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The Implementation of English for Biology Based on CLIL Student Handbook to Improve English Proficiency of Prospective Student Biology Teacher

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Abstract: The ability to communicate using English is an important pillar in establishing international cooperation in the era of Society 5.0. The Faculty of Teacher Training and Education serves as one of the faculty that must facilitate prospective educators. This study aims to examine the contribution of the implementation of English for Biology Based on Content Language Integrated Learning (CLIL) Student Handbook to improve the English proficiency of prospective student teacher in the Biology Education study program. The research was carried out with a quasi-experimental approach with a multiple- group pretest-posttest pattern. The test subjects and the unit of analysis are all students who take English for Biology course in the second semester of the 2021/2022 academic year with a total of 120 students grouped in five classes. The results of the analysis show that there is an increase in students' English proficiency which is in the quite effective category with the acquisition of N-gain scores for classes A, B, C, D, E, and F of 68, 58, 60, 62, 58, and 61. The average N-gain is 68 or in fairly effective category. In conclusion, the use of English for Biology Based on CLIL Student Handbook is quite effective in increasing the English proficiency of prospective student teacher in the Biology Education Study Program of the Faculty of Teacher Training and Education University of Mataram.

Keywords: CLIL; English proficiency; Prospective student

Introduction

The ability to communicate using English is an important pillar in establishing international cooperation in the era of society 5.0. Communication skills and collaboration skills are part of 21st-century skills that really need to be facilitated in their development at all levels of education, including universities. One of the infrastructures that can facilitate the development of English proficiency as well as improve the mastery of the subject matter is English for Specific Purpose (ESP). ESP has proven useful in developing skills that integrate scientific knowledge with communication skills (Kulamikhina et al., 2020; Musikhin, 2016), helping subject teachers to be able to teach with an introduction to English (Hendroanto et al., 2018) and providing experience exploring solutions to problems related to their field of science (Musikhin, 2016). Lee et al. (2013), stated that in the field of science, learning research aimed at developing mastery of science material and English proficiency which is important to do. This is necessary so that prospective teacher students in the Biology Education Study Program, FKIP have sufficient English skills. Therefore, for the last two years, students have been provided with a compulsory subject, namely English for Biology (EfBio). Based on the experience of teaching EfBio courses, the problems faced by students include, 1) less-basic English proficiency, and 2) less technological pedagogical content knowledge.

One of the English learning strategies for certain purposes is Content Language Integrated Learning (CLIL). This strategy emphasizes the importance of integrating study material with foreign language

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instruction (Pérez et al., 2017) and has proven effective in developing knowledge and skills related to the subject matter, as well as simultaneous mastery of English (Rahman, 2015; Rao, 2014). As part of an effort to facilitate the development of students' English proficiency especially in Biology Education Study Program, during the academic year of 2021 the researcher team has been developed teaching materials entitled English for Biology Based on Content Language Integrated Learning (CLIL) Student Handbook. The handbook has been validated by experts in term of structures, biological content, and English language representation. This study has been undertaken as the processes of empirical validation of the handbook. This step is focused to examine its effectiveness in improving the English proficiency of prospective student teacher in the Biology Education Study Program, of FKIP University of Mataram.

Method

This study was designed to test the effectiveness of the product developed by previous research, namely Teaching Materials English for Biology: Student Handbook in increasing the English proficiency of prospective Biology teacher students at FKIP, University of Mataram. The research was carried out with a quasi-experimental approach (quasi-experimental research) with a multiple-group pretest-posttest pattern. The test subjects and the unit of analysis are all second-semester students who take English for Biology lectures at Biology Education Study Program FKIP in the 2021/2022 academic year which consists of 6 classes namely A, B, C, D, E, and F. Students who are actively participating in lectures from the beginning to the end of the semester were taken as the data analysis unit of this research. English proficiency data were analyzed by using the statistical formula n-gain. The n-gain test is used to measure the difference between the post-test and pre-test, in other words, the n-gain test aims to determine whether the increase in the ability of scientific argumentation and critical thinking of students in the experimental class is better than the control class. The n-gain formula used such as shown in formula 1 and 2 such as suggested by Coletta et al. (2020).

$$g = \frac{Class\ Ave\ \%\ post - Class\ Ave\ \%\ Pre}{100\% - Class\ av\ \%\ pre} \quad (1)$$

$$g\_ind = \frac{\%\ post\ score - \%\ pre\ score}{100\% - \%\ pre\ score} \quad (2)$$

