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Research Article

Integration of RBL and CLR to Enhance Analytical Thinking Skills of Pre-Service Teachers

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Abstract

This research aims to examine 1) analytical thinking skills of pre-service teachers by using research-based learning (RBL) and community learning resources (CLR), and 2) satisfaction of learning activities among the pre-service teachers. The one-shot case study was implemented in the research design. The research sample included 3rd year Social Studies students of Faculty of Education Khon Kaen University, (n =35). Research tools included 4 sets of a lesson plan, an evaluation form of student's analytical thinking skills, and a satisfaction questionnaire. Descriptive statistics: Mean, Percentage, and Standard Deviation were applied to analyze the obtained data. Research results showed 1) positive development of analytical thinking skills of the students through RBL integrated with CLR. 28 students out of 35 students (80 percent) passed the test with an average score of 20.46 (75.79 percent). 2) Pre-service teachers had overall satisfaction in RBL integrated with CLR at a high level ($\bar{x}$ = 3.94, S.D. = 0.34).

Keywords

Analytical Thinking Skills, Research-Based Learning, Community Learning Resources, Pre-Service Teacher

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Introduction

The current trend of global changes has been an important factor that shakes human adaptation to current circumstances and human needs analytical thinking to gain information and uses it as a baseline for decision-making and problem-solving rationally (Permana, Hindun, Rofi'ah, & Azizah, 2019; Prawita & Prayitno, 2019; Spaska, Savishchenko, & Komar, 2021). It is generally known that analytical thinking skill is an advanced skill in the 21st century that facilitates learning and living activities (Istiyono, Dwandaru, Lede, Rahayu, & Nadapdap, 2019; Krishnan et al., 2020; Perdana, Jumadi, & Rosana, 2019; Phrasophonphatthanapundit, Auiwong, Thanaphaet, Khemma, & Ruangsan, 2021; Susaoraj, 2013; Ujir, Salleh, Marzuki, Hashim, & Alias, 2020). Based on its significance, this skill has been used to develop Thai citizens, as seen in the National Strategy of Thailand 2018-2021 on developing and strengthening human capital which seeks to develop Thai people of all ages in a multifaceted manner so that they can become decent, skilled, and quality citizens. The scope includes the promotion of physical, mental, and intellectual characteristics, proper multi-dimensional development, long-term wellbeing at all phases of life, public awareness, and social responsibility. Citizens are also expected to be thrifty, charitable, disciplined, and ethical, as well as capable of logical thinking and 21st Century skills (Office of the National Economic and Socail Development Council, 2020). This is also in line with National Education Act (Office of Policy and Educational Plan Religion and Culture Office of the Permanent Secretary Ministry of Education, 1999) and National Qualifications Framework for Higher Education in Thailand (Office of Higher Education Commission, 2006).

Analytical thinking relates to the human ability to classify sources of media, events, actions, and ideas to divide into sub-components. This skill is a vital tool to acquire important matters, link thinking components, and verify the principles (Bloom, 1956; Kesorn et al., 2020; Sari, Perdana, Wilujeng, & Kuswanto, 2019). It is therefore important to provide training activities on analytical thinking to students to achieve learning experiences appropriately (Puchumni, Tungpradabkul, & Magee, 2019; The Education Department of Bangkok Archdiocese, 2010; Thongdee et al., 2021). As mentioned in many previous scholarly works, practicing analytical skills has been significant in the development of learning management and teachers needed learning management to develop analytical thinking. This changed the role of the teacher to a learning designer or facilitator for learners. Also, some studies mentioned that teachers should create learning activities that encourage students to gain knowledge from various learning sources and practice analytical thinking skills to construct knowledge on their own (Art-In, 2011; Mardiansyah, Saptono, & Setiawati, 2019; Perdana et al., 2019; Permana et al., 2019; Sari et al., 2019; Spaska et al., 2021; The Education Department of Bangkok Archdiocese, 2010).

