# Inquiry-Based Learning Implementation to Improve Critical Thinking of Prospective Teachers

Damajanti Kusuma Dewi, Wayan Ardhana, Irtadji, Tutut Chusniyah, and Ambar Sulianti

***Abstract*—Teachers must possess critical thinking skills to become good facilitators in the education process to produce students with high-order thinking skills. This research aims to evaluate the implementation of the inquiry-based learning (IBL) method in improving the critical thinking (CT) skills of prospective teachers with their own learning styles. An experimental study is the research method used in this research with the matching-only pretest–posttest with a control group design. The selected participants consisted of two groups of prospective teachers, a total of 76 people with low critical thinking skills and 50 people with very low skills. The experimental group was given the IBL method, while the control group was given the problem-based learning method, which refers to the latest curriculum. Treatment is given for 8 weeks. The statistical analysis used includes Wilcoxon, Mann–Whitney, and Kruskal–Wallis followed by post hoc. The results of this study show an increase in critical thinking in both the experimental group and the control group. However, the increase in the experimental group was significantly higher than the control group. The increase in experimental group with low and very low CT group did not differ significantly. On the other hand, in the control group, the increase in CT in the low group was significantly higher than the very low group. Furthermore, the Kruskal–Wallis difference test in the experimental group based on learning styles showed that prospective teachers with converging learning styles were more able to follow the IBL method compared to other learning styles.**

***Index Terms*—Inquiry-based learning, critical thinking, prospective teachers, learning style.**

## I. Introduction

Although the Indonesian government implemented several education management revisions, the learning outcomes have not been satisfactory. This is according to the 2018 Program for International Student Assessment (PISA) survey, a 3-year survey of 15-year-old students assessing their acquisition level of the critical knowledge and skills essential for full participation in society [1]. Furthermore, Indonesia needs to improve its current education system and management, especially after emerging in the 74th position out of the 79 countries that participated in the PISA assessment. This position was even below their ranking in the previous 3 years [2]. One of the causes for this drop is the limited training for Indonesian students in solving contextual problems. Therefore, they require high order thinking skills, such as identification, argumentation, and creativity for effective problem-solving.

Bloom's taxonomy states that human thinking skills are classified into low-order thinking skills (LOTS) and higher-order thinking skills (HOTS). Students are taught the significance of positive educational development, which implies that thinking skills have a close relationship with learning. Furthermore, research in Papua shows a very significant relationship between HOTS and academic achievement [2]. Based on HOTS, students need to understand, summarize, and relate whatever they learn by analyzing it through problem-solving. On the contrary, based on LOTS, they acquire and memorize what has been learned and relate it to previous knowledge to achieve their goals. However, at high-level thinking, they need to use logic in mastering concepts to solve more complex problems [3].

Several components are needed to produce quality education, including school leadership, classroom management, application of teaching materials, and the role of teachers [4]. One of the vital and generally discussed factors related to education quality is the teacher's role. In Indonesia, teacher quality problems have always been a serious concern of education. Improving the learning quality with an impact on education is to be accompanied by an increase in their capabilities and competencies. This needs to be applied in developing innovative and creative learning activities to produce competent graduates [5]. Teachers accustomed to using HOTS influence the thinking skills of students [6]. They must have good critical thinking skills to experience higher-order thinking processes [7]. Critical thinking (CT) is included in higher-order thinking skills [8]. Being one of the HOTS, critical thinking should be central in learning development because it gives humans life skills, creativity, and innovation in solving complex real-life problems [9]. Moreover, critical thinking capacity is an indicator of higher-order thinking skills [10], [11]. CT is the ability and willingness to be open-minded to ideas regardless of one's beliefs and to engage in reflective and balanced thinking [12]. Through CT, students explore a problem, question, or situation, integrate all available related information, arrive at a solution or hypothesis, and justify one's position [13]. Given these reasons, prospective teachers must have good critical thinking skills.

The improvement of education quality cannot be separated from the twenty-first-century skills framework, which includes learning skills, innovation skills, comprising communication, collaboration, creativity, and critical thinking. Since 2013, the Indonesian education curriculum has shifted from teacher-based to student-based method [14],

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The authors are with Universitas Negeri Malang, Indonesia (e-mail: damajantikusuma@unesa.ac.id, wayanardhanaunm@gmail.com, ir_ta_dji@yahoo.com, tututchusniyah@gmail.com) and UIN Sunan Gunung Djati, Indonesia (e-mail: ambarsulianti@uinsgd.ac.id).

