience and improved the learning outcome. In a direct comparison, the experimental group showed better performance. Although the findings showed good results toward the use of Augmented Reality in class, the percentage of students who own mobile devices that support Augmented Reality is still considerably limited. Augmented Reality has been known for many years, but student teachers at PTEC (or the participants) have not been aware of its existence.

While the education institute lacks computers for practice (coupled with the fact that many student teachers in PTEC own a smartphone), Augmented Reality is considered to be the mandatory tool for ICT integration. As Augmented Reality works only on smartphones but not computers, it offers the possibility for student teachers to interact with the content knowledge anywhere and anytime.

During the COVID-19 pandemic, all kinds of education in Cambodia are

offered online. Thus, Augmented Reality contents are the best for students' interaction with the lesson because the school labs are not accessible and not all of the items could be found in their houses or the area which they live in.

Augmented Reality will not replace the textbooks or regular ways of teaching preservice student teachers, but it is designed for blended education. It supports the content in the textbook by providing interactive content which is an extra benefit to expand the knowledge capacity and to help strive for a deeper form of understanding. Augmented Reality creates a 3D animated environment where student teachers can interact and learn the movement of the subject they learn, and there is a significant difference between pre-service student teachers that were taught with regular teaching methods and those taught with the support of Augmented Reality technology.

5. Conclusion

This study was conducted to explore the effect of using Augmented Reality on teaching and learning for Biology classes. Even though most of the teacher educators agree that ICT integration into the subject will contribute significantly to the quality of teaching and learning, there are still some limitations in the practice. However, the overall impression in the questionnaire showed a high level of satisfaction. Based on the questionnaire and the classroom observation, the use of mobile devices during class is considerably an affordable way for student teachers in PTEC to increase their overall engagement and to expose themselves to more opportunities within their subject specialization in order to extend their understanding.

The overall results of the study demonstrated the positive trend towards the integration of ICT tools in the classroom, and it is recommended that teacher educators continue integrating the affordable ICT tools so that the student teachers will benefit from it for their meaningful learning and for the future of Cambodia's human resource in the 21st century.

This paper was written based on data from a single quasi-experimental design. The results apparently supported the use of ICT to improve teaching and student test score. However, the lack of purely experimental design, the interpretation of the result must be read with care. It is therefore recommended that similar method should be conducted by radom selection and random assignment of the participants to the experimental group and control group.

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Appendix A

Test

1. សត្វពហុកោសិកាទាំងអស់មានស្បែក។
   ចំពោះមនុស្សស្បែកមាន..... ។
   ក. ពីរស្រទាប់
   ខ. បីស្រទាប់
   គ. បួនស្រទាប់
   ឃ. ប្រាំស្រទាប់

2. ក្នុងស្រទាប់អេពីឌែមមានកោសិកាម៉្យាងធ្វើឱ្យស្បែកមានការប្តូរពណ៌គឺ.....។
   ក. មេឡានីន
   ខ. មេឡាណូស៊ីត
   គ. មេឡាតូនីន
   ឃ. មេឡាតូស៊ីត

3. ស្បែកជាស្រទាប់ការពាររបស់សារពាង្គកាយ។
   ក្នុងស្បែកមាន.....ជារបាំងទប់ទល់នឹងជំងឺដែលបង្កដោយបាក់តេរី និងផ្សិត។
   ក. ខ្លាញ់
   ខ. ញើស
   គ. រោម
   ឃ. សេបូម

4. ក្នុងស្បែកក្រពេញញើសមាននាទីសំខាន់.....។
   ក. ការពារសារពាង្គកាយ
   ខ. តម្រូវសីតុណ្ហភាព
   គ. ធ្វើឱ្យស្បែកមានសំណើម
   ឃ. ធ្វើឱ្យស្បែករលោង

5. ស្រទាប់ក្រៅបង្គស់របស់ស្បែកជា.....A..... កើតពី.....B.....។
   ក. A: អេពីឌែម B: កោសិកាសន្ធាន
   ខ. A: ឌែម B: កោសិកាសន្ធាន
   គ. A: អេពីឌែម B: កោសិកាអេពីតេល្យូម
   ឃ. A: អេពីឌែម B: កោសិកាអេពីតេល្យូមងាប់

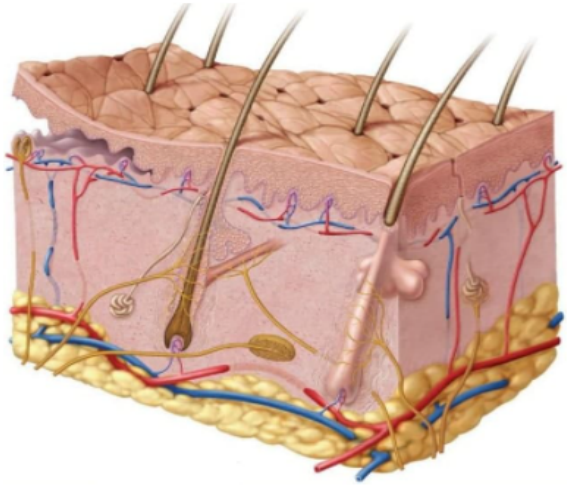
6. ឌែមជាស្រទាប់មួយរបស់ស្បែកកើតឡើងពី .....A... និង ...B....។
   ក. A: ជាលិកាសន្ធាន B: កេរ៉ាទីន
   ខ. A: កូឡាសែន B: កោសិកាសន្ធាន
   គ. A: កោសិកាអេពីតេល្យូម B: កោសិកាសន្ធាន
   ឃ. A: ជាលិកាសន្ធាន B: កូឡាសែន

7. នៅក្នុងស្បែកមានក្រពេញជាច្រើនមាននាទីផ្សេងៗគ្នា។
   ក្រពេញម្យ៉ាងបញ្ចេញញើសនិងមានក្លិនមិនល្អគឺ.....។
   ក. ក្រពេញសេបូម
   ខ. ក្រពេញញើស
   គ. ក្រពេញអាប៉ូគ្រីន
   ឃ. ក្រពេញសេបូមនិងក្រពេញញើស

8. ធ្នូលវិញ្ញាណក្នុងស្រទាប់ស្បែករួសនឹងសីតុណ្ហភាពស្ថិតនៅ.....។
   ក. គល់រោម
   ខ. ជាប់ជាលិកាខ្លាញ់
   គ. ស្រទាប់អេពីឌែម
   ឃ. ស្រទាប់ឌែម

9. តើស្បែកមាននាទីយ៉ាងដូចម្តេចចំពោះសារពាង្គកាយ?
   .....
   .....

10. សង្កេតមើលរូបភាពខាងក្រោម៖ ក). តើរូបភាពបង្ហាញពីអ្វី? ខ). ចូរពណ៌នាពីរូបភាពនេះឱ្យបានក្បោះក្បាយ។



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Appendix B

Questionnaire

I. Part 1: Personal information

1. Sex:
    a. Male
    b. Female

2. Personal materials for my teaching and learning. (You can select more than one)
    a. Desktop
    b. Laptop
    c. Smart phone
    d. Tablet

3. The mobile phone brands I use are:
    a. Apple iPhone
    b. Samsung
    c. Vivo
    d. Oppo
    e. Huawei
    f. Xiaomi
    g. OnePlus

II. Part 2: About Augmented Reality (AR) technology

4. The technology tools that I think are important for the teaching and learning process are: (You can choose more than one)
    a. Computer
    b. Smartphone
    c. Tablet
    d. Internet
    e. Mobile Apps
    f. LCD projector

5. The content sources that I think are important for my learning process are: (You can choose more than one)
    a. Website
    b. E-books
    c. YouTube
    d. Podcast

6. Technology that I have seen, known or used through teachers' demonstrations. Example: It could be an app, it could be a website, it could be a device, and so on. (You can select more than one)
    a. Kahoot
    b. Padlet
    c. Wikispace
    d. Google Classroom
    e. Moodle
    f. Google Forms
    g. Zoom
    h. Anki
    i. Geogebra
    j. Mathlab
    k. Virtual Reality
    l. Augmented Reality

7. How often do you use Google Image Search?
    a. Rarely
    b. Occasionally
    c. Normally
    d. Frequently
    e. Regularly

8. Have you ever known or used Augmented Reality (AR) before?
    a. I used to.
    b. I never use it.

    If ever, answer 5:

9. How often do you use AR technology?
    a. Rarely
    b. Occasionally
    c. Normally
    d. Frequently
    e. Regularly

10. The use of AR technology has helped me to understand the lessons of Biology.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

11. Using AR technology makes me love learning the subject of Biology.

a. Totally disagree
b. Disagree
c. Neutral
d. Some agree
e. Totally agree

12. I think AR technology is easy to use for my subject of Biology.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

13. I feel like experimenting with real objects when I use AR in biology lessons.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

14. I feel scared when I use AR technology.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

15. I rank my knowledge of AR technology: (Scale from 1 to 5)
    a. 1- I do not know at all
    b. 5- Proficiency

Perceptions of using Augmented Reality and reflection on today's lesson

16. Do you have a device that supports AR technology?
    a. I have.
    b. I do not have one.

17. Do you think AR technology should be incorporated into your lesson plan or teaching process?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree

e. Totally agree

18. What tools are suitable for student teachers to use effectively in learning through AR technology?
    a. Computer
    b. Smart phone
    c. Tablet

19. I use AR technology only when there is a teacher presentation.
    a. I agree.
    b. I do not agree.

20. I can get help about using AR technology from friends and the internet.
    a. I agree.
    b. I do not agree.

21. Using AR technology can help me gain information and in-depth knowledge of today's lesson content?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

22. Using AR can help me get quick information and knowledge about today's lesson content?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

23. Using AR technology makes me more interested in learning?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

24. Will you introduce AR technology to other classmates?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

25. How well do you think you can use AR technology?
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

26. AR technology is really desirable to use
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

27. I have high confidence with experience in using AR technology
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

28. I am confused about the use of AR technology
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

29. I think I use AR technology incorrectly
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

30. I think AR technology content is reliable
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

31. I think AR technology content has many benefits
    a. Totally disagree

b. Disagree
c. Neutral
d. Some agree
e. Totally agree

32. I think AR content gives me better results than not using AR.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

33. I plan to continue using AR for my studies.
    a. Totally disagree
    b. Disagree
    c. Neutral
    d. Some agree
    e. Totally agree

The Influences of Reflective Conversation on Teaching Practicum. A Case Study of Mathematics Student Teachers at Phnom Penh Teacher Education College

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Abstract

In pre-service training programs, student teachers receive training on the subject matter knowledge and pedagogical content knowledge. To practice what they have learned, they have to conduct teaching practicum in the real classroom. During the practicum, student teachers are also involved in reflective conversation with their supervisor to discuss their challenges and how to improve lesson plans and instructional methods. This study aims to explore the influences of reflective conversation on student teachers' lesson preparation and teaching implementation. The study employed a qualitative case study design where the data was collected based on a review of lesson plans and teaching observation during a 10-week teaching practicum. Two student teachers were selected for this study using a convenience sampling method. The results showed that student teachers understood well about the learning objective, content knowledge, the consistency of learning objectives, students' activities, and learning assessment. However, the choices of instructional methods and how to enhance students' interaction are still major challenges for them. This study suggests that further research should investigate in detail student teachers' difficulties and mentors' feedback to find out factors that influence student teachers in preparing lesson plans and implementing the lessons.

Keywords: Reflective conversation; teaching practicum; student teachers; Cambodia

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1. Introduction

Despite the efforts of the Ministry of Education, Youth and Sport (MoEYS, 2016) to improve the quality of student teachers and teachers so far, research has shown that the quality of teacher education in Cambodia has barely improved (Tandon & Fukao, 2015). Pre-service teacher programs are not adequate for student teachers to master the content knowledge and pedagogical content knowledge (Phin, 2014; Tandon & Fukao, 2015). Williams et al., (2016) have argued that student teachers in Cambodia receive subject content knowledge rather than pedagogical content knowledge in pre-service training.

Under the Teacher Policy Action Plan, teacher education in Cambodia has been reformed by upgrading the basic teacher education qualification from 12+2 pedagogical training to a bachelor's degree in education (12+4). Among the six Regional Teacher Training Centers (RTTCs) in Cambodia, Phnom Penh and Battambang RTTCs have been upgraded to Phnom Penh Teacher Education College (PTEC) and Battambang Teacher Education College (BTEC) respectively to implement the new reform of teacher education as a pilot program.

PTEC has provided pre-service training to student teachers for 4 years. The first batch of the 12+4 program enrolled in 2018 has reached the final year of the pre-service training. During the 4-year training, the student teachers have learned not only about the subject content but also theories of teaching, lesson plan preparation, and teaching practicum. They also do peer teaching and rehearsal to identify the points they need to improve by discussing and reflecting with their peers and lecturers. The student teachers are able to practice their teaching while their peers who have background knowledge in teaching and understand classroom dynamics act as the students. This practice poses few challenges compared to a real classroom setting.

In the teaching practicum, however, there are many challenges. During the COVID-19 pandemic, some students could not attend their classes; therefore, flexibility in instruction was needed. Nonetheless, the instruction was mostly in the form of online classes (i.e., some students were in classes while others were online). Face-to-face teaching in the class seems to be more comfortable than instructing the class from a distance because both teachers and students can see, control, and communicate with each other easily. In addition, it is complicated for the teacher to organize the class in the form of online classes. It may pose any major problem for classroom management, but it challenges them to prepare the lessons that can be applied effectively with online classes and how they implement the lesson in real practice. In order to assist them in overcoming these challenges, reflective conversation was introduced to identify points for improvement. The lesson plans and video recordings of their teaching were then

selected to be analyzed and commented on by their peers and lecturers.

To explore the influences of reflective conversation, this study seeks to answer the following research questions:

1. How did student teachers at Phnom Penh Teacher Education College plan their lessons for teaching practicum?
2. How did they implement the lessons?
3. What are the influences of reflective conversation on their lesson preparation and teaching implementation?

1.1. Introduction to the Teaching Practicum

Teacher quality is the first priority in improving the quality of education. Improving the quality of teachers begins with the improvement of the quality of pre-service training programs in teacher training institutions. In the pre-service training, student teachers do not learn only subject content and teaching methods, but they also apply what they have learned in real classes.

Teaching practicum is a central component in any teacher education program (Jusoh, 2011). It is the time for student teachers to experiment with obtained knowledge and put them into practice. Moreover, it provides them with authentic and hands-on experiences (Kim, 2020) and helps develop their teaching skills to produce more prospective teachers, including dealing with various challenges that influence teaching efficacy in practices (Van Schagen Johnson et al., 2017). Teaching practicum also provides student teachers with the abilities to understand individual development, self-evaluation, self-management, and interpersonal skills.

According to the regulations and guidelines of the teaching practicum introduced by MoEYS, teaching practicum is conducted for four main reasons (MoEYS, 2016). They include (1) provide a chance for student teachers to practice teaching in real classes by applying knowledge and theories that they have learned from teacher training institutions; (2) provide a chance for student teachers to develop their professional competencies and attitudes for their future career through the experiences from actual teaching practice; (3) enable teacher training institutions and schools involved in practicum to cooperate together to provide quality pre-service training for student teachers in the future; and (4) evaluate the professional competencies of student teachers after they receive pedagogical training.

At PTEC, student teachers are required to do practicum every year throughout the 4-year pre-service training program. The purpose and duration of the practicum each year is different. In the fourth year, the last year of the practicum

and pre-service training, student teachers are required to do practicum for 10 weeks. The purpose of this practicum is to equip student teachers with four professional skills for teachers: (1) professional knowledge, (2) professional practices, (3) professional study, and (4) professional ethics (PTEC, 2019).

1.2.Lesson Plan Assessment

Researchers and educational experts agree that lesson plans are crucial for teachers to effectively conduct the lesson (Akyuz et al., 2013; Ruys et al., 2012). However, some prospective teachers at PTEC still face challenges in developing creative lesson plans (Elçin & YAZGAN-SAĞ, 2018). Before the start of the Year-4 teaching practicum, Mr. Koji Takahashi, an expert from the Japan International Cooperation Agency, introduced a rubric to assess student teachers' lesson plans. The rubric consists of five criteria as follows:

1. Understanding the goal of a lesson and the aspects to be focused on in the lesson. This criterion is referred from the "aspects" of mathematics lessons which include conceptual understanding, skill mastery, and problem-solving. The aspect of conceptual understanding requires student teachers to understand clearly the goal of the lesson and content to be taught and the ways that students develop their knowledge in the lesson. In addition, skill mastery and problem-solving mean the abilities of student teachers to prepare the lessons appropriately and easy to understand.
2. Choice of instructional methods and activities, in which the teacher has to choose appropriate teaching methods and activities to respond to the objective of the lesson.
3. Consistency between the lesson objective, activities, and assessment. At this point, the student teacher has to prepare the activity and the assessment problem to respond to the lesson objectives.
4. Proactive planning based on expected students' responses. A good lesson plan has required the teacher to expect or predict the problem that can occur during teaching and learning each topic, and then the teacher has to pre-prepare the answer or teaching material and activity to help the students eliminate the students' misconceptions.
5. Students' engagement in learning. The teacher has to seek students' demands in learning and help them to acquire knowledge through thinking, discussion, and various activities as individuals or in group work.