The Department of Social Studies (DSS), Faculty of Education, Khon Kaen University (KKU) has the vision to produce teachers who are full of social studies knowledge, learning skills, experiences, and practical knowledge, together with problem-solving skills, morals, and ethics in the teaching profession. DSS also trains social studies students to understand the current global situation which is diverse and constantly changing. To fulfill the above-mentioned vision, DSS focuses on the implementation of Research-Based Learning (RBL) in learning activities to develop various thinking skills including analytical thinking among students, and encourage student's self-discovery (Faculty of Education: Khon Kaen University, 2014; Sinlarat, 2015) intending to develop student's knowledge gaining (epistemology) by allowing them to create their ways of study. This leads to the preparation of quality graduates who are ready to develop society in the future (Faculty of Education: Khon Kaen University, 2014; Sinlarat, 2015). As RBL provides learners a tool for lifelong learning, especially experiences that learners receive from research conducting, it encourages learners to have in-depth learning and self-esteem (Paweenbampen, 2015), in line with the study of Teesukha (2014) on research-based instruction implementing in a course of curriculum development for pre-service teachers which found that the overall student's ability to develop school curriculum was at a high level. The students were able to bring learning resources in the community to integrate with RBL to enhance learners to seek knowledge on their own together with various learning processes and resources (Onrahong J., 2007). This is also consistent with other recent scholarly works. For example,

in 2018, Witchuda Ponyangnok (2021), studied the results of learning management by using RBL in science and local wisdom in the analytical thinking ability of 28 undergraduates in Phranakhon Si Ayuttaya Rajabhat University. The research results showed a very positive improvement of students on analytical thinking. This is also in line with the studies of Niphon Cuthairat, Panwadee Kasaudom, and Chaiyan Thavaraworn (2019) in Chonburi Vocational College, with 19 students majoring in accounting; Tepporn Lomarak and Buncha Naunsay (2020) on professional development process integrated with RBL with 40 in-service teachers in Buriram Province.

However, the studies on RBL of the students majoring in Social Studies in KKU have not been conducted before. To fulfill this academic gap left behind by previous scholarly works, the researchers, therefore, were interested in studying the implementation of RBL to support the improvement of analytical thinking skills in DSS. This research takes place in KKU and focuses on the associations between RBL and analytical thinking in different educational contexts that make it an interesting setting to test the generalizability of findings from previous studies. Therefore, this research implements RBL integrated with community learning resources (CLR) in the course "Geography Management in School", organized by DSS. The approach was used to design learning activities that encouraged learners to use research process together with learning resources in the community with the aims to provide students analytical thinking skills and a good attitude towards the research process, and to develop student's self-learning as a guideline to promote the learning process in higher education. Additionally, this research will be beneficial to educational agencies to use research results as fundamental information to develop a learning process model per the 21st century educational management.

Objectives

The one-shot case study was implemented in research design with the aims to examine (1) analytical thinking skills of pre-service teachers by using RBL integrated with CLR; (2) satisfaction of pre-service teachers on learning activities with RBL integrated with CLR.