Information:
g = N-gain
S_{post} = Post-test score
S_{pre} = Pre-test score
S_{max} = Maximum score of the question

The quality of n-gain is categorized as in Table 1 below:

Table 1. N-gain Assessment Criteria

Percentage	Criteria
< 40	Not Effective
40 – 55	Less Effective
56 – 75	Enough effective
> 76	Effective

Result and Discussion

Mastery of English is an urgent need for the younger generation, especially future educators of the Indonesian nation to be able to compete in the social system, research, business, and education in this global era. People who are able to communicate intensively in international languages, especially English, can make a significant contribution to the progress of their nation and country (Hudson, 2009). One of the factors that support the improvement of students' English proficiency is the implementation of teaching materials that are in accordance with student needs.

The implementation of English for Biology on CLIL-Based learning takes place for one semester (six months) with the test subject and unit of analysis being second-semester students who attend English for Biology lectures at the Biology Education Study Program FKIP in the 2021/2022 academic year with a total of 6 classes, namely A, B, C, D, E, and F. Based on the implementation, the results were related to the proficiency in English, along with an explanation related to the results of the study.

Proficiency or good English skills have a high contribution to the progress of the nation and state. Therefore, FKIP as one of the faculties in higher education must facilitate English proficiency. The complete data on the results of processing test scores on the English proficiency of Biology Education students, FKIP, University of Mataram, can be seen in the appendix. The average score of the Pre-Test, Post-Test, and n-gain can be seen in Table 2.

Normalized gain data analysis was carried out in order to see if there are increased differences in English proficiency before and after the implementation of CLIL-Based English for Biology learning. Based on the table above, shows that there is an increase in students' English proficiency in the quite effective category with the acquisition of n-gain scores for classes A, B, C, D, and E of 68, 58, 60, 62, 58, and 61. This shows that the implementation of learning English for Biology based on CLIL is quite effective in increasing the English proficiency of Biology Education students with an average N-gain value of 61. Hurajova (2019) in her research stated that CLIL is an important and useful approach for students in developing communication skills. This was obtained based on the observations of science subject teachers and general English teachers.

The results of Cimermanová's research (2020) also show that prospective teacher students gave a positive response to the application of CLIL but lacked confidence and creativity. The class average N-gain value of the prospective student teacher can be seen in Figure 1.

Table 2. Students' English Proficiency Scores

Aspect	Classes											
	A		B		C		D		E		F	
	T_0	Ta	T_0	Ta	T_0	Ta	T_0	Ta	T_0	Ta	T_0	Ta
N	24	24	24	24	24	24	24	24	24	24	24	24
$\bar{X}$	0.08	13.04	2.84	12.80	2.87	71.74	0	11.5	2.4	13.37	0	11.80
SD	0.4	4.36	1.43	3.37	1.32	4.36	0	4.05	1.31	3.64	0	3.37
<g>	68%		58%		60%		62%		58%		61%	

Description: N = number of students; $\bar{X}$ = Average; SD = Standard Deviation; <g> = N-gain; T_0 = Pre-test; T_a = Post-test.

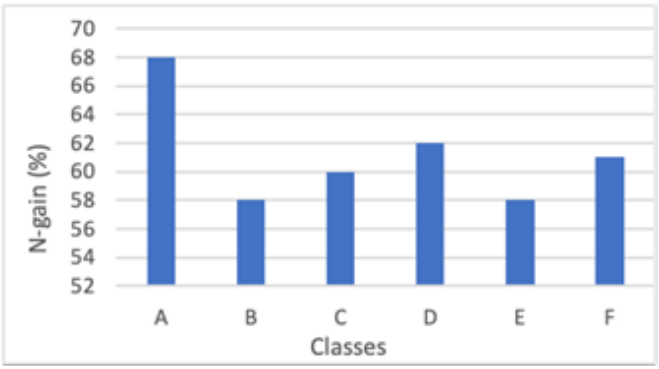

Figure 1. The average n-gain of student english proficiency

Content Language Integrated Learning (CLIL) is an approach to learning English that is integrated with fields of study material as content and context that can encourage students to make connections between new knowledge and prior knowledge. CLIL has proven to be effective and can be applied to the fields of science, mathematics, engineering, health, business, and education. Learners who study with the CLIL approach can develop reading skills, mastery of the field of study concepts, retention of field-specific terminology, and positive attitudes toward learning (Chostelidou et al., 2014; Moghadam et al., 2014). CLIL has also been shown to make a significant contribution to increasing learning motivation (Heras et al., 2015).