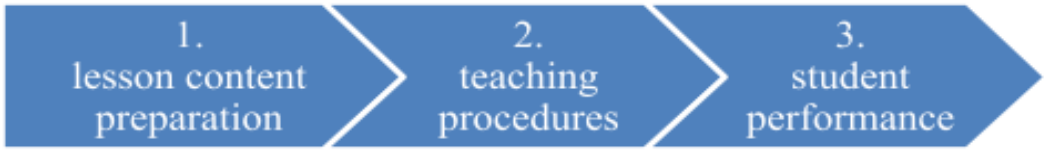
1.3.Reflective Conversation

During the teaching practicum, student teachers do not have only a chance to practice the lessons, but they are also observed by their mentors and supervisors who reflect on their teaching. Reflective conversation is then conducted to help student teachers to solve the problems that they encounter in their classroom teaching. According to the guideline for student teachers' practicum, reflective conversation is not a subject knowledge, but it is a form of personal worldview positions, a form of value that has become an integral part of self-concepts (PTEC, 2019). The guidelines note that reflective conversation is connected with the student teacher's intention to the analysis, introspection, synthesis, and understanding of their own experiences and evaluate it in the context of social significance.

In order to provide student teachers with effective reflective conversation, our research team consisting of four mathematics lecturers had a discussion about what should be considered during reflective conversation. Finally, we decided to look through the strengths and weaknesses of three main processing criteria: (1) lesson content preparation, (2) teaching procedures, and (3) student performance. Figure 1 shows the processes of our commentary during reflective conversation.

Figure 1

Processes of lecturers' commentary during practicum



For the first criteria, the lesson content preparations cover the content of the lesson within a one-hour session. It includes the flow of the lesson, how they review the lesson, the quality of giving examples to generalize the concepts or theories introduced in the lesson, and the exercises to cultivate the students' thinking skills. The second criteria illustrate student teachers' explanation ability, their interaction with students and how they pose the questions to cultivate the students' thinking. It also includes student teachers' ability to be flexible in responding to the student questions and manage the classroom and teaching time. The last criteria focus on how student teachers assess their student performance and the result of this assessment.

2.Research Methodology

Since the main objective of this study is to explore the influences of reflective conversations on the instructional methods of student teachers at PTEC during their practicum, this study employed a qualitative case study design where the data was collected based on a review of lesson plans, and teaching observations during the 10-week teaching practicum. The teaching practicum started from January 24 and ended on April 4, 2022.

Two female mathematics student teachers in 4th year at PTEC were selected as a sample of this study based on a convenience sampling method. Totally, there were 20 mathematics student teachers who were studying in 4th year at PTEC. However, these two student teachers conducted teaching practicum at the same grade level (grade 7) at Preah Sisovath High School which is a New Generation School. To avoid confusing, the two student teachers were coded as ST1 and ST2. On the other hand, the researchers who involved in this study were the mathematics lecturers at PTEC. They were coded as LR1, LR2, LR3 and LR4.

For the data collection, this study is divided into three phases within the 10-week period. In the first phase, student teachers started preparing their lesson plan and recorded an online teaching video. Then, the researchers reviewed the lesson plans and observed the teaching video based on the observation criteria developed by the researchers. For the second phase, the researchers conducted a reflective conversation with the participants based on the critical points that the researchers had noticed in the lesson plan and teaching video. In the third phase, the researchers reviewed the lesson plan and observed the teaching video to see the improvement after conducting the reflective conversation.

The data in this study were analyzed according to the themes of the observation criteria such as lesson content preparation, teaching procedure, and student performance. Each theme was divided into sub-themes focusing on the strengths and points for improvement in the teaching activities. During the observation, the researchers took note of the student teachers' activities based on the criteria in the observation form. After analyzing the teaching video, all the researchers discussed to reach a consensus on the main themes.

3.Findings

The findings are organized into three main themes, including (1) the pre-assessment of lesson plans (2) pre-assessment of teaching videos, (3) post-assessment of lesson plans, and (4) post-assessment of teaching assessments.

3.1. Pre-Assessment of Lesson Plans

As mentioned earlier, one lesson plan of each of the two student teachers was selected at random to be assessed. The assessment focused on five main criteria: (1) understanding the goal of the lesson and aspects to be focused, (2) choices of teaching methods, (3) consistency between the lesson objective, activities, and assessment, (4) proactive planning based on expected students' responses; and (5) students' engagement in learning. In this section, we present the results of the lesson plan assessment of each case.

Case ST1

The lesson of Case ST1 was conducted on March 6, 2022; it focused on the content of multiplication and division of integers.

1. Based on the comments from the lecturers, they have similar ideas on the first criteria and an understanding of the goal of the lesson and aspects to be focused. However, Case ST1 could not determine the objective correctly. The objective of cognitive domain (knowledge) is clear, attainable, and consistent with the content; however, the skill does not match with the knowledge. Moreover, only two among the four lecturers mentioned the content. They both had similar ideas on the lack of examples for students to generalize the rules of multiplication and division of integers. As one of them said:

   > *The lesson was prepared by including learning games and quizzes to inspire students to learn; however, the teacher provides inadequate examples for students to generalize the rules. (LR1)*

2. For the second criteria, choices of instructional methods, the student teacher utilized an inductive approach to define the rule of multiplication and division of integers. There seemed to be a point of contention among the four lecturers' comments. Three of the four lecturers (LR1, LR3, and LR4) thought that the teacher used appropriate methods in her lesson, but some teaching activities were not appropriate with the time allowance while some others were not adequate for the students to generalize the rules. The following quotes illustrate this point:

   > *The teacher used appropriate instructional methods (LR1, LR2, LR3), but the students' activities were less than the teacher's activities while the key concepts were generated by the teacher (LR3). Moreover, the teacher spent much time revising the previous lesson (LR1, LR4).*

However, one lecturer (LR2) stated that the teacher did not clearly understand the instructional method and conceptual construction.

3. In relation to the consistency between lesson objectives, activities, and assessment, the four lecturers also did not agree on some points. For instance, two lecturers (LR1, LR2) mentioned that the objectives of the lesson, teaching activities and learning assessment, were well connected. However, one lecturer (LR3) mentioned that the teaching activities did not match the objective. LR4 did not mention clearly about the connection between the lesson objectives and teaching activities.

   The teacher did not either pose the questions to identify student misconceptions or consider the duration for students to generalize the rules. (LR4)

4. For the proactive planning based on expected students' responses, all the lecturers had similar comments. They said the teacher only showed the teaching procedures (i.e., steps of teaching, examples, and exercises given to the students) but the teacher showed neither the correct answers nor students' responses. In other words, the teacher did not show any expected student misconceptions and how to overcome them.

   "Teacher did not prepare the correct answers and students' expected responses (LR1, LR3). Moreover, the teacher did not consider about students' misconceptions and how to remedy it (LR1, LR2, LR3, LR4)"

5. Lastly, for students' engagement in learning, all lecturers also had similar comments. The teacher posed some questions and tasks for the students to practice and most of the students actively participated. However, those were only the exercises for students to practice. It would be better if the teacher could provoke students into thinking to generate the rules of multiplication and division by themselves. Moreover, there was no indication of group work or discussion among students and the presentation of their works. LR2 also stated that it was difficult to assess students' thinking without observing their presentation.

   The teacher and students somehow interacted in the teaching and learning process (LR1, LR2, LR3, LR4), but there is no indication of group work or presentation of their results (LR1, LR2).

Case ST2

The second participant prepared the lesson plan to teach how to solve the problems related to the interest in the content of percentage. In this lesson, she utilized an inquiry-based learning (IBL) approach to define the interest formula. After reviewing the lesson plan based on the assessment criteria, we present the

results as follows:

1. The result of the first criteria, understanding the goal of the lesson and aspects to be focused, showed that the participant understood how to write the objective of the lesson. She chose the appropriate verb of Bloom's Revised Taxonomy and followed the standard of the objective regarding the action, condition, and standard (ACS). However, the content was inappropriate with the teaching methodology, and the content knowledge of this lesson on how to formulate the interest formula was inadequate. The following quotes explain this point:

   > *The objectives of the lesson followed the standards (LR1, LR2). The content focused on the interest problems, but the participant focused only on the interest formula (LR2). The content of the lesson is not clear, especially the explanation of the interest formula (LR1, LR3, LR4).*

2. The result of the second criteria, choices of teaching methods, revealed that her understanding of the choice of teaching methodology was still superficial. She wanted to apply a better teaching approach; however, it was inappropriate for the lesson content.

   > *Applying the IBL approach is unsuitable for teaching problem solving (LR1, LR2, LR3, LR4). Moreover, the step of IBL is incorrect (LR1). The posing problem is difficult for students to understand and to formulate the interest formula (LR4).*

3. The result of the third criteria, the consistency between the lesson objective, activities, and assessment, showed that somehow there was consistency between the lesson objective, activity, and assessment. However, because she chose the inappropriate teaching method, the result of the assessment did not reach the expectations of the objectives of the lesson.

   > *The lesson objective, activities, and assessment were consistent (LR1, LR2, LR3). However, the result of the assessment was low because the students did not clearly understand the concept of the interest formula (LR2). The teacher assigned students to work in groups, but the students could not solve the problem, so the teacher solved the problem by herself (LR3). The students did not present their answers to the class and only listened to the teacher's explanation (LR1, LR4).*

4. The result of the fourth criteria, proactive planning based on expected students' responses, showed that the expected result of the students' answers focused only on the correct answer. As the lecturers said:

> *"The teacher wrote the correct expected result in the student's activities column. However, she did not write the expected misconception and how to eliminate the students' misconceptions (LR1, LR2, LR3, LR4)."*

5. The result of the fifth criteria, students' engagement in learning, revealed that the teacher understood the significance of group work, and engaged their students in the classroom activities by using the IBL approach.

> *The students worked in a group to formulate the interest formula (LR1, LR2, LR3, LR4).*

3.2. Pre-Assessment of Teaching Videos

The assessment of teaching videos was conducted to reflect on three main criteria: (1) lesson content preparation, (2) teaching procedures, and (3) student performance.

Case ST1

Based on the result of the teaching videos assessment, all the four lecturers agreed that the student teacher prepared the lesson well in terms of the structure and coherence of the lesson content. However, there were a variety of points for improvement and suggestions. For example, LR1 and LR3 stated that the examples that the teacher provided to their students to generate the rule of multiplication and division of integers were inadequate. It would be better to give one more example about how to multiply and divide a negative number with another negative number. Similarly, it was suggested that the teacher should explain more about the multiplication and division of negative numbers with negative numbers. LR4 suggested having more attractive slide presentations by adding child-friendly figures or diagrams.

For the second criteria, teaching procedures, all lecturers had various views. For example, LR1 and LR3 agreed that the teacher did well in terms of following the steps of teaching procedures and the explanation and synthesis of the lesson contents. However, only a few students interacted with the teacher while most of them were not active (LR1, LR3, LR4). At the same time, LR1 also raised that the main ideas came from the teacher, not the students. In other words, LR3 and LR4 agreed that the class management should be improved and the time allocation for students to think should also be increased. LR2 and LR3 also

added that the teacher did not explain more when their students did not understand the lesson.

Lastly, for student performance, all the lecturers shared common views that the student teacher prepared quizzes to attract the students. However, the students still did not perform well (LR1, LR2, LR3, LR4).

Case ST2

The result of the classroom observation for Case PR2 is discussed below:

1. For the result of the first criteria, lesson content preparation, the teacher prepared the lesson and covered all the content. However, the example that the teacher used was not appropriate to conclude the formula. Moreover, the example in the fourth step was difficult for the students to solve. This point is illustrated in the following quote:

> *The lesson covered the important points (LR1, LR3, LR4). However, the example was not appropriate and made it difficult to formulate the interest formula (LR2, LR3). The content and the word problem were not clear (LR1). The enrichment problem was very difficult, and only a few students could solve it (LR2, LR3).*

2. The result of the second criteria, teaching procedures, found that the teacher could explain to the students and lead them to participate in the classroom activities. However, the teacher was more involved in the activities than the students because the students could not solve the problems posed by the teacher.

> *The teacher's explanation was clear and the classroom management was good (LR1, LR3). During teaching, the teacher posed a lot of questions, and students had enough time to think about how to solve the problem. However, the activity that the teacher used did not follow the IBL step (LR1, LR4). Moreover, the teacher was more active than the students. To formulate the interest formula, the explanation was done by the teacher (LR1).*

3. The result of the third criteria, student performance, revealed that the result of the formative assessment did not reach the objective of the lesson since only a few students could solve the problem. As a result, the teacher had to lead all of the activities and explanations.

> *In the assessment process, the students did not understand yet how to use the interest formula to solve the problem (LR4). Only a few*

students could answer the teacher's questions (LR2, LR3). The teacher solved the problem, and the students did not solve it. So, the teacher could not synthesize the result of the assessment (LR1).

3.3. Post-Assessment of Lesson Plans

After the reflective conversation, the lesson plan and teaching video were randomly selected again to be assessed based on the same criteria as pre-assessment.

Case ST1

The lesson of case ST1was conducted March 17, 2022. The lesson was about how to construct an angle bisector by using a ruler, a compass, and angle properties (vertically opposite angles, complementary, and supplementary angle).

1. For the first criteria, understanding the goal of the lesson and aspects to be focused, all four lecturers (LR1, LR2, LR3, and LR4) had the same opinion. They agreed that the teacher determined the learning objectives and prepared the lesson plan well. The learning objectives were clearly stated and followed the action, condition, and standard while the lesson content was well organized and constructed.
2. For the second criteria, choice of instructional method and activities, the teacher utilized inductive approach as the instructional method. Two among the four lecturers (LR2, LR4) asserted that the teacher did not choose the appropriate method to teach while the other two lecturers (LR1, LR3) argued that the instructional method was fine, but the teacher did not place students' activities at the center. LR1 and LR3 also added that the main concept of the lessons was generated and given by the teacher. Furthermore, LR2 also added that the teacher would be better off using teaching materials such as a fan or straws to explain to the students so that they are able to visualize the angle properties clearly.
3. In relation to the consistency between the lesson objective, activities, and assessment, all the four lecturers confirmed that the lesson was consistent. However, LR4 suggested that the teacher should provide two or three more examples to the students before asking them to make generalizations.
4. For proactive planning based on expected students' responses, LR2 and LR4 stated that the teacher had good preparation in terms of preparing correct answers, promoting students' thinking, identifying their expected misconceptions, and offering remedy to them. However, LR1 and LR3

argued that the teacher only prepared the correct answers well but not the aspects related to the students' thinking and expected misconceptions.

5. Lastly, for the students' engagement in learning, all the four lecturers agreed that the students were active in thinking and answering individually. However, as stated in the second criteria above, the teacher directly told the main concepts to the students rather than get them to generalize by themselves. As LR1 said, it would be better if the teacher got students to work in pairs or groups so that it could enhance cooperative learning.

Case ST2

The lesson of PR2 focused on the conversion of fractions to decimals and from decimals to fractions. The result of the lesson plan assessment is as follows:

1. For the first criteria, understanding the goal of a lesson and aspect to be focused, the result from the three lecturers found that the participant understood and determined the objective of the lesson. The objective covered all the important aspects of the content. However, as LR1 mentioned, the content of the lesson was inappropriate for the duration of the class.

> *The objectives and content of the lesson were clear (LR2, LR3, LR4), and the objective was aligned with the content of the lesson (LR3). The objective was clear, but the content of the lesson was inappropriate (e.g., the statement in the generalization part did not cover all the content). The flow of the content was well organized, but it was too long when compared to the class duration (LR1).*

2. For the second criteria, choices of instructional methods and activities, the participant utilized an inductive approach as an instructional method. The three lecturers shared the same view that this approach was appropriate with this content; however, LR2 thought that utilizing the inductive approach in this lesson was not appropriate.