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[15]. The last curriculum (2019 curriculum revision 2013) focuses on character education, literacy, and competence. This curriculum applies student-centered learning to improve their HOTS abilities. Student-centered learning is adopted by many schools and education systems that promote problem-based, project-based, case-based, and inquiry learning worldwide [16], [17].

Problem-based learning (PBL) is the student-based learning approach widely used in Indonesia. PBL was implemented in more than 17,000 studies in Indonesia since 2013 through the Google Scholar database source. PBL helps students to be active in learning [18]. By definition, PBL is a learning method around problem-solving activities by delivering arguments or ideas and communicating to peers by interacting with various classroom components. Moreover, it involves reflecting on what students should follow to solve the problems raised by the teacher [19]–[22]. In the PBL method, participants are motivated to learn in groups since the social interaction reduces students' nervousness during the learning process. In the neuroeducation points of view, excessive worry results in anxiety, which then becomes a body reaction to stress through the neurochemical system and certain brain regions. The hippocampus, amygdala, and medial prefrontal cortex are the brain parts involved in stress response. Moreover, cortisol and norepinephrine are released through the corticotropin-releasing factor and hypothalamic–pituitary–adrenal axis [23]. In general, anxiety is related to processing worried mind preferences or treated stimuli that damage cognitive control [24]. A study correlating anxiety to brain wave observation through Electroencephalography shows that anxiety affects memory strength [25].

Meanwhile, research in Indonesia and the results of the PBL meta-analysis over a 7-year period show that PBL has not been able to improve the collaboration skills of participants. Constraints in implementing PBL in Indonesia are mainly due to low levels of self-confidence [26]. On the other hand, one of the student-based methods carried out independently rather than in groups is inquiry-based learning (IBL), which is a student-centered constructivist pedagogy that puts students in control of their learning. Students develop their questions to examine, engage in independent investigation, and collaborate with one another [27]–[29]. IBL requires students to actively build their own knowledge, reason, and compare new with initial concepts. Therefore, IBL trains students' thinking skills in solving problems and directs them to become independent learners through a series of activities [30]. A study in Malang, Indonesia, recommended that teachers empower their students' HOTS abilities through inquiry/discovery classes to create meaningful student-centered learning [31]. Other research showed that students implemented with the inquiry learning method exhibited high motivation, enjoyment, and creativity. High motivation contributes to the learning process and improves student achievement. Moreover, intrinsic motivation fosters high cognitive engagement in the classroom, resulting in adaptive outcomes [32].

An essential condition for learning is an intense interest in responding to educational activities. Student interest in learning correlates with cognitive and affective factors, which in turn affect the learning progress [33]. Research has been conducted on the relationships between IBL and critical thinking worldwide. However, there has never been a report on its implications for various learning styles in Indonesia. The learning style theory states that students have individual modes and learn more quickly and effectively when having the material that fits their styles. The interaction of the student's previously acquired knowledge, motivation, and messages impacts message delivery [34]. Learning styles are related to reading and listening achievement because this determines students' understanding. They feel comfortable absorbing, obtaining, understanding, and processing information in their way [35]. Learning style determines the instruction given, and students need to be taught and assessed in a way that suits them individually.

Learning styles, also called cognitive strategies, direct an individual's management of the internal processes. These processes relate to learning, thinking, memory, abilities influenced by innovative strategies, and response organization [36]. Learning styles are cognitive, affective, and physiological features that indicate how students perceive interactions and respond to their learning environment [37] Kolb (1984) states that learning style is a personal way of processing information, feelings, and behavior in learning situations [38].