Conceptual Framework

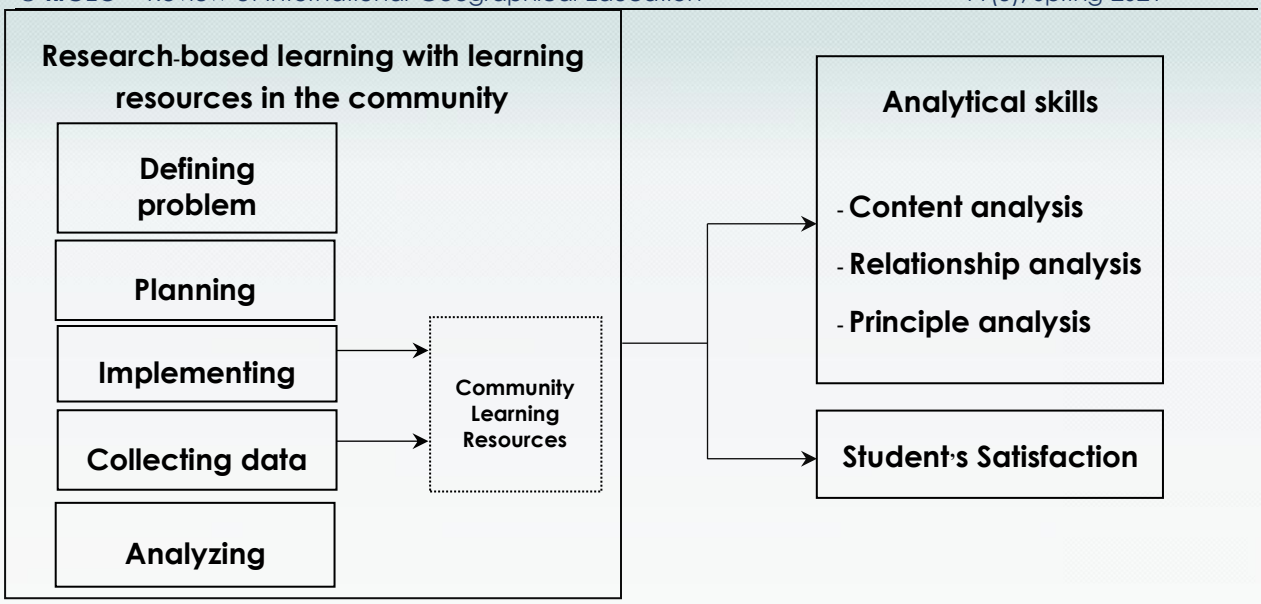
Based on the literature reviews, many academic papers confirmed that RBL can enhance systematic and critical thinking skills. Several papers showed five steps of learning activities integrated with RBL as follows: Step 1: defining problem; Step 2: planning learning activity; Step 3: implementing learning activity; Step 4: collecting data; Step 5: analyzing data and reporting research results (Faculty of Education: Khon Kaen University, 2014; Khaemanee, 2016). It is reported that CLR is an essential tool implementing in RBL because the goals of RBL focus on what the learners received from researching (Silanoi, 2001). The implementation of RBL integrated with CLR is effective to produce learning outcomes and let learners improve their thinking skills to define events, actions, and ideas linked to learning outcomes and individual's attitudes towards learning activities (Bloom, 1956; Susaoraj, 2013). This leads to the conceptual framework of the study below:

Methodology

The research target group of the study was the 3rd year-social studies students of the Faculty of Education, Khon Kaen University who enrolled in the course "Geography Management in School" in 2017, organized by DSS, totally of 35 students.

Research Design

This research was the pre-experimental research conducted as the One-Shot Case Study design.



Research Tools

The research tools of the study are presented in the following details.

1) Lesson plan integrated with RBL and CLR. The lesson plan, created by researchers, consisted of 4 sets which cover 24 hours of learning duration. Once the lesson plan was created, it was delivered to 3 educational experts for evaluation. It was found that lesson plans had the most appropriation for implementing in learning activities ($\bar{X}$= 4.88). Research tools included 4 sets of the lesson plan, an assessment form of student's analytical thinking skills, and a questionnaire for students' satisfaction survey. Descriptive statistics: Mean, Percentage, and Standard Deviation were applied to analyze the obtained data.
2) Analytical thinking skill assessment form was designed as the subjective assessment. The assessment consisted of 5 question items with a scoring rubric. Researchers assessed the effectiveness of the tool by assessing the coherence index between the question items and the components of analytical thinking from 3 experts. It was found that The Conformity Index was found at 0.67-1.00.
3) Satisfaction questionnaire was designed as a five-rating scale question, (10 question items). Criteria of scaling are as follows:

5 means 'students were very satisfied';
4 means 'students feel satisfied';
3 means 'students feel neutral';
2 means 'students feel dissatisfied';
1 means 'students feel very dissatisfied'.

The satisfaction questionnaire was validated by 3 experts. Suggestions from experts were reviewed and revised before using it to collect data with trial students (34 of the 4th year social studies students). Additionally, the reliability test of the questionnaire was presented at 0.79.

Data Collection

The researchers conducted data collection through a learning activity. The activities covered 4 sets of a lesson plan which took 24 hours of learning duration. Once pre-service teachers completed activities, analytical thinking skill assessment and satisfaction survey were provided to pre-service teachers immediately to collect the data.

Data Analysis

In this study, descriptive statistics: Mean, Percentage, and Standard Deviation was used in data analysis. Mean scores were interpreted as the satisfaction level as following details (Srisa-Ad, 2010).