> *The teaching methodology was appropriate which included the examples for generalization (LR1, LR3, LR4). However, the flow of the lesson was not good enough (LR1). The student teacher did not clearly understand the meaning of the teaching methodology and teaching approach (LR2).*

3. For the third criteria, there was consistency between lesson objectives, activities, and assessment. However, it was still limited because the assessment did not cover all the contents of the objectives. In addition, as LR1 noted, the flow of the teaching activity in the third step was not clearly stated in the lesson plan.

> *The consistency between lesson objectives, activities, and assessment was not well connected (LR1, LR2, LR3, and LR4).*

4. In the fourth criteria, proactive planning based on expected students' responses, the participant prepared the correct answer well; however, the answer did not focus on students' misconception and how to eliminate it. As LR2 said, the student teacher utilized improper terms in the content. In contrast, LR4 argued that the participant prepared the plan based on expected students' responses.

> *The teacher prepared the expected answer. However, it referred to the correct answer and did not prepare for the expected misconception (LR1, LR2, LR3). The teacher appeared confused with how to utilize the term decimal point (LR2). In contrast, the teacher appeared to be well prepared for the expected answer and misconception (LR4).*

5. For the fifth criteria, students' engagement in learning, all the lecturers agreed that the students were involved in the class activities to solve the problem. However, the instruction about the activities was not clearly stated, and the teacher did not motivate the students to discuss in groups.

> *The students work individually on a lot of activities to generalize the important points of the lesson (LR1, LR2, LR3, and LR4). However, the teacher's instruction was unclear (LR4), and the question did not include high-order thinking (LR2). The teacher did not prepare the group discussion activities to motivate students to work as a group (LR1).*

3.4. Post-Assessment of Teaching Videos

Case PR1

Based on the result of the teaching videos assessment after the reflective conversation, all the four lecturers agreed that the teacher prepared the lesson well in terms of the structure and coherence of the lesson content. However, LR3 suggested that it would be better if the teacher provided more than one example. One example is inadequate for the students to generate the conclusion

unless the teacher explains more. On the other hand, LR1 argued that the conclusion of the lesson concepts (complementary and supplementary angles) should not be restricted to exactly two angles.

> *A complementary angle is an angle where the sum of two or more angles is equal to 90o, while a supplementary angle is an angle where the sum of two or more angles is equal to 180o. It is not restricted to only two angles (LR1)*

In relation to the second criteria, teaching procedures, three among the four lecturers (LR1, LR3, LR4) asserted that the teacher explained and followed the steps of the lesson plan well. Moreover, the teacher summarized the lessons well and used appropriate application to enhance the students' understanding in drawing angle bisectors (LR1, LR3). However, the teacher's activities were overwhelming (LR1, LR3) while the teaching time duration was not appropriate for such lesson content. Similarly, LR2 also agreed that the teacher followed the lesson plan well, but he suggested that the teacher should use some common teaching materials such as straws or color paper to make complementary or supplementary angles. He further added that the teacher should explain more about the order of steps in finding the values of angles.

For the last criteria, student performance, all lecturers claimed that the student performance was still not adequate to accomplish the learning objectives. LR2, LR3 and LR4 mentioned that students were struggling in constructing an angle bisector and had misconceptions in complementary and supplementary angles. In other words, for reinforcement, LR1 suggested that the teacher should let students practice by themselves rather than explain to them.

Case ST2

After the observation, all the lecturers mentioned that PR2 prepared the content that covered the important points of the lesson. For example, LR3 pointed out that the lesson was well organized. However, LR1 argued that the example and the practice exercises were too much for teaching in one hour.

As for the result of the second criteria, teaching procedures, LR3 mentioned that the teacher explained clearly and posed a lot of questions to encourage the students to think. The teacher could control the class and synthesize the important points of the lesson. The students interacted with the teacher during class. However, LR3, agreeing with the other three lecturers, noted that the teacher was more active than the students. In addition, the teacher did not provide enough time for the students to think and have the opportunity to explain the answer.

Lastly, for the criteria of student performance, all the lecturers agreed that the teacher assessed the students' understanding. However, the result did not achieve the objectives of the lesson. The students explained the answer without clearly understanding, and only a few students shared their answer. Finally, the teacher explained the expected answer that she had prepared prior. In addition, LR4 added that the teacher had inadequate knowledge of formative assessment.

4.Discussion

Based on the results of Case ST1 above, it was found that the reflective conversation has cultivated the student teachers' understanding on the first criteria, understanding the goal of lesson and aspects to be focused on. It also slightly influenced the criteria of choices of instructional methods and proactive planning. However, there is no indication of student teacher's improvement in terms of consistencies between learning objectives, teaching activities and assessment, and student performance.

Before conducting reflective conversation, one of the student teachers (ST1) struggled to determine the learning objective with two different points. The first one is the use of action verbs, and the second one is the connection between knowledge and skills. However, during the reflective conversation, the teacher confessed that it was an unintentional error for the connection between knowledge and skills because the new lesson plan was copied and pasted from the previous lesson plan. However, the use of an action verb to write learning objectives was not clear to her. Moreover, she found it difficult to recognize the different uses of verbs in the three domains of learning objectives (Knowledge, Skill, Attitude). Ferguson (1998) asserted that learning objectives are statements of desirable, observable, teachable, learnable behaviors that are evidence of learning outcomes. Each statement of learning objectives must begin with action verbs that clearly indicate the behaviors (Ferguson, 1998). Chatterjee and Corral (2017) suggested that teachers should make the important connection between intended learning depth and action verbs that reflect the intended learning outcome in the learning objectives. They further added that action verbs guide the learners to the intended outcome.

In relation to the choice of instructional methods, there were controversial ideas among the four lecturers regarding the term "inductive" whether it can be used as an instructional method, a teaching strategy, or an approach which consists of some instructional methods. LR1, LR3 and LR4 asserted that the term "inductive" is usually used with the term "approach" rather than "instructional strategy". However, there is a particular flow of activities as instructional methods, starting from examples to the theory. So, using the term "inductive teaching method" is reasonable. On the other hand, Prince and Felder (2006) used the term "inductive teaching method" and defined it as an umbrella term

that encompasses a range of active learning methods. Those include inquiry learning, problem-based learning, project-based learning, and so on. However, LR1 argued that "inductive teaching" is just like a teaching strategy and cannot be used as a teaching method. However, regardless of this controversy, the student teachers in this study chose the instructional method more appropriately.

The results of both cases indicate that reflective conversation slightly influenced the student teachers' proactive planning and student performance. All the four lecturers agreed that the reasons for this slight impact were time constraints and difficulties in classroom management due to the usage of two different modes of teaching, onsite and online.

In relation to the teaching implementation, the results of both cases were very close. It seems that the student teacher improved slightly in terms of teaching content and teaching procedures, but there was no indication of improved student performance.

5.Conclusion

Based on the result of finding above, this study concludes that before reflective conversation, the two mathematics student teachers organized the lesson appropriately in term of learning objectives determination and aspects to be focus, Moreover, it also found that the student teachers understand the subject content knowledge clearly, even some short of example was inadequate for students to generate the lesson content, however the structure of lesson preparation was in consistent. In contrast, the result indicated that students are somehow interacted with teacher only some reinforced activities, but not the main activity that students are required to generate the lesson by themselves. Moreover, there is no indication of proactive planning about student thinking, misconception and how to remedy it.

Similarly, this study also found that student teachers prepared the lesson well in term of the quality of learning content and structure. However, there were some challenges for them such as improving student engagement, classroom management and yield lead to hardly achieve the learning objectives.

After reflective conversation, it found that student teachers have an adequate understanding of the learning objectives, content knowledge, the consistency of learning objectives, students' activities, and learning assessment. However, the choices of instructional methods and enhancing students' interaction is still a major challenge for them. The most difficult challenge is on how to get students to generate the conclusion of the lessons and on how the student teachers will guide their students to reach the said conclusion. This influences the quality of their teaching and yields negligible improvement on the students' performance

The findings in this study also show that reflective conversation slightly influenced the student teachers' lesson preparation and teaching implementation. However, this could be affected by some other factors including the viewpoint of lecturers, time constraints for student teachers to prepare the lesson, and the actual situation of the classroom.

This study suggests that future research should investigate in more detail student teachers' difficulties and mentors' feedback to find out more factors influencing student teachers in preparing and implementing lesson plans. Future research should also include a larger sample size and extend the scope of research to include student teachers in other teacher education colleges or training centers in Cambodia.

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Improving Elementary Pre-Service Teachers' Teaching Competency in Khmer Language Subject Using Microteaching

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Abstract

This study aims to examine how microteaching improves elementary pre-service teachers' teaching competency in the Khmer language subject. The study was initiated because we observed from the practicums of the previous years that our student teachers performed their teachings with a lack of both lesson planning and clear teaching process. To deal with this problem, microteaching was applied via online learning to help promote student teachers' teaching skills. Data were collected through pre/post-tests, questionnaires, and peer observation sheets during teaching practice involving 49 pre-service teachers at Phnom Penh Teacher Education College. After the microteaching implementation, we observed that student teachers could gain more confidence in teaching, plan better lesson plans equipped with suitable materials and techniques, and teach more effectively with time and classroom management compared to their performance before the introduction of microteaching. The findings revealed that microteaching could change the way in which student teachers teach and prepare lesson plans. They worked in small groups to practice each lesson repeatedly and give feedback to each other before they started to teach the next sessions or teaching loops. These activities inspired them to be reflective teachers. In addition to the changes in their teaching skills, we found that microteaching also helped to improve their teaching competence and familiarize them with the procedures in teaching methods, how to give and receive feedback, and how to use technology in teaching and learning.

Keywords: Microteaching; teaching competency; teacher education programs; Khmer language

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1. Introduction

1.1. Background of the study

Khmer is the official language of Cambodia. It plays an essential role in people's life and work. However, we have noticed that many Cambodian students receive very low results in this subject. According to the PISA-D national report in 2018, only 8% of Cambodian students achieved the minimum level of proficiency in reading (MoEYS, 2018). According to the National Assessment which was conducted by the Education Quality Assurance Department of MoEYS (MoEYS, 2013, 2015, 2016), Grades 3 and 6 students in Cambodia were able to answer less than half of the questions correctly based on the entire test content that included writing and dictation. The results from PISA-D national report and National Assessment both show that Cambodian students are facing problems in reading literacy and reading comprehension. In response to this problem, the Ministry of Education, Youth and Sport (MoEYS) has made a reform to enhance the education quality. Among those components of the reform, teacher education is one of the top priorities. From the reform of education in Cambodia, Phnom Penh Teacher Education College (PTEC) was formed in 2018 to train teachers of a 12+4 program which is believed to be effective in producing competent teachers.

From the teacher training policy, the vision of MoEYS is to produce knowledgeable, skillful, and qualified teachers who can perform their profession which is socially acknowledged. The vision aims to develop teachers with qualified capacity, responsibility regarding professional ethics and effective work with the goals to motivate capable candidates to apply to be trained as teachers and to promote the pre-service training and teachers' continuous professional development (MoEYS, 2013).

Since PTEC has recently approached its third year of the 12+4 program, the first generation of the pre-service teachers had gone through the practicum in the first year as observers at primary schools; gone through the second-year practicum as teacher assistants; and should have been through the practicum as independent teachers at their third year directly at schools. Unfortunately, the world is facing problems brought about by the COVID-19 pandemic, and Cambodia is no exception. Walking through these hard times, all public and private schools have not been able to properly operate due to the pandemic, so the PTEC's plan to conduct the practicum for Year 2 (last year) students had been changed to peer teaching instead of conducting the practicum at the start of the third year (this year). Spontaneous waves of COVID-19 outbreaks within the whole country forced the practicum this year to be implemented online.

1.2. Rationale of the study

Conducting the practicum at PTEC last year was not possible, but peer teaching is conducted as an alternative. From the peer teaching report last year, we found that the class situations were not like a real class, as our student teachers had to pretend to be teachers and students simultaneously. Even so, according to the data from the students' self-reflection form, lectures' feedback and our own observation of peer teaching showed that our student teachers performed their teaching poorly. Based on the E-practicum this year, we found that our student teachers did well with teaching online despite facing many challenges with internet connections and the limitations of young students using electronic devices for online learning, especially since the E-practicum is very new to the Cambodian context. However, we believe that this new learning mode will introduce learners to new knowledge and skills. Many teachers in the world indicate that the support they receive from other teachers in online discussions are very important to them (Burns, 2011).

Through the previous practicums, we can still find many weak points in their teachings. Those lacking points include not preparing their lesson plan well, not performing well in the teaching process, lack of preparation, under-utilization of teaching materials, no confidence in teaching, lacking time and classroom management skills, not able to address students' concerns, and lacking the ability to give and receive feedback. The lacking points in the teaching practice of student teachers are not new problems in teacher education. The cause of the problems can be because of the program limitations and lecturers' teaching methods and techniques. To respond to the problems, under the reform of education, TEC has developed new course syllabi of all subjects; and the Khmer syllabus is also established by having the support from Research Triangle Institute (RTI) in which microteaching is included to strengthen performance of student teachers.

Normally, the Khmer language teaching methodology is taught in many ways. Most of the time, the methods have been instructed and lectured as theories in Semester 1, and the practice of the methods and techniques follow in Semester 2. Sometimes within the session, when theory lecturing ends, the student teachers' practices come after. The way they have practiced is that they work in groups or in pairs to plan a lesson, and then, the lecturer will randomly select anyone of them to perform among the class. Perhaps this is too late or too soon for them to demonstrate their teaching in the whole class and in front of the lecturer. From each of their performances, we found that they made the presentation without confidence, professionalism, and quality. As a lecturer, we are not satisfied with our student teachers' learning result nor with our own teaching methods. Thus, we have tried to find out other techniques and teaching practices that work effectively to help pre-service teachers to perform their

teachings successfully. There are so many useful strategies and techniques which will effectively build pre-service teachers' teaching confidence, but this time we are interested in using microteaching which we believe can improve our student teachers' teaching competency. Therefore, the present research on this topic is initiated.

This research aims to help pre-service teachers perform confidently in their teaching and minimize all of those weak points. Microteaching is used to provide more opportunities to student teachers to practice in small groups so that they can take turns to teach and reflect on each other's performance. We planned to implement microteaching directly in the classroom, but due to the COVID-19 pandemic, the technique was conducted online by using Google Classroom as a learning platform, and Google Meet to meet with student teachers, lecturing, and small group teaching practice. The flexibility in applying the technique online provides pre-service teachers with the free-context practice without pressure which can allow them to have a lot of time to practice, review, reflect, and re-practice. Moreover, pre-service teachers can practice without fear or shyness in front of a few friends and a camera. Along with these benefits, their understanding with technology can also improve. However, there are many disadvantages to practice teaching individually without students in the teaching practicum because their peers can only see them on the screen and give feedback and comments via other platforms like Telegram or Google Meet. Practicing online is different from practicing face-to-face because the real classroom activities cannot be prepared appropriately in online classrooms; and teacher-students' interaction is not easy to execute.

Teaching competency has been identified as the most effective contributor to students' achievement. Teachers' competence was conceptualized as the ability to master the knowledge and skills as well as to have a positive attitude to translate the knowledge into an image, so students can understand easily and can be used in everyday life (Ibrahim et al., 2019).

The characteristics of teaching competency are linked to all the three domains in which performance can be assessed: knowledge, skills, and attitude. However, competency is more than just knowledge and skills; it involves the ability to meet complex demands by drawing on and mobilizing psychosocial resources (including skills and attitude) in a particular context. Teaching competency is an inherent element of an effective training process, where one aspires to contribute to the welfare of a particular country or the world itself (Nessipbayeva, 2012).

The limited content knowledge on teaching methodology and the ways to teach affect teaching competency. The pre-service teachers are going to be more

skillful in teaching competence if lecturers conduct microteaching in order to provide opportunities to students to work in small groups to discuss about a topic, plan lessons, search for appropriate methods for the lesson, prepare classroom activities, practice teaching, and reflect on each other's performance than just lecturing about teaching methods where pre-service teachers can just sit, listen, and memorize the theories.

In the context of this study, teaching competency is the concept of teachers' ability in teaching. They can improve their teaching competency by nurturing their knowledge with the skillfulness of teaching and confident attitude toward every classroom setting, which will allow them to help students make connections between their experiences and real life, that is, to connect students' knowledge to their real lives and experiences.

This study aims to answer the following main question:

What are the effects of microteaching conducted by elementary pre-service teachers?

Three minor questions are proposed:

1. How can microteaching be conducted in the Khmer language subject?
2. How can peer feedback improve teaching practice?
3. What is the perception of student teachers of microteaching after it is conducted?

We hypothesize that microteaching can have a positive impact on elementary pre-service teachers' teaching competency.