Kolb stated four learning styles, namely, converging, diverging, assimilating, and accommodating [39]. Kolb defined converging learning as an approach where students prefer to deal with applications and problems to make decisions. Students enjoy technical tasks and think analytically, though they generally have difficulty seeing problems from a different perspective [40]. Hence, convergent learners use common sense to understand through abstract conceptualization and process information through active experiments [41]. Additionally, they are less concerned with social and relational problems and have a career in technology [42]. Assimilating learning was defined as an approach used by people with several abilities, such as gathering information to create a global view and make theoretical models [39]. The assimilator has an abstract conceptualization or reflective observation as the dominant learning ability [40], [43]. The accommodating learning style is hands-on, and accommodators rely more on intuition than logic [40]. Moreover, accommodators understand through real experiences and process information through active experiments [41]. Kolb defined divergent learners as students that prefer collecting information widely and are imaginative thinkers [39]. Furthermore, they behave naturally and use their imagination in solving problems [40].

## II. Objectives of The Study

Based on the research background, the objectives of this study are as follows:

1) Differentiating the IBL and PBL methods in increasing critical thinking of prospective teachers
2) Analyzing the increasing critical thinking of prospective teachers with very low and low CT
3) Evaluating the interaction of student learning styles in accepting the IBL method

## III. Research Methods

### A. Research Design

This research is an experimental study with the matching-only pretest–posttest control group design. The research used the PBL method as the most recommended student-based learning approach in Indonesia. The target population was the first semester prospective teacher students in one of the education studies programs. Fig. 1 shows the research design.

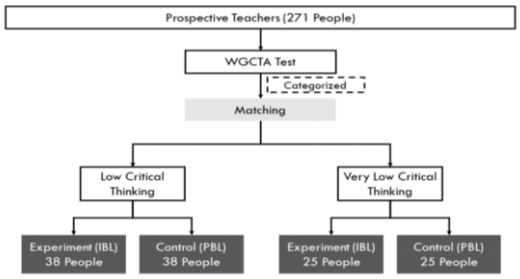


Fig. 1. Research design.

The first step was taking the subject from the prospective teachers recently accepted in one of Indonesia's education faculties. Participants were given an initial critical thinking ability test that functioned in a matching technique. The selected participants comprised a group of prospective teacher students with low and very low critical thinking skills. Furthermore, using the matching technique, the sample was divided into experimental and control groups. The IBL learning model was used in the experimental group, while the PBL model was used on the control group. The treatment was given for eight meetings, each lasting 100 min per week. The two groups then underwent the treatment process and given the posttest.

### B. Research Procedures

The subject tried out in both groups was educational psychology, which is compulsory for prospective teachers. The subject is useful in teaching applications to increase students' HOTS when they graduate as teachers. The experimental group was treated using the IBL, while the control group was treated according to the 2013 revised 2019 curriculum, the PBL. Table I presents the teaching procedure.

TABLE I: Research Procedure

| PBL | | IBL | |
|---|---|---|---|
| **Steps** | **Implementation** | **Steps** | **Implementation** |
| 1. Orientation of problem | a. Educators form the class into several groups, where each group contains 5–6 members | 1. Engage | The teacher's role:<br>• Establish rules and procedures that must be done by students |
| | b. Educators give problems, in various forms, including videos, research results, and interviews, among others | | The role of students:<br>• Focus attention on objects, problems, situations, or events given by the teacher<br>• Connect objects, problems, and existing situations with past experiences<br>• Learn to find things related to new information with old information and manifest in the form of questions |
| 2. Divide and select problems | a. Educators provide opportunities for groups and divide tasks to each member | 2. Exploration | Equilibration phase (reduce the curiosity of the questions that have been arranged)<br>The role of educators:<br>• Develop an environment that can support student activities so that they are able to find answers |
| | b. Educators ask students to choose a major problem or minor problem, which will be focused on | | The role of students:<br>• Search for answers to existing questions |
| 3. Analyze the problem | a. The educator applies the brainstorming method (without criticism) to the problems that have been selected by each student | 3. Explanation | The phase explains and clarifies the concept.<br>The role of educators:<br>• Direct students' attention to specific aspects between the first experience and the situation during exploration, by asking students to apply the questions they have and explain scientific terms directly, explicitly, and formally |
| | b. Educators facilitate students to be able to compare the results of thinking between before and after brainstorming, followed by note-taking, comparing personal and group opinions, and then presenting it | | The role of students:<br>• Describe exploratory experiences and experiences when getting explanations from the educator |
| 4. Searching for answers to existing questions | Educators encourage participants to find common answers, assess problem-solving skills, discard irrelevant opinions, write down reasons for changing results, and prepare appropriate presentations | 4. Elaboration | Participants bring together experiences and new understanding to form new knowledge |

| | | | |
|---|---|---|---|
| 5. Evaluation | a. Educators give opportunities for other groups to provide opinions (accept, reject, or provide additional) by supplying reasons and evidence | 5. Evaluation | Participants assess ideas and concepts, where students learn to assess the knowledge, they already have. Students can receive feedback on the clarity of the knowledge they already have |
| | b. Participants reflect, write down what they have learned, and evaluate | | |