4.51 – 5.00	represented	most satisfaction
3.51 – 4.50	represented	high satisfaction
2.51 – 3.50	represented	moderate satisfaction
1.51 – 2.50	represented	low satisfaction
1.00 – 1.50	represented	lowest satisfaction

Results And Discussion

1) The results of developing analytical thinking skills of pre-service teachers by RBL integrated with CLR found that 28 students (80 percent) out of total 35 students in the geography class passed the qualifying criteria with an average score of 20.46 (75.79 percent). It was clear that RBL and CLR encourage students to gain knowledge and skills from the research process and learning resources in a local community which was in form of objective and subjective materials. This learning integration allowed students to conduct research on their own. They were able to learn how to solve problems, how to think analytically, and as well as constructing self-learning skills. Additionally, this integration contributed to student-centered instruction which aimed to encourage learners to directly discover knowledge by themselves (Faculty of Education: Khon Kaen University, 2014; Sinlarat, 2015). The result was confirmed by Paweenbampen (2015)who found that RBL is a creative teaching technique that encourages learners to construct their knowledge. This is very important for 21st-century education. It also supported a student-centered instructional approach by using research as a part of the learning process which consisted of learning from experiences, practicing skills, thinking processes, management skills, and applying knowledge to solve the problem effectively. Therefore, it is clear that this integration was beneficial to students as a tool for lifelong learning especially providing students with a direct experience in the research process in which it encouraged learners to have self-esteem (Table 1).

Table 1:
Result Of Assessment of Analytical Skills of Pre-Service Students by Using RBL And Community-Based Learning Resources

Number of students	Number of students qualified	Percentage	Total score	Mean score	Percentage
35	28	80	27	20.46	75.79

According to the assessment of analytical thinking skills of pre-service teachers by using RBL integrated with CLR, pre-service teachers had a mean score of 20.46 (75.79 percent) which qualified the criteria. Analyzing by analytical thinking skill components, pre-service teachers had a mean score that qualified the criteria in all components. Pre-service teachers had the most-mean score in 'Content Analysis' (75.24 percent), followed by 'Relationship Analysis' (73.65 percent) and 'Principle Analysis' (73.03 percent), respectively. This indicates that pre-service teachers used the left brain to think deeply and connect something rationally. The left brain is used to make ordinal thinking and comparative thinking (Moonkham, 2004). The function of the thinking process begins with classifying priority and then analyze relationships between subjects to find how the subjects related each other and then making principle analysis through the systematic structure (Bloom, 1956) (Table 2).

Table 2
Result Of Assessment of Analytical Skills of Pre-Service Students by Using RBL And CLR, Classifying by Components

Number of students	Analytical thinking skills					
	Content analysis		Relationship analysis		Principle analysis	
	Mean score	Percentage	Mean score	Percentage	Mean score	Percentage
35	6.77	75.24	6.63	73.65	6.57	73.02

2) The satisfaction of integrating RBL and CLR among pre-service teachers was found at a high level ($\bar{x}$ = 3.94, SD = 0.34). Analyzing by items, pre-service teachers received experiences in data collection and interaction with others at the highest level ($\bar{x}$ = 4.57, SD = 0.56). Satisfaction on applying knowledge and research process in daily life was found at a moderate level ($\bar{x}$ = 3.37, S.D. = 0.73), which was the lowest mean score among all components. This is because of the benefits of integration between RBL and CLR that allow students to plan and carrying out activities on their own. They are encouraged to find problem-solving, and they have opportunities to study learning resources. Students also have opportunities to collect data by several methods such as interviews and observation until they can construct sets of knowledge based on the research process, and they can discuss with others to exchange opinions analytically. This finding is confirmed by Teesukha (2014) who developed RBL and implemented it in a class of curriculum development for pre-service teacher students. The finding appeared that students had an opinion on RBL at a high level in all aspects.

Table 3
Result of assessment of pre-service students on the integration of RBL and CLR in the class

Item	Details	$\bar{x}$	S.D.	Opinion
1	Integration of RBL and CLR is suitable for contents in a class subject	3.69	0.68	High
2	Integration of RBL and CLR allows students to search for information, exchanging knowledge, and sharing an opinion.	3.97	0.62	High
3	Pre-service teacher is free to manage learning activities.	4.00	0.69	High
4	The pre-service teacher is active and happy to get in learning activities.	4.34	0.54	High
5	Learning activities encourage students to have analytical thinking skills rationally.	3.94	0.73	High
6	Pre-service teacher receives experiences in research sites and has the opportunity to practice an interpersonal skill with others.	4.57	0.56	Highest
7	Learning activities integrated with RBL and CLR cause students to work systematically.	3.83	0.79	High
8	Pre-service teacher t has the opportunity to engage in learning activities in every step.	3.91	0.70	High
9	The pre-service teacher can apply knowledge and research processes to use in daily life.	3.37	0.73	Highest
10	Learning activities integrated with RBL and CLR encourage self-learning to pre-service teachers.	3.74	0.78	High
Total		**3.94**	**0.34**	**High**