2. Literature review

2.1. What is microteaching?

Microteaching is an innovative technique of teacher training introduced in the mid-1960s at Stanford University by Dr. Dwight Allen. Since then, it has been used with success as a way to help teachers acquire and hone new skills (Sadat Ali & Mittal, 2015). Görgen (2003) stated that pre-service teachers can experience real teaching situations with microteaching, and they can transfer their teaching knowledge into practice. The main purpose of this technique is to provide teachers with the opportunity for safe practice of an enlarged cluster of teaching skills while learning how to develop simple, single-concept lesson in any teaching subject; to develop specific teaching skills such as questioning, the use of examples and simple artifacts to make lessons more interesting, effective

reinforcement techniques, introducing and closing lesson more effectively; and to provide skilled supervisors with an opportunity to get constructive feedback to improve the content and methods of teaching. Rama (1979) defined teaching competency as the ability of a teacher manifested through a set of overt teacher classroom behaviors that are a result of the interaction between the presage and the product variables of the teaching within a social setting.

Microteaching refers to an innovative method of training wherein the student teachers or teacher trainees conduct a class for a small group of students for a small time (Teachmint, 2021). This scene is to improve the skills of teachers confidently by concentrating on a particular skill at one time. Microteaching is a significant teaching practice model or method that contains many actions, including methods, learning guides, motivation, classroom management, assessment, analyzing and so on. This technique is designed to simplify the complexities of the regular teaching-learning process in which class size, duration of lecture, task, and content are scaled down to allow appropriate teaching environments.

In microteaching, lecturers demonstrate the skill to be practiced that can be shown through actual demonstrations or a video presentation of the skills. Then, the group members select a topic to prepare a five-to-ten-minute lesson. The pre-service teachers then have the opportunity to practice and reflect on their use of the skills. Practice takes the form of a ten-minute microteaching session in which three to four students are involved. This means that pre-service teachers have the opportunity to practice teaching and develop the skills in planning lesson, applying teaching methods and techniques in their lesson plan and teaching process; experience the classes in a situation; instruct, ask and answer questions between teacher and students; manage classroom activities; manage time, and be flexible in solving problems. Along with the teaching process, videos are taken to make sure that the class members can view and give feedback.

2.2. Research on microteaching

From the use of microteaching, our pre-service teachers are expected to improve their skills in teaching such as the active-learning process and in a real-life-classroom experience. They are also expected to strengthen their intellectual skills, be familiar with teaching methods, and have the ability to enhance teaching practices and teacher-student interaction. Furthermore, expectations also rest on other aspects such as improving the ability in planning lessons, building confidence in pre-service teachers, creativity in organizing classroom activities, effective lesson planning, speaking skills, conceptual and theoretical knowledge on the subject, and assessing and giving feedback effectively. In microteaching, pre-service teachers take turns to be teachers and

students to obtain different perspectives from both positions. This is a great opportunity for them to learn what students' needs are and what it generally feels like to be a student.

Research (e.g., Arsal, 2015; Kusmawan, 2017) has shown that microteaching could effectively improve pre-service teachers' teaching ability. The complexity of a teaching situation can be overwhelming; hence, to deal effectively with it, teachers must not only have good knowledge of the subject in hand but are also expected to have some amount of communication skills such as the ability to observe, supervise, lead a discussion and pose questions. All these skills can be attained by the use of the microteaching technique while training (Otsupius, 2014). According to UZUN (2012), in the program tried with 31 primary education pre-service teachers in Aksaray university in environmental education courses during 2009-2010 academic year, the study carried out according to pretest and posttest found that pre-service teachers' view of lecturing changed positively and their worries decreased after the application. However, we have yet to witness any research papers related to this matter in the Cambodian context. Since we found that microteaching works well in improving pre-service teachers in international contexts, we also want to test how it works and how effective the technique can be in developing our pre-service teachers' competency in teaching.

Based on the background described above, this research aims to build elementary pre-service teachers' teaching competency which would enable them to practice in the zone of proximal development, build confidence, improve classroom management, and enhance teaching preparation.

There are many teaching methodology books published in Khmer, but we found no text about microteaching. In a book called "Teaching Method" published by the National Institute of Education (NIE, 2018), there are many teaching methods, approaches, and techniques, yet there is no topic related to microteaching. To fill the research gap since no such study has ever been conducted within the Cambodian context before and to respond to the problem in order to improve student teachers' performance, we conduct the present study to answer the main research question: What are the effects of microteaching conducted by elementary pre-service teachers?

3. Research Methods

Micro-teaching is the technique we chose to use in the research implementation that required pre-service teachers to work in small groups in the cycle of planning, teaching, giving feedback, re-planning, re-teaching, and re-giving feedback as shown in Figure 1. Microteaching activities discussed in this study were conducted with 49 Year 3 pre-service teachers in Semester 2 in which they

have to practice teaching the Khmer language to upper primary school students on the four skills of learning language – reading, writing, listening, speaking – and grammar. However, among these 49 student teachers, there were four student teachers who were absent during the pre-test, and eight student teachers were absent during the post-test. That means 12 student teachers had completed only one test; that is why we took away the absent student teachers' data and analyzed only 37 student teachers' pre/post-test scores. Despite the inevitable closure of physical classes caused by the COVID-19 pandemic, we were able to conduct it online by letting students work in small groups to plan lessons and use the lesson plan to teach, reflect, and record videos. The group members can view and give feedback or comments by using an observation sheet (see Table 1). This allows anyone that plays the teaching role to be flexible with their teaching methods. Group members can watch their friends' teaching on the screen again and provide comments. In the process of small group viewing, all the members take turns to teach and give feedback and comments. Each video recorded and every feedback given to them have to be posted in Google Classroom so that the lecturer can also view them to see the progress of each individual and give feedback in order to improve their teaching.

Figure 1

Microteaching cycle

In this study, we used the mixed methods of quantitative and qualitative methods in which we collected data from two groups of 49 student teachers by using tools such as pre/post-test (see Appendix 1), questionnaires (Appendix 2), and observation sheets (Appendix 3). The research procedure started with the conduct of a pre-test, followed by the microteaching technique that was applied for six weeks. Then, the observation was conducted. At the end of the research implementation, a post-test and questionnaire were completed by the student teachers.

The pre/post-test was designed in Google Forms, and the test was used to assess our pre-service teachers' content knowledge of teaching methods which we focus mainly on teaching listening, speaking, reading, writing and grammar. As

we know, teachers can teach because they have three kinds of knowledge: content knowledge of any subjects, method cognition, and pedagogy. Without any one of them, teaching would not be possible. We tested our pre-service teachers to know how much they are aware of those methods so that we can support them to the very best in the process of microteaching. Even though it was not their first time to be exposed to these teaching methods, the test was to measure the exact level they were at before and after microteaching implementation. The questionnaire was designed in Google Forms to ask pre-service teachers about their confidence, satisfaction, and emotion in teaching these four language skills. The observation sheet was also designed in Google Forms and used by the lecturer and their peers while practicing teaching from one loop to another to see the improvement in their teaching practice.

4. Results and Discussion

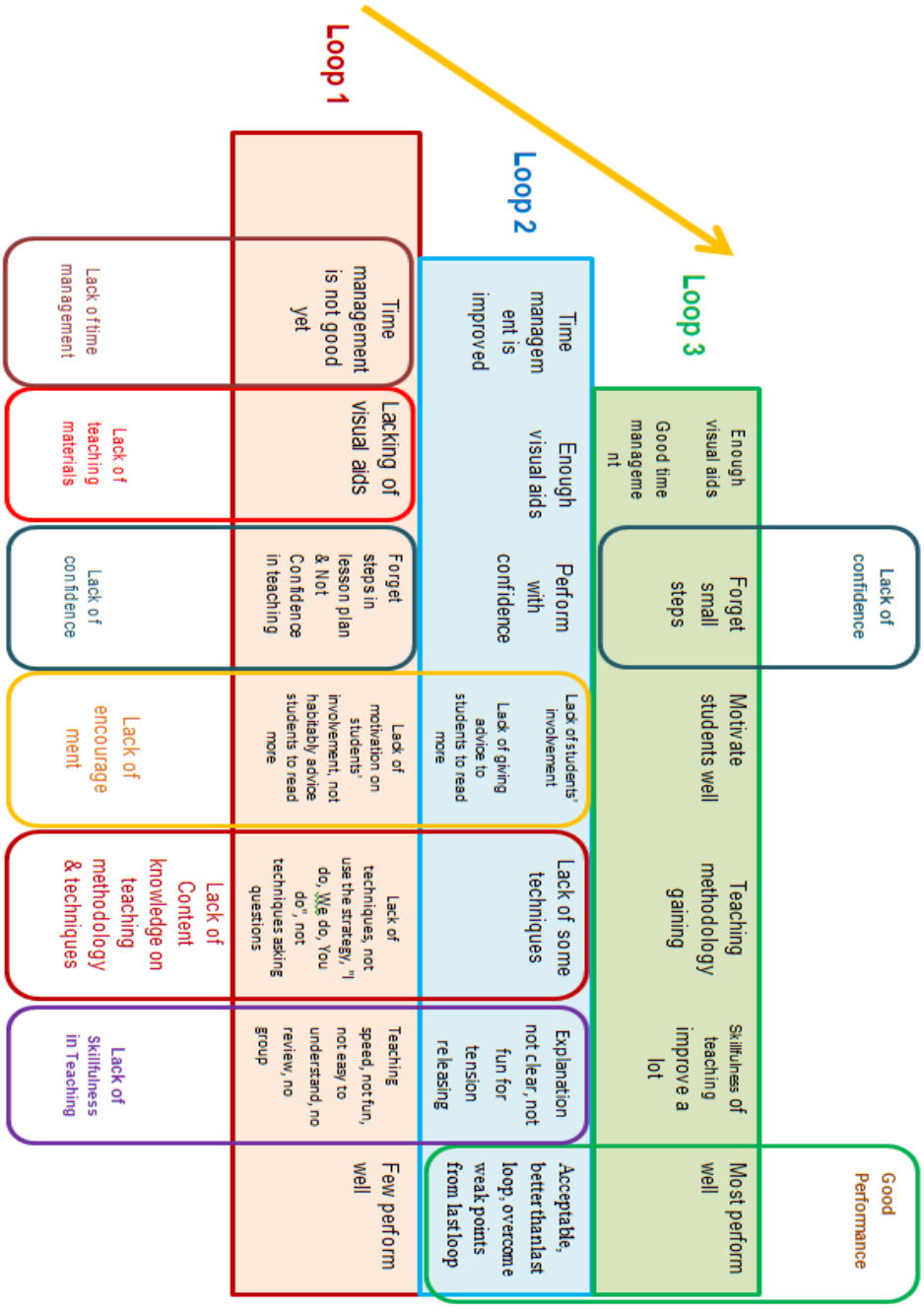
Table 1
Participants' demographic information

Primary student teachers, Tear 3		N	%
Gender	Male	12	32.43
	Female	25	67.57
Age groups	20-25	37	100

Figure 2 below shows the progress of the student teachers' teaching practice in microteaching loops. Each student teacher has the opportunity to practice three loops in each lesson, and their group members take turns to fill in the observation sheet and give feedback to each other's teaching before another teacher takes their turn. From the data analysis on the feedback of student teachers, we found that the feedback to improve teaching was decreasing from the first loop to the second and the third; and the feedback of satisfaction increased alongside their practices. We can assume that microteaching practice certainly made their teaching more confident and seamless.

Figure 2

Friends' feedback on each loop of teaching practice

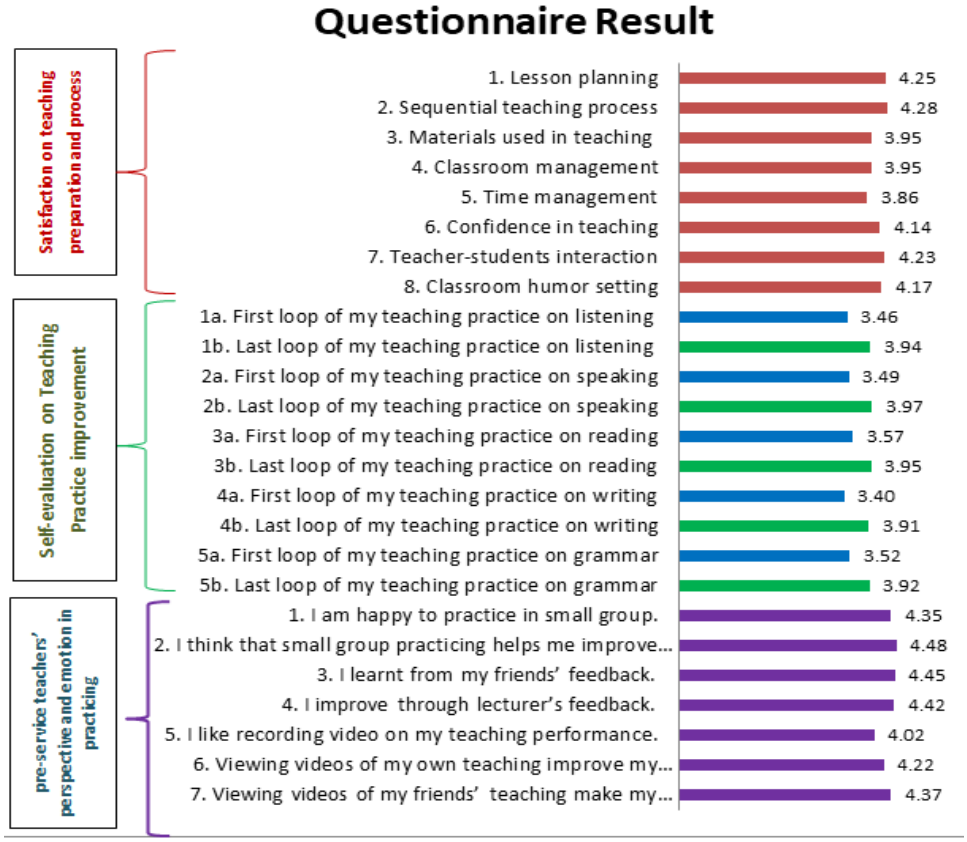


4.1. Results from the Questionnaires

Figure 3 below shows the results of the questionnaire. The questionnaire was conducted after the course ended to survey their satisfaction on teaching preparation and process, self-evaluation on teaching practice improvement, and their perspective and emotion in teaching practice.

Figure 3

Questionnaire Results



The first part of Figure 3 is about the **"Satisfaction on teaching preparation and process"** which reveals that most of our student teachers were satisfied with their preparations for teaching and their teaching process based on their lesson planning. Preparations were generally about their teaching process, the materials used in their teaching, classroom and time management, their confidence in teaching, teacher-student interaction, and classroom humor. As shown in Figure 3, the mean result of the student teachers approaches 4 at the lowest 'satisfied', and 4.28 at the highest 'very satisfied'.

The second part of Figure 3 is the **"Self-evaluation on teaching practice improvement"**. This demonstrated their self-evaluation on the first loop and the last loop of their teaching practice on the four skills of language learning and grammar. Their first teaching loop was evaluated at the level between 3.40 to 3.57, which was a bit over "Fairly good", and their practice at the last loop is between 3.91 to 3.97, which approached "Good". The most important information is that no one evaluated themselves as "Poor" anymore at the last loop. This shows progress in teaching, allowing our student teachers to better evaluate themselves compared to the first loop.

The third part of Figure 3 is about **"their perspectives and emotions in teaching practice"**. It showed that they were happy practicing in small groups which helped them improve their teaching. Feedback from their peers and instructors helped them learn and improve. Their general method of choice was rewatching recordings of various classroom activities. This way of learning also helped them improve their teaching. Every point in part 3 of Figure 3 is between 4.02 and 4.48, which means they "Agree" with those points.

Table 2

Result of t-test for the effect of the microteaching of the dependent variable

T-Test: Paired Two Sample for Means

Test	N	Mean	df	SD	t	p
Pre-test	37	39.44	35	12.93	-11.83	0.00
Post-test		77.22		16.75		

$p < 0.05$

As shown in Table 2, there was a statistically significant difference between the pre-test (M = 39.44, SD = 12.93) and the post-test (M = 77.22, SD = 16.75) of the student teachers in terms of their skill attainment at the end of the course; [t = -11.83, p < .05]. The findings revealed that the microteaching was effective in developing the student teachers' understanding on the teaching method when compared to their understanding before microteaching was applied.

Based on the result of the test, the relationship between the understanding of the teaching methods and teaching competence can be inferred; once they are skillful in teaching, the teaching procedures will be automatically memorized. From the teaching practice, their skills of teaching are developed, and the knowledge of the teaching methods comes along.