### C. Statistical Analysis

The statistical analysis used aligned with the research objectives. The Wilcoxon test was used to examine the difference in critical thinking before and after treatment in each group based on the non-normality of the data distribution results. Moreover, the Mann–Whitney difference test was used to compare CT teacher candidates' improvements between the IBL and PBL groups. The Kruskal–Wallis test was used to examine an increase in CT in the IBL and PBL groups in the low and very low CT groups. In addition, it was used to assess the CT increases in different learning styles with IBL method, followed by a post hoc test.

## IV. Results

This section presents descriptive and analytical results according to the research objectives. Table II presents the descriptive characteristics of the assessment results of critical thinking skills in the experimental and control groups.

TABLE II: CT Before and After Treatment

| CT Test | Mean | Tests of normality (p) | Difference test analysis | Sig. |
|---|---|---|---|---|
| IBL pretest | 7.21 | 0.000 | Wilcoxon | 0.000 |
| IBL posttest | 10.37 | 0.048 | | |
| PBL pretest | 6.89 | 0.005 | Wilcoxon | 0.000 |
| PBL posttest | 9.10 | 0.009 | | |

As presented in Table II, CT increased in both the IBL- and PBL-treated groups. Furthermore, the Mann–Whitney test was performed to see which group had significantly higher CT changes. The results of the Mann-Whitey test are presented in Table III.

TABLE III: CT in the Experiment and Control Group

| Group | Mean | Median | Difference test analysis | Sig. |
|---|---|---|---|---|
| Experiment | 3.159 | 3 | Mann–Whitney | 0.000 |
| Control | 2.238 | 2 | | |

The results of statistical analysis in Table III, show that the increase in CT in the group using IBL was significantly higher than the group using PBL. For clarity, Fig. 2 shows the enhancement of CT in each group.

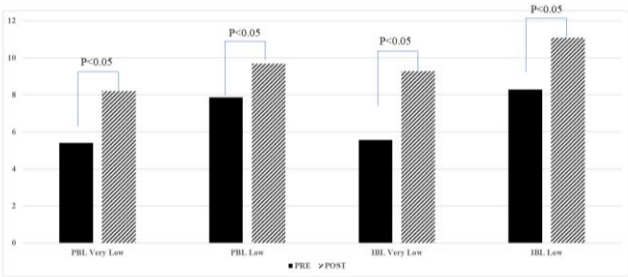


Fig. 2. Difference of CT in all groups.

Fig. 2 shows an increase in CT in the entire research group. Furthermore, Table IV presents the descriptions of each group with low and very low CT.

TABLE IV: Descriptive Critical Thinking in All Groups

| Item | IBL | | | | PBL | | | |
|---|---|---|---|---|---|---|---|---|
| | PRE | | POST | | PRE | | POST | |
| | Very Low | Low | Very Low | Low | Very Low | Low | Very Low | Low |
| μ | 5.56 | 8.29 | 9.28 | 11.08 | 5.40 | 7.87 | 8.20 | 9.68 |
| SD | 0.87 | 0.89 | 1.62 | 1.92 | 0.70 | 0.96 | 1.38 | 1.165 |
| Med | 5 | 8 | 9 | 11 | 6 | 8 | 8 | 10 |
| Min | 4 | 7 | 7 | 7 | 4 | 7 | 7 | 7 |
| Max | 7 | 10 | 12 | 14 | 6 | 10 | 12 | 12 |
| N | 25 | 38 | 25 | 38 | 25 | 38 | 25 | 38 |

The Kruskal–Wallis test was performed to analyze the differences in each group, as presented in Table V, and was followed by Mann–Whitney's post hoc analysis in Table VI.