Conclusion

Analytical thinking is an advanced thinking skill that is the foundation of learning and life spending. It is generally admitted that analytical skill has become an important skill in the 21st century which learners should have. To input analytical skills into learners, RBL integrated with learning resources in the community is a process of developing complex thinking skills by allowing learners to carry out activities in every step on their own together with getting experiences empirically in the local community. This process finally encourages learners to construct knowledge, learning skills, and having preferred attributes to apply in daily life appropriately. As mentioned above, the objectives of this research were: to examine 1) analytical thinking skills of pre-service teachers by using RBL and community learning resources, and 2) satisfaction of learning activities among the pre-service teachers. The study was carried out utilizing a one-shot case study with the 3rd year Social Studies students of the Faculty of Education, Khon Kaen University. The research finding showed the positive development of the analytical thinking skills of the students. 28 students out of 35 students (80 percent) passed the test with an average score of 20.46 (75.79 percent). Pre-service teachers had overall satisfaction in research-based learning integrated with CLR at a high level ($\bar{X}$ = 3.94, S.D. = 0.34). This research took place in KKU to test the generalizability of findings from previous studies. In general, it is confirmed that the integration of RBL and CLR in KKU also provides the positive development of analytical thinking. For future testing of the research result, the research on RBL and CLR should be conducted in different contexts.

References

Art-In, S. (2011). The development of learning management model emphasizing analytical thinking in the science learning area. Khon Kaen Faculty of Education: Khon Kaen University.

Bloom, B. S. (1956). Taxonomy of educational objectives. Vol. 1: Cognitive domain (Vol. 20). New York: McKay.

Faculty of Education: Khon Kaen University. (2014). Research-based Learning Approach. Khon Kaen: Klungnanawittaya.

Istiyono, E., Dwandaru, W. S. B., Lede, Y. A., Rahayu, F., & Nadapdap, A. (2019). Developing IRT-Based Physics Critical Thinking Skill Test: A CAT to Answer 21st Century Challenge. International Journal of instruction, 12(4), 267-280.

Kesorn, N., Junpeng, P., Marwiang, M., Pongboriboon, K., Tang, K. N., Bathia, S., & Wilson, M. (2020). Development of an Assessment Tool for Mathematical Reading, Analytical Thinking and Mathematical Writing. International Journal of Evaluation Research in Education, 9(4), 955-962.

Khaemanee, T. (2016). Sciences of Teaching Knowledge for Effective Instructional Management (21 ed.). Bangkok: Chulalongkorn Press.

Krishnan, I. A., Ching, H. S., Ramalingam, S., Maruthai, E., Kandasamy, P., De Mello, G., . . . Ling, W. W. (2020). Challenges of learning English in 21st century: Online vs. traditional during Covid-19. Malaysian Journal of Social Sciences and Humanities, 5(9), 1-15.

Mardiansyah, E. A., Saptono, S., & Setiawati, N. (2019). The enhancement of senior high school students' analytical thinking skills in learning excretory system material with quantum learning model. Journal of Biology Education, 8(1), 79-88.

Moonkham, S. (2004). Strategies of Strategic Thinking. Bangkok: Pabpim.

Niphon Cuthairat, Panwadee Kasaudom, & Chaiyan Thavaraworn. (2019). Research-Based Learning Principles of Accounting Courses for Students of The Bachelor of Technology Curriculum (Accounting), Chonburi Vocational College. Journal of Education and Social Development, 14(1), 593-602.

Office of Higher Education Commission. (2006). Implementtation Handbook: National Qualifications Framework for Higher Education in Thailand. Retrieved from http://www.mua.go.th/users/tqf-hed/news/FilesNews/FilesNews8/NQF-HEd.pdf.

Office of Policy and Educational Plan Religion and Culture Office of the Permanent Secretary Ministry of Education. (1999). National Education Act of B.E. 2542. Retrieved from www.nso.go.th.