From the research implementation, we found that there was a significant difference in our pre-service teachers' teaching competence in terms of their achievement at the end of the implementation as shown by the result of the

pre/post-test, questionnaire completion, and observation sheet filling from the lecturer and student teachers. Our pre-service teachers gained better scores on their post-test compared to the pre-test. Even if the contents in the pre/post-test were not new to them, as they were exposed to almost all of those as theories in Year 2 and Semester 1 of Year 3, we can still see that their scores in the pre-test were lower than the post-test. It can be stated that practice makes perfect; many practices energize them to conceptually understand the teaching process, which in turn leads to better memory retention.

The questionnaire analysis showed clearly that their confidence, emotional perspectives, and satisfaction with their teaching competence had considerably improved. The interval between the satisfaction of teaching preparation and the process from the first loop to the last was far from one another as measured through the scale of 2 (not satisfied) approaching 5 (very satisfied). The improvement in teaching practice increased from Level 1 (poor) to a bit above Level 4 (good) at their last loops. The third part of the questionnaire revealed that their views and emotions on small group practicing is approaching Level 4 (agree); they agreed that working in small groups, practicing, feedback, viewing videos of their own teaching were useful, helpful, and enjoyable in terms of improving their teaching competency. These three parts were consistent with each other in parallel directions. While the satisfaction of teaching preparation and process was high, their teaching practice improvement was also just as optimistic and high due to practicing in small groups. It makes the process less congested and more seamless. They also found it beneficial.

From the observation, pre-service teachers made good progress on teaching practice from one loop to another with better lesson planning, classroom activity preparation, and a more dynamic teaching process. However, conducting microteaching online was not easy, even though we planned things meticulously. We sometimes encounter bad internet connections. We noted that our student teachers were also a bit shy and hesitant at the start, as they had to record themselves teaching while their peers were watching them and filling in the observation sheet. Fortunately, by practicing from time to time, they became more accustomed to it.

The findings suggested that the microteaching technique applied in teaching practice was more effective in improving the teaching competency of pre-service teachers when compared to their performance before microteaching was applied. This finding matched with Kilic's (2010) findings. The results based on the pre-test and the post test showed that microteaching facilitated progress in student teachers' teaching competency on the subject area, lesson planning, teaching progress, and classroom management. Similar to the findings of Saban and Çoklar (2013), the teacher trainees believed that microteaching is a form of pilot teaching that gives them a chance to evaluate their weak and

strong points with regard to their teaching performance. These experiences allow them to develop time management skills, planning skills, question-asking skills, and the skills to utilize different materials and examples when they are to teach in an actual physical setting.

5. Conclusion

An effective teacher training program is the goal of the teacher education program in Teacher Education Colleges in which different learning methodologies are adopted. Microteaching is the technique that sets out the teaching practice for pre-service teachers, improving the teaching confidence among peers on what they are going to teach their students in the real situation. After microteaching implementation, our pre-service teachers experienced improvements in their teaching competency. They were more confident in teaching as a whole by traversing through many practice loops within the microteaching cycle. Small group teaching practice on every skill such listening, speaking, reading, writing, and grammar teaching enhanced and improved their teaching competence.

The various outcomes by implementing microteaching for the purpose of improving pre-service teachers' teaching competency as shown from the quantitative and qualitative data analysis include but are not limited to things such as: improved familiarity with the content knowledge on teaching methods, improved lesson planning skills, newfound confidence in teaching, and improved classroom and time management skills. Exchanges of feedback or critique is generally customary within this context.

Based on the apparent effectiveness of implementing microteaching with Year 3 student teachers, microteaching as a method is a worthwhile consideration within other fields. It can be included into the course syllabus of teaching methodology to ensure that student teachers of TEC receive optimal practice for teaching their major subjects. This technique is also recommended to other teacher education institutions of Cambodia that seek to improve the quality of their teacher education. Finally, as the plan of conducting microteaching face-to-face has been changed to the online teaching practice due to the COVID-19 situation, future research should explore the impact of microteaching in physical class settings.

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Appendix 1

Phnom Penh Teacher Education College
Name: …… Class group: ……
Academic year 2020-2021
Primary Education 12 + 4, year 3
Subject: Teaching and learning Khmer literacy
Pre/Post-test
Duration: 90 minutes

I. Fill in the blanks below:

1. The 5 Reading comprehension strategies:
    a. Prediction
    b. …….
    c. Check understanding
    d. Imagination
    e. ……

Each strategy is included according to a specific lesson. All the strategies are not required to include in one lesson.

2. Please fill in the blanks of teacher's activities and students' activities in teaching writing:

	Teacher's action	Students' action
Writing Procedure Sample	Think out loud (Think and speak out along) Write, then read again in each writing step. Speaking is more than the other activities.	1. ....
Writing together procedure	២.	Share ideas for what you are supposed to write. Re-read to see whether the writing is acceptable.
Independent writing	៣.	Write by their own

3. What are the 5 steps of writing procedure?
    There are 5 steps include:

a. ……
b. Drafting
c. …….
d. Completed writing
e. …….

4. What types of writing use these 5 steps of writing?
These 5 steps used in the writing test like:
- Essay writing
- ……
- Narrative writing, persuasive writing, and other types of writing

5. Why is reading aloud important for writing?
- Reading text before writing helps students to write better text
- …… ……
- Discuss criteria of how to write effective texts such as word choice, organizations.

6. What are the procedures of each writing step?
The procedures of each writing step are:

duration	**Teaching Activities**
5-10 minutes	**Teaching writing (Teacher do)** ● Guided writing (Teacher do) ● ..... (Teacher do)
20-30 minutes	Practice writing ● .....
5 minutes	Reflection ● Small groups

II. Answer the following questions:
1. Write the procedure of teaching reading.
2. Write the procedure of teaching writing.
3. Write the procedure of teaching speaking.
4. Write the procedure of teaching listening.
5. Write the procedure of teaching grammar.

Appendix 2

Questionnaire

Please tick in the box of the answers which describe you.

No.	I. Satisfaction on teaching preparation and process	Not satisfied at all (1)	Not satisfied (2)	Partly satisfied (3)	Satisfied (4)	Very satisfied (5)
1	Lesson planning					
2	Sequential teaching process					
3	Materials used in teaching					
4	Classroom management					
5	Time management					
6	Confidence in teaching					
7	Teacher-students interaction					
8	Classroom humor setting					

No.	II. Self-evaluation on teaching practice improvement	Poor (1)	Fair (2)	Fairly good (3)	Good (4)	Outstanding (5)
1a	First loop of my teaching practice on listening is					
1b	Last loop of my teaching practice on listening is					

2a	First loop of my teaching practice on speaking is					
2b	Last loop of my teaching practice on speaking is					
3a	First loop of my teaching practice on reading is					
3b	Last loop of my teaching practice on reading is					
4a	First loop of my teaching practice on writing is					
4b	Last loop of my teaching practice on writing is					
5a	First loop of my teaching practice on grammar is					
5b	Last loop of my teaching practice on grammar is					

No.	**III. Pre-service teachers' view and emotion in practicing**	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
1	I am happy to practice in a small group.					
2	I think that small group practice helps me improve my teaching.					
3	I learnt from my friends' feedback.					

4	I improve through the lecturer's feedback.					
5	I like recording videos of my teaching performance.					
6	Viewing videos of my own teaching improves my next-loop teaching.					
7	Viewing videos of my friends' teaching makes my own teaching better.					

Appendix 3

Microteaching Observation Sheet for Peers

Teacher's name: ……
Observer's name: ……
Lesson Title: ……
Loop: ……..

No.	Lesson Presentation	Poor	Fair	Good	Outstanding
1	Stated the objectives clearly				
2	The lesson was instructed effectively and clearly				
3	The activities in the class process are effective				
4	The activities are going smoothly from step to step				
5	Speed of presentation is appropriate with the content				
6	Examples/illustrations were used to emphasize the component				
7	The instruction was integrated into the class activities and exercises.				
8	Used effective visual aids				
9	Allowed the student to participate actively by: Allowing questions Suggesting questions Suggesting question and answering the questions				
10	Students involved in the class activities				
11	Used humor to lighten the mood				
12	The teacher gave significant feedback to help students' understanding.				
13	Summarized the topic in the end				

No.	Lesson Presentation	Poor	Fair	Good	Outstanding
14	Suggested more sources for students to read				

15. Any suggestion or comment for your friend to improve their teaching?

……
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Teaching Educational Research Using a Cooperative Learning Approach: Small-Group Reading in a Virtual Classroom Setting

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Abstract

This action research study aims to examine the use of a cooperative learning approach, small group reading in a virtual classroom setting, through Google Classroom to improve student-teachers' interest in reading for Educational Research (ER). A class of 20 student-teachers in the secondary level (12+4) program of Phnom Penh Teacher Education College participated in this study. They were organized into four groups of five in Google Classroom. Classroom diaries and semi-structured interviews were used as tools for data collection. To see whether a small-group reading approach is effective, the researcher conducted five rounds of activity. The findings clearly showed that student-teachers have not only improved their interest in reading but also built positive relationships among their peers. The class rapidly grew active by following one simple rule: to help each other. The researcher would recommend all ER lecturers to employ small-group reading, yet they should have clear objectives that student-teachers must meet in order to avoid off-topic discussion, and they should also be careful about group scenarios such as group size, roles and responsibilities of student-teachers.

Keywords: Cooperative learning; small-group reading; educational research; virtual classroom

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1. Introduction

Education in the world has been changing rapidly to meet the needs of a knowledge-based society. In this situation, the Ministry of Education, Youth and Sport (MoEYS) of Cambodia recognizes the importance of starting various new learning methods and pedagogy in the teacher training process (MoEYS, 2018). Those learning methods are active learning, problem-based learning, inquiry-based learning, constructive learning, and discovery learning.

According to the Office of Educational Research and Improvement of the US Department of Education (1992), cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. This develops a sense of "we are all in the same boat together," which is a basic tenet of cooperative learning.

Educational Research (ER) is a newly introduced subject to Year 3 student-teachers in both primary and secondary level (12+4) programs at Phnom Penh Teacher Education College (PTEC). It is a brand-new subject not only for student-teachers to learn but also for PTEC lecturers to teach. Lecturers who are teaching ER at PTEC come from different backgrounds. Those lecturers previously taught Khmer, English, and Pedagogy. The ultimate goal of the ER course in Year 3 is to equip student-teachers with the knowledge and skills for educational research in general. At the end of this course, student-teachers are expected to write a research proposal, which will be a preparation for them to conduct a small action research in Year 4 in their practicum classrooms or schools as part of their graduation requirements. The course includes the following elements: definitions of the educational research/action research, identifying research topics, conducting literature review, writing research questions, collecting, analyzing data, and writing the research proposal.

From semester 1 of the academic year 2020-2021, the researcher was assigned to teach the ER courses to Year 3 student-teachers at PTEC. Previously, she was an English teacher, and she had no experience in teaching research. Coincidentally, the COVID-19 pandemic hit Cambodia hard, and all face-to-face classes were canceled. This phenomenon also pushed all lecturers to introduce online learning platforms to our student-teachers. Since then, teaching ER has been conducted in a virtual classroom setting. It is another new experience for both student-teachers and lecturers: teaching and learning a new subject in a new setting.

Before each session, the researcher, who is also a lecturer, always provides her student-teachers with some worksheets or reading articles in soft copies in advance so that they can read individually at home before class. Because of a very limited number of documents related to research guides in the Khmer language, the materials are mostly in English. After a few sessions, the researcher has found out that very few students have read the materials before class regardless of the length of those articles. One day, the researcher decided to ask them why. They were allowed to speak their mind frankly to her. Most of them said that they had difficulties in reading. Educational Research seems to be a theory-based subject which is always about lectures that are very dry, complicated and uninteresting. They were struggling to understand the articles. Another reason is their mixed levels of English that decreased their interest and motivation in reading documents.

As a result, the researcher had a desire to figure out the possible solutions to help them enjoy reading more regardless of their mixed levels of English in the context of a virtual classroom. Therefore, the researcher would like to introduce a cooperative learning approach: small-group reading in Google Classroom to them in Semester 2.

The objective of this research is to find out how small-group reading will motivate Year 3 student-teachers to enjoy reading for Educational Research in a virtual classroom setting.

The study aims to answer the following research question:

> How does small-group reading improve PTEC Year 3 student-teachers' interest in reading for Educational Research in a virtual classroom setting?

This study will provide insights into the teaching of Educational Research by using the cooperative learning and small-group reading approach while implementing a virtual classroom setting by incorporating Google Classroom in PTEC.

2. Literature review

What is a cooperative learning approach?

Firstly, it is very important to understand what we mean by a cooperative learning approach. Just putting students into groups does not guarantee that they will work together cooperatively. Traditionally, teachers have often organized students to sit in groups of four or six, although the discussion and interaction between them may be very limited. Some students did the majority of the work,

while some just sat and copied. This did not make group work better than working alone.

Jolliffe (2007) stated that in cooperative learning, it is quite essential that students are required to work together in small groups to support each other to improve their own learning and that of others. To be truly cooperative, learning should consist of five key elements, and three of these were chosen for discussion. The first one is positive interdependence or "We sink or swim together". This requires each student in a small group to contribute to the learning of the group. Students are required to work in a way so that each group member needs the others to complete the task. It is the feeling of "one for all and all for one". The second one is individual accountability or "No hitchhiking". This means that each member of the group is accountable for completing his or her part of the work. It is important that no one can 'hitchhike' on the work of others. It needs each student of the group to develop a sense of personal responsibility to learn and to help the rest of the group to learn. The third one is interpersonal and small-group skills. This means that in order to coordinate efforts to achieve mutual goals, students must: (1) get to know and trust each other, (2) communicate accurately and unambiguously, (3) accept and support each other, and (4) resolve conflict constructively (Johnson, 1990; Johnson et al., 1991).

Within the framework of the basic principles of cooperative learning, several techniques have been developed. Small-group reading is one among them.

What is small-group reading?

Small-group reading that has three to five members is a cooperative integrated reading that is one among many techniques of cooperative learning. Group work itself is nothing new or magical. So, why is a small group different from normal group work? According to Jacobs (2017), a small group is the CL principle that provides group members equal opportunity to participate. At the same time, a small group makes it less likely that any students are neglected, excluded or able to avoid participation. As mentioned earlier, CL consists of three main elements: positive interdependence, individual accountability and interpersonal and small-group skills, so tasks in small-group reading need to be structured in order to ensure that students are interdependent, individually accountable, and equipped with interpersonal and small-group skills.

Through small-group reading activities, teachers explicitly guide students on what they need to know about reading, keep them engaged and motivated through hands-on activities that promote inquiry and critical thinking (Williams et al., 2009). Moreover, active response during small-group reading increases students' engagement and motivation to participate (Amendum et al., 2009).

Each group is being assigned particular tasks by reading, which can be reading for presentation, giving feedback, or so on. In each group, members have their own roles and responsibilities to achieve the main goals.

Research on cooperative learning approaches

Up to the 1980s, about 40 studies conducted with various methods of cooperative learning in real classrooms were published. They were collected, analyzed and reviewed by Slavin (1988). Overall, the effects on students' achievement were generally found to be positive.

Cooperative learning in multi-level classrooms allowed students with diverse backgrounds to work together in small groups. Together with the redesign of the learning task, division of labor and the orderly conduct of the cooperative learning group provide each student with the opportunity to contribute to the group's progress and thereby they enjoy some academic status among peers while learning (Cohen, 1982; Sharan & Hertz-Lazarowitz, 1982). As a result, cooperative learning incorporates both the academic and social interactive dimensions of classroom life within the same set of procedures (Sharan, 1980).

In addition, studies that were conducted in Taiwan (Kao, 2003; Liao, 2005) showed that motivation and speaking skills can be enhanced via cooperative learning. These studies were conducted on junior and senior high students in Taiwan regarding their cooperative learning and its effects on their learning motivation and English-speaking skills.

Similarly, with regard to the Vietnam context, Dang (2007), Pham et al. (2010), and Tuan (2010) conducted studies on the use of cooperative learning among students of secondary and intermediate level in which they analyzed the experiences and perceptions of those students. The results showed improvement in language skills, interpersonal skills, and creative thinking skills.

In early 2020, online learning was introduced to nearly all levels of education in Cambodia because of the impact of COVID-19. At the same time, we have tried several innovative means to include cooperative learning in such classroom settings. Research has reported that group work through computer-mediated collaboration could result in improved performance, interaction, and critical thinking (Bliss & Lawrence, 2009). In this sense, cooperative learning has been found to result in higher achievement among students when compared to individualistic and competitive learning even when different methods are applied in diverse settings (Johnson et al., 2000).