TABLE V: The Kruskal–Wallis Test of CT

| | Difference of CT |
|---|---|
| Kruskal–Wallis H | 82.915 |
| df | 3 |
| Asymp. Sig. | .000 |

a. Kruskal–Wallis test.
b. Grouping variable.

TABLE VI: The Mann–Whitney Post Hoc Test

| Group | Ave Rank | Median (min, max) |
|---|---|---|
| IBL very low CT | 54.72 | 4(1,7) [a] |
| IBL low CT | 41.08 | 3(0,6) [ab] |
| PBL very low CT | 30.5 | 3(1,6) [b] |
| PBL low CT | 107.49 | 2(0,4) [c] |

The same letter in Table VI indicates no significant difference. Thus, Table VI shows that the increase in CT in the IBL group did not differ significantly between the low CT group and the very low CT group. On the other hand, in the PBL group, the increase in the low CT group was significantly higher than the very low CT group. Furthermore, the Kruskal–Wallis test is performed, as presented in Table VII.

The results of the Kruskal–Wallis difference test show significant differences in CT in student learning styles. Then to see which groups of learning styles are significantly different, followed by post hoc using Mann Whitney test which is shown in Table VIII.

TABLE VII: THE KRUSKAL–WALLIS TEST OF LEARNING SYTLE

| | Learning Style |
|---|---|
| Kruskal–Wallis H | 25.285 |
| Df | 3 |
| Asymp. Sig. | .000 |

a. Kruskal–Wallis test.
b. Grouping variable.

TABLE VIII: POST HOC TEST OF LEARNING SYTLE

| Group | Ave Rank | Median (min, max) |
|---|---|---|
| Converging | 48.71 | 5(3,6) [a] |
| Accommodating | 28.43 | 3(0,7) [b] |
| Assimilating | 24.63 | 3(0,4) [b] |
| Diverging | 20.31 | 2(0,4) [b] |

The results of the post hoc analysis show that subjects with a converging learning style have a higher critical thinking increase compared with other learning styles.

## V. DISCUSSION

This study examines critical thinking improvement in prospective teachers by comparing the IBL experimental and PBL control treatment methods. This refers to the 2013 Indonesian education curriculum revised in 2019, where teachers should not use conventional teacher-centered learning. PBL is the most student-centered learning method used in Indonesia. According to the first finding, the IBL and PBL groups showed an increase in prospective teachers' critical thinking skills.

The student-centered learning teaching approach allows to explore and obtain their own in-depth knowledge and improve learning quality [44]. Moreover, this approach focuses on in-depth learning and understanding and increases students' motivation, making them independent and responsible. The application of this approach influences students' perceptions of learning activities. Critical thinking is a cognitive activity that is related to using the mind concerning education. Learning to think in a vital, diagnostic, and evaluative way means using mental processes, such as attention, categorization, selection, and judgment [45]. Creating a comfortable atmosphere for students to face integrative activities increases their motivation in reading achievement [46].

IBL and PBL increase the curiosity of student teacher candidates. This is supported by the mismatch theory, stating that curiosity is generated by a desire to understand more, which arises when expectations are violated [47]. Moreover, this theory aligns with that of Oudeyer *et al*., which showed that increased curiosity was correlated with higher activity in the striatum and inferior frontal cortex [48]. The feedback in the implementation of IBL and PBL stimulates curiosity and increases the knowledge gap salience. In line with these results, several studies have shown that students that guess feedback improve learning outcomes [49].

The second finding is that CT in the treatment group showed a significant improvement than in the control group. IBL improves CT than PBL for both prospective teachers with low and very low CT. This finding aligns with that of Llewellyn and Siburian *et al*., which recommended applying inquiry learning for students to explore and empower their thinking skills actively. Therefore, inquiry learning strategies are more meaningful and useful in creating critical and creative thinking skills [50]. Research shows the effectiveness of the inquiry-based learning model in developing students' critical thinking skills [51]. This model is a series of learning activities that emphasize the critical thinking process and analysis in problem-solving [52]. In line with this, Hairida (2016) concluded that inquiry-based learning is effective for developing students' critical thinking [53]. The model allows and helps students gain an understanding of the scientific method to develop critical thinking skills [54].