Office of the National Economic and Socail Development Council. (2020). National Strategy. Retrieved from http://nscr.nesdb.go.th/wp-content/uploads/2019/10/National-Strategy-Eng-Final-25-OCT-2019.pdf.
Onrahong J. (2007). Outcomes of Integrated Instruction Using Community Learning Resources as media in Learning Subject Social Studies, Religion and Culture, Unit "Our Hometown" for Grade 6 Students of Ban Luang School Chiang Rai Educational Service Area District Office 4. (Master Thesis in Teaching and Instruction), Chiang Rai Rajabhat University, Chiang Rai
Paweenbampen, P. (2015). Research-based Learning. CMU Journal of Education, 1(2), 62-71.
Perdana, R., Jumadi, J., & Rosana, D. (2019). Relationship between Analytical Thinking Skill and Scientific Argumentation Using PBL with Interactive CK 12 Simulation. International Journal on Social Education Sciences, 1(1), 16-23.
Permana, T. I., Hindun, I., Rofi'ah, N. L., & Azizah, A. S. N. (2019). Critical thinking skills: The academic ability, mastering concepts, and analytical skill of undergraduate students. JPBI (Jurnal Pendidikan Biologi Indonesia), 5(1), 1-8.
Phrasophonphatthanapundit, E. K., Auiwong, P. B., Thanaphaet, C., Khemma, P., & Ruangsan, N. (2021). The Administration Model of Private Schools under KKPEO in 21st Century. Psychology and Education Journal, 58(2), 9588-9594.
Prawita, W., & Prayitno, B. A. (2019). Effectiveness of a Generative Learning-Based Biology Module to Improve the Analytical Thinking Skills of the Students with High and Low Reading Motivation. International Journal of instruction, 12(1), 1459-1476.
Puchumni, P., Tungpradabkul, S., & Magee, R. (2019). Using Information Retrieval Activities to Foster Analytical Thinking Skills in Higher Education in Thailand: A Case Study of Local Wisdom Education. Asian Journal of Education Training, 5(1), 80-85.
Sari, R., Perdana, R., Wilujeng, I., & Kuswanto, H. (2019). The implementation of problem-based learning model with online simulation to enhance the student's analytical thinking skill in learning physics. Paper presented at the Journal of Physics: Conference Series.
Silanoi, L. (2001). Training Paper: Teaching Integrated with Community Learning Resources. Faculty of Education, Khon Kaen University. Khon Kaen.
Sinlarat, P. (2015). Principle and Teaching Technique in Higher Education (4 ed.). Bangkok: V Print (1991) Limited.
Spaska, A. M., Savishchenko, V. M., & Komar, O. A. (2021). Enhancing Analytical Thinking in Tertiary Students Using Debates. European Journal of Educational Research, 10(2), 879-889.
Srisa-Ad, B. (2010). Basic Research (5 ed.). Bangkok: Suveeriyasarn.
Susaoraj, P. (2013). Development of Thinking (5 ed.). Bangkok: 9119 Technique Printing.
Teesukha, P. (2014). The development of teaching model: curriculum development course by using a research based learning approach for pre-service teachers. (Ph.D. in Curriculum and Instruction), Silpakorn University, Bangkok.
Tepporn Lomarak, & Buncha Naunsay. (2020). Professional Development Process Integrated Research-based Learning, Contemplative Education, and Coaching and Mentoring for In-service Teachers. Journal of Research and Development, 14(2), 57-73.
The Education Department of Bangkok Archdiocese. (2010). Assessment of Analytical Thinking Skill among Students in Bangkok Archdiocese School Academic Year 2010. Retrieved from http://.www.edba.in.th
Thongdee, V., Sukumal, P., Kositpimanvach, E., Namseethan, S., Thabphumee, P., & Ruangsan, N. (2021). The Buddhist Integrative Model in Promoting Master Teachers in Upper Northeast of Thailand. Psychology and Education Journal, 58(3), 4194-4198.
Ujir, H., Salleh, S. F., Marzuki, A. S. W., Hashim, H. F., & Alias, A. A. (2020). Teaching Workload in 21st Century Higher Education Learning Setting. International Journal of Evaluation Research in Education, 9(1), 221-227.
Witchuda Ponyangnok. (2021). A Study of the Results Learning Management by Using Research-Based Learning in Science and Local Wisdom on the Analytical Thinking Ability of Science Students. Journal of Educational Review Faculty of Education in MCU, 7(2), 255-267.