Since there appears to be no previous work that uses cooperative learning in the new classroom setting within PTEC, together with the current situation of education in Cambodia that points toward an increased use of online learning

and research on the benefits of cooperative learning at all levels, this study aims to find out how a cooperative learning and small-group reading approach will help Year 3 student-teachers to enjoy reading for ER in a virtual classroom setting. The results of the study will benefit lecturers as well as student-teachers participating in online ER courses, as they reflect on and improve teaching and learning practices in the virtual ER classroom.

3. Methodology

3.1. Research design

This study employed qualitative data collection since the central concern of this research is to understand how a cooperative learning approach (small-group reading) will help Year 3 student-teachers to improve their interest in reading for the ER subject. Classroom diaries and semi-structured interviews were used as the main tools for data collection.

3.2. Research setting and participants

Twenty Year 3 student-teachers from a class of the secondary level (12+4) program of Phnom Penh Education College (PTEC) participated in this study. There were 12 female student-teachers among the 20 participants. The class was randomly organized into four groups of five students based on the chronological order of the class name list.

3.3. Research instruments and data collection procedure

As stated earlier, classroom diaries and semi-structured interviews were used as the main tools for data collection in this study. First, classroom diaries are a data collection tool that simultaneously supervises all class activities and records detailed observation of them for later analysis (Nunan, 1989). In each classroom diary, the researcher, who is also the lecturer, focused on three main aspects: lesson objectives, attendance, and events. The researcher always started each record by stating the objectives of the lessons. In addition, successful group work relies mainly on regular participation, so each record took note of the absence of the group members. Thus, attendance was regularly checked. Then, the main record noted down all the activities and events of classes. Each group needed to create a Google Meet link specifically for their own group members and send it to the class Telegram group or Google Classroom. Each session lasted around 60 minutes. There were two sessions for one meeting. The researcher always joined the meeting in order to facilitate, observe, and take notes of students' work, reading and discussion. Simultaneously, the representative of each group recorded the meeting via his or her devices and sent it to the lecturer after finishing each session.

Second, semi-structured interviews were conducted in the Khmer language as it allows the participants to express their ideas freely. After implementing the cooperative learning approach (small-group reading), the researcher conducted the interviews using in-depth techniques to enable the interviewer to get in-depth information from participants as well as to get to know about their perception after experiencing small-group reading in Semester 2 together. The researcher randomly selected one male and one female student-teachers from the class. The interview questions were mainly about how they viewed, preferred, and compared between ER in Semester 1 and 2.

Before describing all the activities in the research conducted in Semester 2, we should know what the activities conducted in ER classes of Semester 1 are. That is, before each class, each session always started with a warm-up activity: checking all the homework from the previous session. Then, the researcher introduced a new topic by lecturing in Google Classroom. After that, she asked students to work individually, such as to read to get more ideas on the new topic or so on. The researcher then concluded the class and assigned a new homework for next week's session. However, in Semester 2, the researcher redesigned the lesson by changing and adding some more activities based on cooperative learning principles to promote a sense of CL's three key elements: positive interdependence, individual accountability, and interpersonal and small-group skills, which they have not experienced before. Those included implementing a rule: always help each other, guiding each group to share responsibilities, vote for a checker to facilitate discussion in their groups, and so on. Again, before each session, the class began by checking homework. Then, instead of lecturing in Google Classroom, the researcher asked students to form in four groups of five members in Google Meet in order to read the articles of each lesson that had been prepared for them. This encouraged learning by doing. The activity is known as small-group reading. After reading, each group had to prepare, present what they had read to the class, give feedback to their peers, and complete other tasks assigned. In Semester 2, the lecturer who was also the researcher acted as a facilitator rather than a lecturer. After that, the lecturer wrapped up and concluded the class and assigned new homework.

3.4. The conduct of small-group reading activities

Twenty students were randomly organized into four small groups of five students based on the chronological order of the class name list. There were five rounds of activities of small-group reading (or cooperative integrated reading). Helping each other is one simple rule that needs to be strictly followed. In each round, a task related to reading was assigned. Reading normally lasted from 20 to 30 minutes. The discussion and activity took approximately another 30 minutes. Each reading passage was taken from the course's main reading material: A Practical Guide to Research Methods, third edition, by Dr Catherine

Dawson. Class worksheets and various articles were taken from Google Scholar. There was a checker in each group. All members of each group shared responsibilities of the assigned tasks in order to meet the goal of each task. Each session was video-recorded so that the researcher could always go back and observe via the videos.

The first task was called "Reading for presentation". In this task, the researcher asked students to read about how to calculate the Mean, Standard Deviation (SD) and Correlation in the main reading material, and prepare a demonstrating presentation to the class after the group work. The second task was also "Reading for presentation". Yet, this time the topic was a new one. It was about coding for qualitative data analysis. Again, each group had to present what they had read and understood to the class. The third task was "Reading to give feedback". In this task, each member of the group had to read the completed worksheet (Worksheet A) of the other three members and give feedback to their peers after reading. Worksheet A was about identifying research problems, sub-problems, and solutions for those problems. Next, the task was also "Reading to give feedback". Similar to the previous task, each member needed to read and give feedback again for the other three members about Worksheet B: Forming research questions. In order to give feedback to their peers, each student-teacher needed to read about how to write a good research topic and good research questions in the main material. Lastly, the task was known as "Reading for Literature". Each group needed to search for articles related to their research topics in Google Scholar and read them. After reading, they had to do Worksheet C which was about finding at least one related literature and filling some important information about the literature they found, such as year of publication, names of authors, research objectives, research questions, theoretical/conceptual framework, research design, data collection tools, findings, and conclusion.

3.5. Data analysis

To analyze the data, the researcher developed three main themes: positive interdependence, individual accountability, and interpersonal and small-group skills. Two sub-themes also emerged: motivation to read and positive relationships among peers. The researcher used the data from the classroom diaries of five class periods as the primary units for data analysis. In addition, the data from semi-structured interviews were used to complement the dairies.

Figure 1

Outcomes of a CL approach: small-group reading

4. Findings

4.1. Findings from Classroom Diaries

During the first task (Reading for presentation), the researcher noticed that some groups did not participate actively. They read the assigned task, but they did not talk or discuss with each other. Some of them seemed to be rather shy and dared not to share their ideas. After reflecting on the first task, the lecturer assisted with the group work and reminded them about the rule ("Helping each other") in the second task. It was found that in the second task, those passive groups became more active in discussing with each other. Moreover, the quality of their second work was also much better than the first one. They designed attractive slides and presented them to the class with confidence. In the third task (Reading to give feedback), it was found that four groups were able to give each other feedback after reading. However, one group still had some problems as they were not quite sure about their roles and responsibilities. The lecturer further assisted that group, then in the next round of the fourth task activity, no more problems were discovered. Last but not least, the fifth task of the activity showed that they built up a habit of discussion. They actively discussed information they found in the literature and learned together.

Based on the classroom diaries, the researcher found that they gradually built up not only a sense of individual accountability to achieve the group's goal but also the sense of positive interdependence among their small group, which increased their motivation in reading and promoted positive relationships among their group members.

4.2. Findings from Semi-Structured Interviews

Data from the interviews showed that after employing small-group reading, student-teachers who previously did not feel comfortable to read now got to enjoy reading with help and support from their team. As one participant mentioned:

> *Before, I always checked every word when I read alone. I felt so lost and directionless. However, I now learnt to get the main idea from texts from my group. It was such a good chance to learn from each other. Sometimes, I feel shy to ask the teacher, so I can ask friends in groups… (S2)*

Furthermore, the data analysis also revealed that student-teachers got along better with their classmates. For example, one participant said: "We got to know each other better…" (S1).

The findings clearly illustrated that student-teaches felt at ease to read and had fun with the activities with some support from their classmates. They also managed to get along better after implementing small-group reading.

It can be concluded from the semi-structured interviews that student-teachers unconsciously developed a sense of interpersonal and small-group skills which enabled them to obtain positive relationships with their group members.

The analysis of classroom diary and semi-structured interview data led to two major findings. First, small-group reading promoted a sense of individual accountability and positive interdependence among student-teachers, which increased their motivation in reading. Second, small-group reading created a sense of belonging, interpersonal and small-group skills, which built up positive relationships among their peers.

5. Discussion

As mentioned above, the findings of this study clearly showed that small-group reading not only increased student-teachers' motivation in reading but also developed positive relationships among their peers. The small-group reading gradually became active, and the working outcomes of each task also became

better. As one participant said, she got to have a better understanding of her friends: "We got to know each other better…" (S1). Another participant added that he could learn from his peers and asked them to explain to him if he did not understand:

> *Before, I always checked every word when I read alone. I felt lost. Then, I gave up. However, I now learnt to get the main idea of texts from my group. It was such a good chance to learn from each other. Sometimes, I feel shy to ask the teacher, so I can ask friends in groups…". (S2)*

These findings are in line with Kao (2003) and Liao (2005) who found that motivation and speaking skills of junior and senior high school students could be enhanced through cooperative learning. Studies by Dang (2007), Pham et al. (2010), and Tuan (2010) in Vietnam also found that upon undertaking cooperative learning, secondary and intermediate level students' language skills, interpersonal skills and creative thinking were improved.

6. Conclusion

The present study has established positive outcomes of small-group reading. First, small-group reading promoted a sense of positive interdependence and individual accountability among the groups when they followed one simple rule: helping each other. Second, it built up interpersonal and small-group skills of student-teachers, which promoted positive relationships among peers. The class rapidly grew active after the introduction of cooperative learning.

This study has some important implications. First, it is recommended that all lecturers, especially ER lecturers, should consider employing small-group reading in their classes. Second, when using small-group reading, lecturers should be cautious about group scenarios such as group size, roles, and responsibilities of student-teachers. Third, lecturers should make sure that they clearly state the goals and objectives that student-teachers must meet and that there is no off-topic discussion. Fourth, it is important to note that small-group reading is only a technique of cooperative learning while there are many other techniques such as Think-Pair-Share, jigsaw models (e.g., Home & Expert Groups), and so on.

Finally, this study is not without limitations. First, only a class of Year 3 secondary level (12+4) program participated in this research. There are still many more classes of Year 3 primary and secondary levels (12+4 programs) at PTEC. Second, there were just five tasks of activities conducted in this study due to time constraints. Third, small-group reading was only employed in the ER class. Last but not least, small-group work in this study was mainly about reading, not other skills.

Therefore, future research should cover more classes to see whether there are different findings. Moreover, other lecturers may consider conducting the activities of small-group reading for the whole semester. Other researchers of other subjects in PTEC and elsewhere may do experiments using small-group reading in their classes, too. Finally, other researchers are encouraged to integrate small group reading with any other skills rather than reading.

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Using Guided Writing to Improve Student Teachers' Expository Paragraph Writing at Phnom Penh Teacher Education College: An Action Research Study

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Abstract

This study reported the results of action research conducted with student teachers in their second year at Phnom Penh Teacher Education College (PTEC). During the academic year 2020-2021, student teachers at PTEC struggled with their paragraph writing. They had trouble putting their thoughts into words and using proper phrases and sentences to compose an expository paragraph in particular. Action research was designed to teach writing skills through guided writing to address this concern. The purpose of the study was to examine whether guided writing could assist student teachers to enhance their expository paragraph writing abilities. Data from the pre-test and post-test were analyzed using a t-test to examine the significant changes between both tests. The results showed that guided writing could help students enhance their writing skills. Based on the t-test value, it was proven by the mean score rate of the students' pretest and posttest of the experimental group. The mean score for the pretest and posttest of the second cycle of the experimental group was 59.46 to 83.16 while the mean score of the pretest and posttest of the control group was 54.66 to 68.91. The student teachers showed a strong desire to be actively involved in the teaching and learning process through guided writing. As a result, it is possible to conclude that guided writing can help students enhance their expository paragraph writing. Based on the findings of the study, it is suggested that English teachers should employ guided writing in their classrooms to assist students to develop their writing skills.

Keywords: Guided writing; expository paragraph; action research; student teachers; teacher education

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1. Introduction

Language is a system or means of communication to get ideas or information across. This importance is the reason why people need to learn it. English is considered an international language and is used in every part of the world in both English as a Foreign Language (EFL) and English as a Second Language (ESL) context. In an EFL context like Cambodia, English is not a primary language for daily communication. The principle of providing maximum input and opportunities for output of the target language is practical for the teaching and learning process in such a context. English can be categorized into four major skills: listening, reading, speaking, and writing. Listening and reading are receptive skills, while speaking and writing are productive skills. In particular, writing skills are considered the most difficult skills to learn since they require many components of the language, such as knowledge of grammar, adequate vocabulary, the structure of writing, and the ideas to make the writing readable and meaningful for readers (Harris, 1993). Writing skills are a crucial skill for learners to put their ideas on paper to express meanings and messages in any form of communication. According to Harris (1993), writing is a complex activity. It is of fundamental importance to learning, personal development, and achievement in the education system. As teachers, we need to strive continually to find the best ways to help our students find fulfillment as writers. Teaching writing is very crucial from the primary to higher education level because it contributes to the improvement of students' communication ability and their success with other subjects. Students need to be prepared for this globalization era. In short, students should master good writing skills for both communicative and academic purposes.

Byrne (1997) stated that writing is the production of a sequence of sentences arranged in a particular order and linked together in certain ways. A sequence of sentences, whether they are short or long, after being put in order and linked together, will form a coherent whole. This coherent whole is called a text. A text may consist of one paragraph or more. Bell and Burnaby (1993 cited in Nunan, 1992) mentioned that writing is an extremely complex cognitive activity in which the writer is required to demonstrate control of several variables simultaneously. This sentence-level includes control of content, format, sentence structure, vocabulary, punctuation, spelling, and letter formation.

Writing can be classified into many types. One basic writing organization that students need to develop is paragraph writing which will lead them to a more complex form of writing. Langan (2008) pointed out that a paragraph is a short paper of around 150 to 200 words. It usually consists of topic sentences, supporting sentences, and concluding sentences that make up together to explain or support one topic or subject. There are some common types of paragraphs such as narrative paragraphs, descriptive paragraphs, expository paragraphs, and

persuasive paragraphs.

Because it is so important for student teachers to develop their writing skills, Phnom Penh Teacher Education College offers 14 credits for Language Enhancement and Academic Discourse Skills for Bachelor of Art (Education) programs in Lower Secondary Education and two credits for Primary Education, which students must complete within four years at PTEC (MoEYS, 2021). This course provides student teachers with the essential language and voice skills they will need to teach as well as engage successfully in academic writing tasks such as assignments and theses.

However, according to teacher trainers' reflective writing and general observations from teacher trainers who have taught this course since 2018, some student teachers still lack the basic skills of English necessary to produce a well-written academic paragraph. The issue isn't just their basic knowledge of the English language; it is also the approaches used by the teacher trainers.

Student teachers struggled to develop their ideas in written form due to their low degree of writing skills. Their attitudes toward writing lessons and the results of the pretest were both indicative of the problem. When they were asked to write, they always complained. They also stated that they were unable to write despite not having tried it. They appeared to be unhappy about having to take writing classes. To summarize, they attempted to avoid it. Aside from that, they were unable to openly express their ideas and thoughts. It was because they lacked language competence and were fearful of making mistakes when it came to sentence structure.

According to the teacher trainers, the students had some challenges with their writing abilities. The lack of vocabulary, grammar expertise, and originality contribute to these issues. According to one teacher, his students had to look up words in dictionaries to see if they had been learned previously.

The students admitted that they couldn't mentally arrange phrases into proper written English. Because some of them lacked basic grammatical and vocabulary abilities, they were unable to freely communicate their thoughts. Furthermore, the pupils had little motivation to study writing since they believed it was difficult to learn and they had limited time in the classroom to practice writing. The researchers also administered a pre-test to determine the state of the students' writing abilities.

Based on the problems mentioned above, we chose guided writing to improve paragraph writing because it is believed that learning by doing is the best way to learn writing. Furthermore, guided writing is a teaching strategy that can be used to extend and develop text written during independent writing. It involves

a teacher guiding a small group of students in their attempts to create individually written texts. The teacher is also responsible for responding to students' attempts and extending students' thinking during the process. It allows students to focus on many areas of writing, such as spelling, grammar, sentence structure, content, punctuation, and so on.

It also encourages student teachers to revise and edit their writing. The students' work can be assessed by the teacher by moving around the class during the guided writing process. Based on the potential of guided writing, it can be concluded that this technique can help improve student teachers' expository paragraph writing.

1.1. Research objectives

Based on the background of the problems, the objective of the present research is to find out whether guided writing can improve expository paragraph writing of the second-year student teachers at Phnom Penh Teacher Education College.