Critical thinking corresponds to the threshold at which transformation becomes the most distinctive characteristic. This is because obtaining the threshold involves a series of continuous shifts. Progress is made through effective teaching and learning. It has been determined that PBL encourages critical thinking [55].

Problem-based learning improves students' lifelong skills, such as critical thinking, which they use in the learning process. This is useful in the knowledge construction process by relating current and previous knowledge [18].

The PBL method control group was divided into groups. In these groups, participants that seemed confident appeared as the mainstay of their group friends who lacked confidence. At first, these participants looked excited but also tired. Some participants showed a lack of confidence and problem-solving motivation and were lazy to defend answers. They are irresponsible for their answers but follow their more confident friends. Furthermore, in the self-reflection session, many less-confident participants cannot accept criticism gracefully. They are the last to answer questions, conform to be accepted in their group, and are not enthusiastic in group discussions. Therefore, they should be asked the reason why they solve the problem being studied to motivate the participant in PBL group.

The participants in the IBL group were not divided into groups. Instead, they formulate their problems, seek answers, and correct them using the material links shared by the facilitators. With the IBL method, they compare their abilities after learning with their own abilities before. They do not compare their abilities with others, either in the same group or different groups.

The third finding is that the converging learning style had a higher CT improvement than the approaches in the IBL group. The individual learning style convergence consists of abstract conceptualization and active experimentation, which means that individuals learn through thinking and action. People with convergent styles prefer experimenting with new ideas, conducting simulations, and working with practical applications [43]. People with convergent learning styles are problem-solvers and adept at finding practical solutions. Moreover, they prefer technical tasks and are less concerned with people and interpersonal aspects. People with converging learning styles are best at finding practical uses for ideas and theories. It is easy to arrive at technical decisions through the application of abstract concepts to real-life situations. A unified learning style enables special skills and technology. People with a converging learning

style are able to use the left and right brain to think [56]. Furthermore, students with a converging learning style have advantages in applying theory to problem-solving [57]. This makes participants with the highest converging learning styles improve their critical thinking skills.

The limitation of this study is that the learning style is the participant's choice, not something that is taught by the facilitator in IBL. Thus, the type of person with a converging learning style will be excellent at implementing IBL and improving their critical thinking. As for other learning styles (assimilating, accommodating, and diverging), although not as good as the converging type in implementing IBL, they still significantly improve critical thinking. We suggest further research on IBL implementation with a larger and unlimited sample size for prospective teachers not only who have low and very low critical thinking.

## VI. Conclusion

From this study, it can be concluded that Inquiry-based learning (IBL) improves the critical thinking skills of prospective teachers. This increase in critical thinking abilities is higher than problem-based learning methods. IBL increases the entire group of prospective teachers, on the other hand, the PBL method is not suitable for groups with very low CT. Prospective teachers with a converging learning style find it easier to implement IBL so that it results in the highest increase in CT.

## Conflict of Interest

The authors declare no conflict of interest.

## Author Contributions

Damajanti Kusuma Dewi is the head of the research, contributing to the research planning, implementation, collection of data, and the main author. Wayan Ardhana contributed to directing the implementation of IBL as well as supervising data collection. Irtadji contributed to collecting data processes and analyzing research results. Tutut Chusniyah contributed to directing research methods, participated in supervising research IBL and PBL implementation, and analyzing statistical results. Ambar Sulianti contributed to directing research design, analyzing statistics, implementing cognitive-affective learning processes from a biopsychological perspective, and as a correspondence author.

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**Damajanti Kusuma Dewi** was born in Madiun on October 27, 1970. She was graduated from the University of Putra Bangsa Surabaya majoring in psychology. Then she had a magister's degree in psychology on psychometry from Gadjah Mada University Jogjakarta Indonesia in 1998. At present, she had a doctoral degree at Universitas Negeri Malang.

She was a vice of the psychology program at Universitas Negeri Surabaya. She is also active in developing technology for education. Digital storytelling was her project in 2012. She had a publication in a journal of educational technology applying digital storytelling in blended learning to improve communication ability. Applying cooperative learning to improve math, developing a science module to improve academic achievement are two of her publications in 2011. She is also active in social engagement by having guidance for traditional playing among children in Surabaya.

Dewi was active in the psychology association in Indonesia. She also had some research on online guidance and counseling. She made a module on project-based learning to improve higher-order thinking in 2015 and create a profile for teachers of early childhood education. She is one of the committees in the early childhood education association specialized in curriculum development.