The EfBio-Student Handbook teaching materials have been developed with reference to Pérez et al. (2017), which include development steps: 1) choosing the right topic of material and determining the subject matter and relevant English language materials, and 2) identifying and selecting the right learning resources such as types of textbooks, audio, and video, 3) organize and adapt the material, 4) decide the types of learning activities and elaborate activities, 5) develop an evaluation tool for English proficiency and mastery of the subject matter and other required instruments. Therefore, the development of the English for Biology Based on CLIL Student Handbook has been prepared based on selecting appropriate topics, identifying learning resources, determining types of learning activities, and developing appropriate evaluation tools.

Conclusion

The implementation of the English for Biology Based on CLIL Student Handbook has been proven to be quite effective in improving English proficiency of prospective student teacher in Biology Education Study Program, Faculty of Teacher Training and Education in University of Mataram.

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References

Chostelidou, D., & Griva, E. (2014). Measuring the Effect of Implementing CLIL in Higher Education: An Experimental Research Project. *Procedia - Social and Behavioral Sciences*, *116*, 2169–2174. https://doi.org/10.1016/j.sbspro.2014.01.538

Cimermanová, I. (2020). On Developing Materials for CLIL. *Proceedings of the International Scientific Conference*, *1*, 86. https://doi.org/10.17770/sie2020vol1.4809

Coletta, V. P., & Steinert, J. J. (2020). Why normalized gain should continue to be used in analyzing preinstruction and postinstruction scores on concept inventories. *Physical Review Physics Education Research*, *16*(1), 1–7. https://doi.org/10.1103/PhysRevPhysEducRes.16.010108

Hendroanto, A., Istiandaru, A., Syakrina, N., Setyawan, F., Prahmana, R. C. I., & Hidayat, A. S. E. (2018). How Students Solves PISA Tasks: An Overview of Students' Mathematical Literacy. *International Journal on Emerging Mathematics Education*, *2*(2), 129. https://doi.org/10.12928/ijeme.v2i2.10713

Heras, A., & Lasagabaster, D. (2015). The impact of CLIL on affective factors and vocabulary learning. *Language Teaching Research*, *19*(1), 70–88.

https://doi.org/10.1177/1362168814541736

Hudson, P. (2009). Learning to teach science using English as the medium of instruction. *Eurasia Journal of Mathematics, Science and Technology Education*, *5*(2), 165–170. https://doi.org/10.12973/ejmste/75268

Hurajova, A. (2019). Contribution of CLIL methodology to the development of bilingualism and bilingual language competence of slovak secondary-school students. *European Journal of Educational Research*, *8*(4), 905–919. https://doi.org/10.12973/eu-jer.8.4.905

Kulamikhina, I., Kamysheva, E., Samylova, O., Balobanova, A., & Rakhmetova, E. (2020). Development of Professional Communication Skills in Students in the ESP Class: Integration of Communicative and Critical Thinking Approaches. *Proceedings of the International Scientific Conference on Philosophy of Education, Law and Science in the Era of Globalization PELSEG*, 210 –215. https://doi.org/10.2991/assehr.k.200723.043

Lee, O., & Buxton, C. A. (2013). Integrating Science And English Proficiency For English Language Learners. *Theory into Practice*, *52*(1), 36–42. https://doi.org/10.1080/07351690.2013.743772

Moghadam, N. Z., & Fatemipour, H. (2014). The Effect of CLIL on Vocabulary Development by Iranian Secondary School EFL Learners. *Procedia - Social and Behavioral Sciences*, *98*, 2004–2009. https://doi.org/10.1016/j.sbspro.2014.03.635

Musikhin, I. A. (2016). English for Specific Purposes: Teaching English for Science and Technology. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, *3*(6), 29–35. https://doi.org/10.5194/isprs-annals-III-6-29-2016

Pérez, M. L., & Malagón, C. G. (2017). Creating Materials with ICT for CLIL Lessons: A Didactic Proposal. *Procedia - Social and Behavioral Sciences*, *237*, 633–637. https://doi.org/10.1016/j.sbspro.2017.02.029

Rahman, M. (2015). English for Specific Purposes (ESP): A Holistic Review. *Universal Journal of Educational Research*, *3*(1), 24–31. https://www.hrpub.org/journals/article_info.php?aid=2200.

Rao, V. C. S. (2014). Teaching Strategies Of English For Science And Technology (EST) Research Methods of data collection Research findings. *International Conference on English Language and Literature (ICELL – 2014*, 27–30. https://www.academia.edu/