1.2. Research questions

This study attempts to answer the following research question:

How can guided writing improve expository paragraph writing of the second-year student teachers at Phnom Penh Teacher Education College?

2. Literature Review

2.1. Definitions of Writing

According to Harris (1993, p. 10), *"writing is a process that takes time, especially when we consider the sometimes-lengthy periods of thought that precede the creation of an initial draft."* He also claims that writing is a difficult endeavor. It is critical to learning, personal growth, and academic accomplishment in the educational system. Similarly, according to Hedge (1998, p. 19), *"writing is a process. It is a complicated procedure that involves several operations running at the same time. Furthermore, some writers appear to have a much greater grasp of how to make the process work for them, resulting in more successful works of writing."* We may conclude from the above definitions that writing is a process that involves complicated activities and is vital to the educational system. All occur at the same time to generate a successful piece of writing.

Byrne (1997) offered another definition, stating that writing is the process of forming letters or combinations of letters by making marks on a flat surface of some kind. It encompasses more than the creation of graphic symbols, much like speaking encompasses more than the creation of sounds. To construct

words, the symbols must be placed according to certain standards, and the syllables must be grouped to form sentences. From this definition, it can be concluded that writing is the production of graphic symbols that have to be arranged according to certain conventions to form meaningful words, sentences, etc. Therefore, writing is a complex process and set of activities involving the arrangement and production of written form in which the writer employs linguistic conventions (word spelling, sentence structure, punctuation, and so forth) to express ideas, thoughts, opinions, and feelings in a way that people, as readers, can comprehend.

2.2. The Writing Process

Writing is a multi-step process with various stages. Process writing, according to Brookes et al. (1997), is about handling one by one the aspects that determine what we write down. The writing process is separated into three stages: planning, drafting, and revision (McCrimmmon, 1984).

Planning is a set of techniques for locating and producing written information. It is also known as pre-writing. Writers choose a topic and acquire facts or ideas during this stage. To summarize, planning is the first step in the writing process that assists writers in discovering, exploring, and evaluating the topic.

Drafting is a set of techniques for organizing and developing a long piece of text. Writers should decide on the key topic that will be communicated while drafting. Writers will then concentrate on the outline, which is how they will organize the substance of their work to make it coherent. Finally, a title, an introduction, and a paragraph are added to complete the composition.

Revising is a set of techniques for re-examining and re-evaluating the decisions that led to the creation of a piece of writing. When revising, writers should critically examine their rough draft to see if the aim is obvious. Writers double check all parts of the writing process, including spelling, sentence structure, grammar, punctuation, paragraph development, and so on. This revision process can be repeated until all of the main components of the text are in place. After all of these steps have been completed, the writers will be able to see the outcome of their work (McCrimmmon, 1984).

2.3. The Teaching of Writing

According to Harmer (1997, p. 73), there are four reasons for teaching writing to English as a foreign language:

a. Reinforcement

Although some students learn languages solely via their ears, the majority of them gain immensely from seeing the language written down. Students frequently find it beneficial to compose sentences in a new language shortly after learning it.

b. Language development

The act of writing itself aids learners in learning as they go. All of the mental effort students must engage in to generate effective written texts is part of their ongoing education.

c. Learning style

Writing is excellent for students who need a bit more time than others to pick up a language simply by looking and listening. Instead of the hustle and fuss of interpersonal face-to-face conversation, it can also be a quiet reflective pastime.

d. Writing as a skill

Teaching writing is equally as vital as teaching speaking, listening, and reading. Students must be able to compose letters, respond to advertisements, and so forth. They must also be familiar with some of the norms of writing, such as punctuation and paragraph structure.

2.4. Definitions of Guided Writing

Guided writing is linked to a few theories. “Guided writing loosens the teacher's authority but gives a series of simulators, for example, by asking pupils a series of questions” (Brown, 2000, p. 328). According to Huebener (1965, p. 78), “Guided writing is the third writing phase after imitative writing and dictation.” The teacher guides the students' short-written responses, which is why it's called guided writing. Based on the concept above, guided writing is a writing process that follows imitative writing and dictation and is guided by the teacher using stimulators.

According to Doff (1997), as soon as students have acquired basic skills in sentence writing, they need to go beyond tightly restricted writing tasks to freer paragraph writing. If we can assist their writing, students will be able to make this shift more smoothly and learn more. Thus, guided writing is a writing process that is limited to structuring sentences, direct answers to questions, and language-based exercises that focus on vocabulary building, reading comprehension, grammar, and oral skills. It then culminates in a piece of writing to improve students' writing ability.

2.5. The Process of Guided Writing

According to Reid (1993, p. 328), typical guided writing activities in commonly used textbooks include the following:

a. Model paragraph
   The teacher starts by providing a short text as a model paragraph and quickly explaining how a text can be utilized as a model for writing. The teacher must then select an appropriate text for the lesson. It is possible to adopt a piece of text from the textbook that can be written on the board before class commences or transcribed onto worksheets. Students may concentrate on reading comprehension and even explore specific aspects of the text provided.
b. Comprehension questions
   The teacher may ask a series of questions based on the exemplary paragraph provided, which contain basic information about the paragraph's content.

c. Language-based exercises
   A series of tasks focusing on vocabulary building and sentence structure knowledge related to the text may be given by the teacher. Pattern drilling operations such as transformation, substitution, or completion of pattern drills may be included.

d. Oral composition
   Another method for guiding paragraph writing is to perform oral preparation with the entire class beforehand. Students give suggestions for what to write during conversations, and the teacher creates an outline or a list of essential expressions on the board to serve as a foundation for students' writing.

e. Written composition
   Students may follow the model provided by the teacher, but they must replace any material that is incorrect for them. Students can use the model paragraph that is similar with some amount of variations. They may use as many of the model's structures and words as they want in their paragraph.

2.6. Previous Research on Guided Writing

Galbraith and Torrance (2004, p. 64) offered two critical perspectives on the practical implications of writing styles based on previous research. First, a planning method in which authors "focus on figuring out what they want to say before putting pen to paper, and only begin to compose full text when they have figured out what they want to say." The teacher could use available media, such

as photos, animations, and videos, or instruments to aid writing and guide pupils who have some thoughts to communicate before really beginning writing, depending on the planning technique. Second, a revision approach in which writers "figure out what they want to express while writing, and material evolves across several iterations." Students can think about what they want to write by observing media material and rewriting their manuscripts at the same time.

Writing strategies on how to generate and formulate abstract ideas, as well as the usage of appropriate media or instruments to aid pre-writing and subsequent activities, are essential challenges, as noted above. The most significant aspect of these tactics is guided writing. Guided writing is a type of instructional writing in which the writing process is primarily taught through modeling, support, and practice (Tyner, 2004). According to Holdich and Chung (2003), guided writing allows young writers to establish more valuable connections between text, sentence, and word level judgments, as well as helps youngsters form and redraft writings with specific criteria in mind. Most significantly, when using such a writing technique, the instructor should consider how to steer young students into independent writing and assist them in discovering their own strengths by providing opportunities for choice, peer reaction, and additional scaffolding (Oczkus, 2007).

Therefore, the goal of the present study is to see whether guided writing can improve expository paragraph writing among second-year student teachers at Phnom Penh Teacher Education College.

3. Methodology

This study employs classroom action research. According to Ebbutt (1985 as cited in Hopkins, 1993), action research is the systematic study that attempts to enhance educational practice by groups of participants through their practical activities and reflection on the effects of those actions. Action research is a type of self-reflective inquiry conducted by participants in a social interaction situation (including education) to improve educational practice by group or participants and through their own reflection on the effects of these actions.

This study was conducted at Phnom Penh Teacher Education College (PTEC), where the researchers teach English grammar and academic writing to second-year student teachers of lower secondary education. The medium of instruction is English and Khmer, with Khmer being the country's national language. The second-year student teachers at PTEC were the focus of this study. This class had a total of 25 student teachers. It was made up of 6 males and 19 females. For several reasons, we chose the second-year student teachers of mathematics as the focus of the research. First and foremost, we taught this

class when the student teachers were in their first year at PTEC. Thus, we are familiar with the teaching and learning process there. Second, it is true that some students are brighter and more active than others. Some of them also performed poorly in English, particularly in writing. They are also passive participants in the teaching and learning process. It appears that some of them were unwilling to learn. Third, the time allotted for the student teachers to master written English is relatively limited, and some students still struggle with writing.

The pre-test and post-test items, as well as the teaching lesson plans, were created by the researchers. Prior to the experiment, a pre-test was given to determine the level of writing composition proficiency. Both groups received six lessons from the researchers. The experimental group (Group A) received guided writing exercises, while the control group (Group B) received non-guided activities (i.e., through explanation, oral instructions, and dictations). The classes lasted two months and consisted of two 2-hour sessions every day. An hour was allocated for each group.

Finally, both the experimental and controlled groups were given the post-test, which used the identical set of questions as the pre-test. To determine the effectiveness of guided writing in teaching composition, the results of both the pre-test and post-test were recorded and analyzed on the basis of the average percentage of both groups from pre-test to post-test. After the whole teaching and learning process had been conducted in the classroom, the researchers who were also the teachers analyzed the result of the test by scoring it and finding the mean score. It was done in order to make sure whether or not there was an improvement in students' writing.

4. Results

4.1. The First Cycle

In the first meeting, the student teachers were introduced to the topic titled *"The Qualities of a Good Teacher"*. The main objective of this meeting is to write an outline about the topic. The students were asked to share related words to the topic. Next, the teacher gave a model paragraph entitled *"Three Main Qualities of a Good Teacher"* along with worksheets dealing with the topic. After completing the worksheet, the content and the sentence structures of the text were discussed as a whole class. The teacher, finally, gave a short explanation about the present simple tense used in the text, and the students had to practice using the present simple tense in their worksheet. At the end of the class, students were asked to write outlines for the next topic *"Why Do You Want to Be a Teacher?"* as their homework.

The essence of the second meeting was to discuss and share their writing in

order to provide them with some feedback. The class began with a review of the previous lesson, and students were asked to share their homework with the class. The class then discussed the outline on the whiteboard until they found the most suitable outline as guidance for the next writing. Students used the outline to write their paragraphs with support from the teacher. The teacher's job is to remind them about proper grammar usage in the paragraph and the structure of sentences used in the model.

The main objective of the third meeting was to provide the student teachers with the new text that is still related to the previous text. The researchers started the class by reviewing and reading one of the student's writings. The teacher provided texts for the same topic, and he gave enough explanation along with vocabulary pointers related to the topic. The main lessons were for the students to work in groups of four. They were then asked to write an outline for the new topic *"How to Be a Good Teacher"* before composing their expository paragraph. Following the completion of their writing, the students were requested to read their work aloud in groups. He then invited the other group to provide feedback on their writings. Finally, their homework was to write a paragraph on the same topic based on the discussion and feedback received from the teacher and their classmates.

4.2. The Second Cycle

Throughout this cycle, the researchers attempted to overcome various obstacles. He made the decision to instruct the students by allocating more time to language function exercises. He provided ample opportunities for them to practice their vocabulary and sentence construction. He also became more involved in class management so that the students could get the most out of the session.

In the first meeting, the topic was *"Using Technology in Learning."* The purpose of this session was to introduce the students to new content and prepare them for the next meeting. The researchers began the class by recapping the previous conversation and providing some brainstorming questions on the topic. Following the brainstorming, the researchers went over the simple present tense in further detail. He also assigned several tasks to provide them extra opportunities to write sentences in the present simple tense. Afterwards, the students were invited to work in groups of four to discuss the model paragraph on *"The Benefits of Using Technology in Learning."* They were also asked to complete the worksheet about the text. Then, the researchers asked them to summarize their work in an outline and rewrite the paragraph in their own words with the outline as their homework.

The researchers' intention in the second meeting was to have students discuss

and compose orally on the same topic in the last meeting. The students began discussing in their respective groups and revised the outlines. Each group shared what they had discussed in their groups with the whole class. The last activity was giving feedback on the students' opinions. The researchers asked the students to summarize the result of the discussion in an expository paragraph. He also went around the class to give individual feedback to the students.

In the third meeting in the second cycle, the researchers used the topic *"How Can You Use Technology in Your Learning?"*. After reviewing the previous lesson, the researchers asked the students to share their opinion on the topic, and he put their ideas on the whiteboard. The model paragraph was written on the whiteboard, and the class started dealing with difficult words. The teacher took the chance to explain the relative pronouns used in the relative clauses in the text. The students were also asked to do some tasks on their worksheets before the teacher assigned them to write paragraphs based on the outline on the whiteboard.

The observation from both cycles yielded positive and negative outcomes that may be used to inform the reflection. After the two cycles, most of the students could construct sentences correctly when they were asked to complete their worksheets. The discussion on the topics made the student teachers more active in both speaking and writing, which improved their writing.

4.3. Results of the t-test

The post-test was conducted after finishing the meetings with the students. The t-test results are shown in Table 1.

Table 1

T-test results for the improvement of the guided writing

Test	Group	Mean	SD	P^*
Pre-test	Experimental	59.46	16.26	0.00
Post-test		83.16	22.2	

$^*P < 0.05$

The mean score of the experimental group, as shown in Table 1, was 59.46 for pre-test and 83.16 for the post-test, while the mean score of the pre-test and post-test of the control group was 54.66 to 68.91. The results showed that guided writing could help student teachers enhance their expository paragraphs.

5. Discussion

According to our pre-research observations, students' writing skills in relation to vocabulary mastery, sentence structure understanding, and self-confidence are still low. The teacher does not use an approach that allows students to participate actively in the classroom, and the lesson plan is frequently monotonous. Furthermore, the students are not adequately prepared to write, and as a result, they frequently fail in their writing.

Guided writing assists students in creating any type of material by providing a model paragraph. The students' vocabulary understanding is improved through exercises led by the teacher in guided writing. Furthermore, the students are taught different types of sentence structures as well as linguistics components of writing so that they are better prepared to write. Using guided writing strategies increased vocabulary and sentence structure expertise. Furthermore, students' creative thinking is not entirely constrained by sentence structure. The students can be more flexible in conveying their ideas and views with guided writing, and eventually, deliver their message through their writing.

Guided writing includes practice with oral preparation, which makes the class more engaging. It can be done in a variety of ways depending on the interests and abilities of the students. Oral preparatory exercise in guided writing makes the work considerably more fascinating and brings about more curiosity within the class (Doff, 1988). Furthermore, the teacher provides feedback and advice to the students throughout guided writing tasks. The teacher resolves any issues that emerge during the writing exercise. Interaction before, during, and after writing will make the students more successful writers. Therefore, it is possible to conclude that guided writing can help students develop their writing skills.

6. Conclusion

This study has revealed the effectiveness of guided writing in teaching composition as evidenced by the outcome of average increment that shows that the experimental group performed better than the controlled group as a whole. The mean score of the experimental group, as shown in Table 1, was 54.66 for the pre-test and 83.16 for the post-test, while the mean score of the pre-test and post-test of the control group was 54.66 to 68.91, respectively. According to the results, when teaching writing, teachers should help students get used to writing. Guided writing has been shown to be a successful method for increasing students' writing abilities. In terms of practical application, guided writing is a good approach to use in the teaching and learning process. One method of helping students to improve writing is to use guided writing. In brief, teachers

who want to help their students develop their writing skills should employ guided writing as one of their instructional approaches. Once students understand the overall writing process in guided writing, they will be eager to begin writing.

Teaching writing is a difficult task since many students believe it is the most difficult skill to master. As a result, during the teaching and learning process, teachers will face numerous challenges. Therefore, they must be astute in selecting approaches that will transform their students' attitudes toward writing while also improving their writing skills. They can employ guided writing as one of their methods. Teachers should also provide students with easy samples of good writing as a model to follow. Furthermore, teachers should take an active role in providing guidance to students, as this will greatly benefit them.

It is anticipated that this study's findings will be useful as a reference for future research, particularly in the field of writing instruction. We also expect that other researchers will be able to use this technique with students at different levels in their research. Furthermore, other researchers can apply this technique to improve students' writing skills in areas such as handwriting, punctuation, and spelling. They can also conduct experimental studies comparing this strategy to other methods of teaching writing.

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Improving Teaching Effectiveness through Peer Observation: A Case of a Teacher Educator of Social Studies at Phnom Penh Teacher Education College

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Abstract

This study explores ways of enhancing teaching effectiveness through online peer observation. The research participant was a teacher educator who received a good rating from the teaching trainees at the end of his teaching at Phnom Penh Teacher Education College (PTEC). Three cycles of observation were used to analyze the teaching methods and techniques of the teacher educator. They included: (1) Observation and Reflection, (2) Reflection and Planning, and (3) Reflection and Refreshment. The findings showed that the teacher educator improved his teaching methods to make the class more interesting and attractive, making his student teachers become actively involved in the classroom activities. The teacher educator engaged student teachers in the process of cognitive skills in the lesson and real-life situation. The teacher educator appreciated how the peer observation provided mentorship that helped him improve his teaching skills. The findings suggest that teacher educators should use peer observation to help student teachers learn from each other to enhance their teaching skills and professional development.