**Wayan Ardhana** was born in Bali Indonesia on May 20, 1937. He had a degree in diploma primary teacher trainer from Moray House College of education Edinburgh Scotland in 1975. Then he had a Master of Art, curriculum, and instruction from the University of Northern Colorado in 1978. He had a doctoral program at a teacher training program in Malang in 1983. He becomes a professor in education in 1986 by having a speech about the attribution of success and failure causes of academic achievement.

He had been teaching in Universitas Negeri Malang up to the present. even though he had been retired from a government employee, he was still teaching. He had experience in managing staff such as the vice dean of education faculty since 1966-1969, and vice dean of the postgraduate program.

He was an expert in educational psychology and learning technology. He also elaborated on research methods and statistics in education. Researches related to innovative learning was his project. Basic in education and statistics for education were books written by prof Aradhana.

**Irtadji** was born in Blitar on August 17, 1953. He was graduated from IKIP Malang, a teacher institute majoring in school counseling in 1980. Then he had a magister in educational psychology from the University of Indonesia in 1993. He had a doctoral degree from Universitas Negeri Malang in 2012. Educational psychology was a specialization for his doctoral program.

He was of a lecturer at Universitas Negeri Malang. He is not only a lecturer but also a trainer for teachers. Developing a model of creative teaching for teachers in east java Indonesia was his research in 2015. It was the result of his projects in two years; 2014-2015. Involving students at school to be creative also his project in 2011 until being published.

Dr. Irtadji was active in promoting creativity both on teachers' and students' levels by having a seminar. He also had given some counseling programs to society through some cooperated programs with the local government. Besides, the selection process for students has also become his project since 2013. He joined the government committee to make a selection program for students registering for school. Designing teacher training at some elementary schools also one of his activities.

**Tutut Chusniyah** was born in Lumajang East Java Indonesia on June 2, 1964. She was graduated from Airlangga University Surabaya Indonesia in 1993 majoring in psychology. She had magister in psychology from the University of Indonesia in 2004. The structural model of holy violence was her thesis for her magister degree. Since she was interested in social psychology, she had a doctoral degree from the same university in 2012 and having a dissertation with the title "psychological needs, Islamic ideology, and group identity as a predictor of Khuilafah – Syriah application."

She began her career as a lecturer in the psychology faculty in 1998 in Universitas Negeri Malang. She has been teaching some lectures; politics psychology, social psychology, and environmental psychology. She also becomes a promotor and advisor for students having a thesis and dissertation. At present, she was a vice-dean at Universitas Negeri Malang managing the faculty of psychology.

Dr. Chusniyah was active in becoming a speaker at an international conference. In the last five years, she had some researches related to Islamic fundamentalist. In 2010, she collaborated having a research about defending religious world views after threats in Australia and Indonesia. Then in 2011, she had a discourse analysis on the attitude towards democracy and the Islamic system. She contributed to a book chapter in 2018 writing about Malaysian and Indonesian adolescents' resiliency and relationships with gratitude and happiness. He was also a member of the social psychology association in Indonesia.

**Ambar Sulianti** was born in Indramayu, West Java Indonesia in May 1973. She was obtained a bachelor's degree and continued to obtain a doctorate degree at Padjadjaran University, Bandung. She completed the undergraduate program in less than four years, the master program in two and a half years, and the doctoral program in four years. She immediately undertook the haj pilgrimage a year after obtaining her doctorate degree.

She has teaching experience at Jenderal Achmad Yani University, Indonesian Education University, and now works as a lecturer at the Psychology Faculty of UIN Sunan Gunung Djati Bandung, West Java. She has international publications in the field of education about the Jigsaw cooperative learning method in 2019, habit of happy brain in 2018, and various writings on neurocognitive sciences. She also has recognition experiences as a speaker in various outreach to the community.

Dr. Sulianti has been active as a speaker at various international conferences. In the last five years, she has conducted several studies related to health psychology, parasitology, cognitive neuroeducation, and biopsychology. She has produced 17 intellectual property rights since 2017. She is a lecturer with lots of expertise and has a wide range of competency certificates including a national certification as instructor of learning methods.