Keywords: Peer observation; teaching effectiveness; teacher educators; Cambodia

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1. Introduction

As educators across the globe wrestle with adjusting learning experiences to meet rapidly evolving societal and business expectations, the need to develop processes that support critical reflection and encourage growth in professional practice appears to be gaining momentum. Hunzickers (2011) asserted that what to teach, how to teach, and how to reflect on teachers' practice are issues that apparently challenge educators.

According to Norbury (2001), teaching observation was seen as a method by which both the observer and the observed could improve their own teaching by seeing different ways of teaching, getting feedback on their own teaching from someone who was there, and having discussions about what works, what does not work and why, as well as possible improvements for the future. Peer observation of teaching offers many benefits such as improvements in teaching practices, the development of teaching confidence, and improvement in the ability to learn more about teaching. Peer observation is most effective when the process is designed to be nonjudgmental and developmental rather than evaluative and externally required (Bell & Mladenovic, 2008).

A study by Bell and Mladevonic (2008) showed that peer observation of teachers was more effective than expert coaching or workshops alone. The authors define peer observation of teaching as engaging in collaborative, developmental activity in which professionals offer support by observing each other teach; explaining and discussing what was observed; sharing ideas about teaching; gathering student feedback on teaching effectiveness; reflecting on understandings, feelings, actions and feedback; and trying out new ideas (Bell & Mladenovic, 2008). Similarly, Hunzickers (2011) added that creating professional development opportunities that have an authentic impact on practice requires more than simply brief presentations.

According to Charis (1989), effective teaching is essentially connected with how best to bring about the desired student learning by some educational activities. It requires a lesson organization that can be adequately monitored. The teacher might have to be not only a clarifier of ideas and presenter of information but also an advisor and model of scientific thoughts. Smith (2002) argued that a class taught by an effective teacher would be full of lively, interested and positive children who achieve high standards. There will be low stress and little tension. There will also be a lot of group cooperation and tolerance.

Andrew (2002) pointed out that effective teachers must internalize knowledge and skills so that they can deploy them quickly and flexibly. Moon et al. (2004) indicated that there are three main factors within a teacher's control that

significantly influence students' achievement: professional characteristics, teaching skills, and classroom climate. Each provides distinctive and complementary ways that allow teachers to understand the contribution they make. However, none can operate independently to deliver value-added teaching.

In Cambodia, the teacher policy action plan that has been enacted by the Ministry of Education, Youth and Sport emphasizes standards for teachers in hopes of enhancing teachers' learning, capacity development and professionalism (Teacher Training Department, 2015). Professional standards upheld by Cambodian teachers include four components of professional knowledge, professional practice, professional study, and professional ethics (Teacher Training Department, 2016). However, studies on methods of measuring and observing what teachers know and do and studies on the main dimension of professional development have not been addressed in the policy or its implementation. Hence, this could bring about limitations to the policy's effectiveness as the standard characteristics may not clearly define their effectiveness and productivity (Ingvarson & Rowe, 2008).

Kim and Rouse (2011) noted that policies related to the expected impacts of teacher education on teacher quality will be of limited use until teachers have the professional capacity to reflect on their teaching practices and until their broad commitment is cultivated and respected. This means that teachers' realization and commitment to active and conscious participation in achieving education goals and change regardless of socio-economic and political pressure are strongly related to commitment to excellence and quality rather than solely emphasizing on either pre-service or in-service teacher training. In this sense, Byrne et al. (2010) proposed that peer observation is worth participating in the process for professional development. Norbury (2001) also found that peer observation is an important tool to motivate lecturers to reflect on their own teaching practice and improve the quality of teaching; similarly, Jenny and Lan (2014) pointed out that peer observation could contribute to the development of lecturers' critical reflection and the enhancement of teaching practice.

1.1. Statement of the Problem

Reflecting on peer feedback in such a new educational setting as PTEC can hint at the possibility of a parallel line in terms of promotion of such practices. Particularly, the promotion is related to the continuous professional development plan for all teacher educators as they strive to provide the best experience for their students.

It is factual that since the establishment of PTEC in 2017, and the first batch of 12+4 teacher education programs in 2018, the Office of Internal Quality

Assurance (IQA) of PTEC has conducted two evaluation processes in the form of questionnaire surveys. In the process, there was participation from the majority of student teachers and teacher educators. The two-year evaluation results have shown that teacher educators in the Department of Social Studies have earned fairly good scores from student teachers. According to the student teachers' evaluation in 2020 conducted by the IQA Office, lecturers of social studies had well-organized objectives, lesson content and teaching methods as the student teachers commented that the lecturers had the ability to smoothly transition from the previous lessons to the next ones. However, there has not been any confirmation by specialists or experts on the way the teacher educators teach in PTEC with regard to how good the teacher educators utilize their teaching processes. Thus, this phenomenon has called for research that examines the applicability of teaching methods and techniques as a way to improve teaching practices at PTEC.

1.2. Research Objectives and Questions

This research aims to describe the processes of peer observation as a method to improve the teaching of social studies subjects. It seeks to answer the following research question:

> What are the procedures carried out by teacher educators to conduct peer observation to improve the teaching of social studies subjects?

2. Research Methodology

2.1. Research design

The observation cycle processes were employed in this study to examine how teacher educators use teaching methods and techniques effectively in their respective classrooms at PTEC. Because the analysis of the study focused on understanding the teaching methods and techniques that the educators have constructed. Qualitative research is the most appropriate research design for this purpose. Ary et al. (2009) noted that the major goal of qualitative research was to understand a phenomenon by focusing on the total picture rather than breaking it down into variables; in other words, the goal was to see a holistic picture and depth of understanding rather than a numeric analysis of data. Therefore, a qualitative method is suitable for this study.

2.2. Research participants

There was only one participant in this study. The participant has long years of teaching experience; he has over eight years of experience as a teacher educator

at both Regional Teacher Training Center and Teacher Education College. In his teaching career, he has been involved with a wide variety of subjects such as history, social studies, methods for social studies for Year 2, Year 3 and Year 4, curriculum development, practicum, and thesis supervision. He is currently the head of one department at Phnom Penh Teacher Education College. In this research study, he is a participant and teaches the subject of teaching methods for social studies for a class of Year 3 students that consists of 25 student teachers. He teaches this class for two hours per week.

2.3. Research instruments

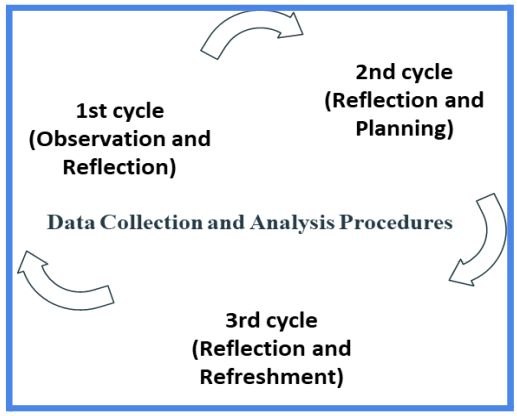
This study employed three observation processes. Due to the COVID-19 pandemic, qualitative design, online meetings, and video recordings were used, along with reflection sessions with the research participant. A specialist who specialized in the social science subject was also invited to provide feedback on the video observations. First, the observation was mainly conducted through a video recording of the participant. Second, the recorded video was sent to the specialist for observation and feedback, and third, the reflection between the research participant and the researchers was employed through the observation. At the same time, some probing questions were added during the reflection time to find out more insights that were related to the implementation of teaching methods and techniques.

2.4. Data Collection and Analysis Procedure

The participant was given explanations related to the nature of the study before permission to conduct the classroom observation was requested. The researchers also requested the school director and department head for the video observation. Then, the researchers contacted the participant by convenient mediums such as a mobile phone and Telegram to make an appointment with him. Finally, the researchers conducted the video observation. Through "Observation and Reflection" in the first cycle, a video was collected from the participant and shared among the researchers for observation. After a week, a plenary discussion was held between the participant and the researchers for the reflection and comments or feedback. Next, "Reflection and Planning" was conducted. This referred to the plenary discussion after the observation and feedback from the invited specialist. The specialist's feedback was noted down and taken into consideration in the second video observation. Lastly, "Reflection and Refreshment" covered the specialist's second observation of the second video produced by the participant. This was conducted in a talk between the researchers and the specialist. The three cycles of observation are illustrated in Figure 1.

Figure 1

Data Collection and Analysis Procedure (Source: Authors)



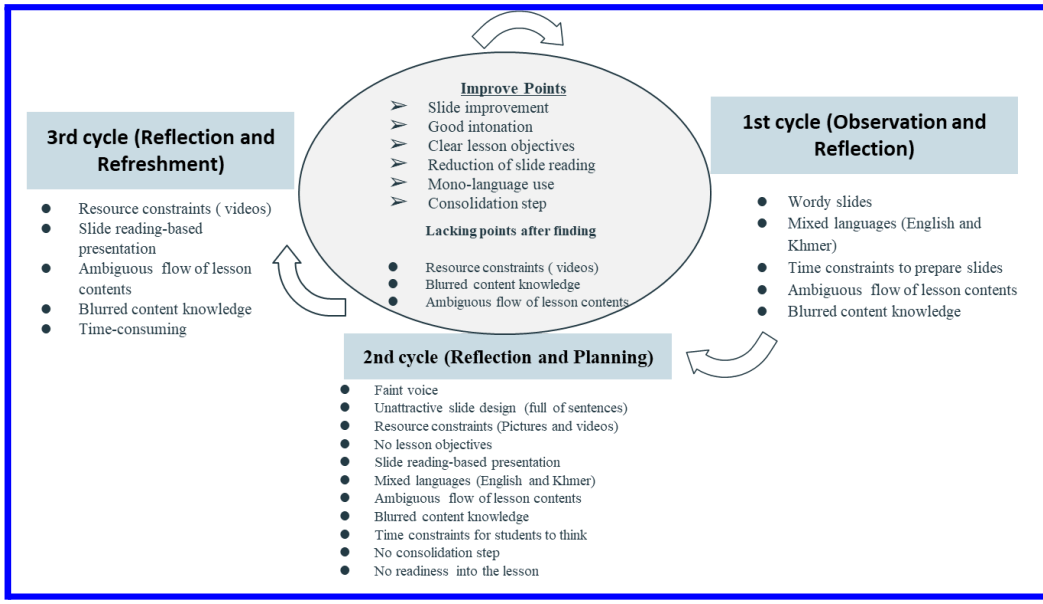
In the first cycle that was explained in a detailed manner, the researchers worked as participants by observing the video recording and taking notes about steps and procedures used by the participant. Then, the participant did a self-reflection of his own video. The researchers noted down the self-reflection points and had informal discussions with the participant to figure out points to be improved. Next, in the second cycle, the researchers sent the video recording to the specialist for comments and feedback prior to the online panel discussion between the researchers and the specialist. It was in this cycle that a working plan for the participant was developed for his second video recording. The participant produced the second video after obtaining the selective comments and feedback from the specialist through the researchers. Then, in the third cycle, the researchers watched the second video recording and did the same procedures by bringing the video to the specialist for discussion for improvement. Finally, the researchers once again shared insights with the participant in order to make the third video recording for the last observation.

3. Findings

The findings from the three cycles showed significant changes in the processes and methods of teaching of the participant. The points to be improved have been made better from one cycle to the next, and there were structured conversations being generated to help the participant through peer feedback from the researchers and the invited specialist. This is illustrated in Figure 2.

Figure 2

Summary of the Findings



3.1. First Cycle: Observation and Reflection

After conducting the video observation and a self-reflection with the participant in the first cycle, there were positive points and things to be improved. The participant acknowledged that his slide presentation was rather wordy; he used mixed languages (English and Khmer) while explaining some particular points to the student teachers. According to the participant, mixed language was used because of the lack of sources (documents) on the lessons taught in the Khmer language, but he was not sure of the accuracy of the translation at all. As a result, English words were used. This could pose problems related to comprehension for the student teachers. Next, his flow of lesson contents was ambiguous; the way the participant prepared the points in the slide presentation was back and forth, potentially causing some misunderstandings. Lastly, he added that he himself did not have a clear understanding of the lesson he was teaching – cooperative learning.

3.2. Second Cycle: Reflection and Planning

With all the short notes and observations in the first cycle, the participant could engage in self-reflection through an online meeting in the form of a feedback

session between the researchers and the participant. For example, as the participant acknowledged that his slides were wordy and that he had limited time to organize the lesson, he could see points for improvement by himself, which was a positive starting point. The implementation of the second cycle was through an online meeting between the researchers and the specialist in the form of a panel discussion to pick up all possible points to be improved. Noticeably, there were five points discussed during the conversation between the participant and the researcher. Those five points were: (1) wordy slides, (2) mixed languages (English and Khmer), (3) time constraints to prepare slides, (4) ambiguous lesson flow, and (5) blurred knowledge content. However, after having the meeting with the specialist in the second cycle, up to 11 points were raised. By the end of the second cycle, the researchers received another video recording of the same content from the participant after the comments and feedback. The result of the second cycle showed that the points to be noted for improvement decreased from 11 to just five.

3.3. Third Cycle: Reflection and Refreshment

In the third cycle, it was crystal clear that as long as more constructive dialogue was developed, more room for improvement was available. For example, in this cycle, the researchers could increasingly identify areas that needed improvement such as slide improvement, good intonation, clear lesson objectives, reduction of slide reading, etc. The participant was able to reduce talking time during presentation, and at the same time, he managed to make much more attractive slides for his student teachers by including pictures, audio and content organization. However, there were also certain issues that still existed, such as resource constraints, limited content knowledge, and ambiguity of the lesson flow. It was with certainty that the participant would require time to make improvement in these areas.

4. Discussion

Through the three cycles of the peer observation, there have been positive improvements in teaching processes and motivation to make lessons better for future teaching. For example, the participant recognized that his slide preparation was not good enough, as it was wordy with a fair amount of usage of mixed languages. This finding is in line with a study by Norbury (2001) who found that peer observation was an important tool to motivate lecturers to reflect on their own teaching practice and improve the quality of teaching. The findings of the present study are also similar to those of Jenny and Lan (2014) who pointed out that peer observation could contribute to the development of lecturers' critical reflection and the enhancement of teaching practice. Based on these observations and interactions throughout the processes, the participant has been building up his commitment and confidence to conduct lessons in a video

format. His sense of confidence in teaching increased through peer feedback and observation – a finding that is supported by Carroll and O'Loughlin (2014) who suggested that peer observation was significant to build confidence in teaching.

In addition, the result of the second cycle showed that the points to be noted for improvement decreased from 11 to five, and the participant was able to improve his flow of lesson organization. This is a sign of improvement through structured conversations between the researchers, the participant, and the specialist. This finding which shows that peer observation has a positive impact on professional development of teachers is similar to the Byrne et al. (2010) who asserted that peer observation is worthwhile in the process for professional development. Likewise, Dos Santos (2017) noted that peer observation could be a good tool for continuous professional development for teachers to develop their teaching strategies.

Furthermore, there has been a sign of enthusiasm from the research participant to join for reflection and peer feedback, which could bring about improvements in teaching success after continuous feedback and comments. In this light, the finding is aligned with Kim and Rouse (2011) who found that policies related to the expected impact of teacher education on teacher quality will be of limited use until teachers have the professional capacity to reflect on their teaching practices and until their broad commitment is cultivated and respected.

5. Conclusion

This study has shown that, through the three cycles of peer observation, reflection, planning, and refreshment, there is improvement in teaching effectiveness. In particular, the study has proved positive improvements in teaching methods, pedagogical practice for teacher educators, and documents for future professional development at PTEC.

Based on these findings, it is recommended that peer observation should be adopted as it provides mentorship opportunities and conveys positive messages to other teacher educators. Peer observation could also help teacher educators improve their teaching skills. Importantly, it paves the way forward for professional development within a community of practice at PTEC and possibly in Cambodia at large.

The present study, however, has limitations concerning the small size of participants and the lack of inclusion of student teachers' and teacher educators' perspectives on video observation produced in the second and third cycle. Thus, future research may address this limitation. A similar study with teacher

educators from different subjects in different departments, such as science, should be conducted at PTEC. Future studies could also be conducted at other teacher education colleges or regional teacher training centers across Cambodia.

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