SEMINAR INTERNATIONAL

University of Nusantara PGRI Kediri
in collaboration with
UNU Blitar and Tulungagung University

Proudly present:

# The 1st
# INTERNATIONAL
# SEMINAR
on Business, Education and Science.

The changing role of
knowledge and living sustainability
in ASEAN community

**FREE**
MEET UP ONLINE SEMINAR
Meeting password ID will be posted on smart.unpkediri.ac.id

📅 **MONDAY, AUGUST 8, 2022**
START AT 8 AM (Jakarta / Bangkok)

VENUE:
HALL CAMPUS 2,
UNIVERSITY OF NUSANTARA PGRI KEDIRI
EAST JAVA - INDONESIA

## - OUR SPEAKERS -

**Mohammadtahir Cheumar, Ph.D**
Lecturer Univ.Sultan Abdul Halim Mu'azam Shah
(UniSHAMS) - Malaysia

**Marwan Hayeemaming, Ph.D**
Kolej Islam Antarabangsa Pombing (KIAP) &
Sasnanuksa School - Thailand

**Alfin Sles, Ph.D**
Executive Director
EMAAN Foundation - Cambodia

**Assoc. Prof. T. Syahrul Reza**
Institut Ilmu Sosial dan Manajemen
STIAMI - Indonesia

HYBRID SEMINAR PLATFORM
zoom
You Tube LIVE STREAMING
UNP KEDIRI YOUTUBE CHANNEL

For more information:
Scan Here!
Click to register:

**smart.unpkediri.ac.id**

# The Implementation of lndependent Curriculum Through Project Based Learning at TK ABA VII Kediri

**1*Anik Lestariningrum,2Efi Rofiqoh, 3Stella Natanie**

*1,3 PG-PAUD, Universitas Nusantara PGRI Kediri, 2TK ABA VII Kota Kediri*
*E-mail: 1anikl@unpkediri.ac.id , 2Efirofiqoh1970@gmail.com*
*3nathaniestella2@gmail.com*

*Corresponding Author

**Abstract**—The new paradigm of learning experiences dynamics along with the development of the world of education with increasingly complex and dynamic technology. These changes also impact the early childhood education environment, where playing as a way of learning will be strengthened again so that children are optimally fulfilled in all aspects of development. Moreover, the impact of the learning process during the Covid-19 pandemic resulted in the interruption of direct interaction with distance learning resulting in children lacking concentration and easily triggered by emotions. At the same time, early childhood is a fundamental period. The government also issued policies related to changes in learning in line with the new curriculum, namely the independent curriculum. Implementing an independent curriculum based on children's needs will be used to improve learning. This study aims to get an overview of the implementation of the independent curriculum at the Kindergarten level, especially in the city of Kediri. This study used a descriptive qualitative method with data collection techniques using observation, interviews, and documentation. Data analysis used descriptive analysis as a narrative that tells about the expected research objectives. The results of this study can be used as initial insight into how to implement an independent curriculum at the early childhood level, especially Kindergarten in the target school program for the first period, namely the age of 5-6 years.
**Keywords**: independent curriculum; early childhood; play; how to learn

***Corresponding Author:***

Anik Lestariningrum,
PG-PAUD,
Universitas Nusantara PGRI Kediri,
Email: anikl@unpkediri.ac.id

# I. INTRODUCTION

Education policies constantly change along with the development of conditions for the spread of Covid-19 in the State of Indonesia, starting with policies issued by the government (Antonius Purwanto, 2021). Health is considered the main priority for determining the policy of learning activities. In addition, based on government evaluations, there is a need for face-to-face learning from students who experience problems in implementing distance learning. Therefore, vaccination intervention for educators and education personnel is needed to accelerate returns to face-to-face learning besides applying strict health protocols (Keputusan Bersama Panduan Penyelenggaraan Pembelajaran Di Masa Pandemi Coronavirus Disease 20 19 (COVID- 1 9), 2021). The letter of the Minister of Education, Culture, Research, and Technology Number 7 of 2022 concerning the Discretion for the Implementation of Joint Decrees of 4 (FOUR) Ministers concerning Guidelines for the Implementation of Learning in the Covid-19 Period has been revised. Then, the regulation of limited PTM in 2022 states that parents/guardians of students can choose limited PTM or PJJ for their children until the first semester of the 2021/2022 academic year ends. Starting from the second semester of the academic year or the 2021/2022 academic year (January 2022), all students must take limited PTM (DITPSD KEMDIKBUD, 2022).

Along with these policy changes, the curriculum also needs to be adjusted, and the curriculum must constantly change to suit the times, especially nowadays when science and information technology has grown more massive and uncontrollable. Curriculum changes might impose negative or positive impacts on the quality of education. The positive impact is that students can learn by following the developments of an increasingly advanced era. Literature on the importance of managing an institution that can survive during pandemic conditions prioritizes the implementation of increasing competence in technology using digital media because of the high usage of digital applications for learning during distance learning (Lestariningrum, 2021a). Developing educators' competence will bring the essence of maintaining children's education by playing (F. Wahyuni & Azizah, 2020), in which children's way of learning through playing is prioritized. Referring to Ki Hajar Dewantara's learning (Istiq'faroh, 2020), freedom to play is based on the child's independence (Noventari, 2020), not through commands but by providing good example guidance (Magta, 2013). In this case, it highlights the differentiation or diversity and uniqueness of early childhood, which becomes the concept of developing an independent curriculum for early childhood education (Lestariningrum, n.d.).

Independent curriculum-based learning will be designed by considering students' current stage of development and level of achievement according to learning needs. It will reflect the characteristics and development of diverse learners so that learning becomes meaningful and

enjoyable (Kemdikbud, 2021). The government also prepares it in the form of guidelines concerning a centred and pro-student learning and assessment dedicated for educators at the education unit level in implementing an independent curriculum. The learning program will bring out children's happiness with the application of learning without coercion, subject to the stages of child development (Handayani & Rohman, 2020). From the explanation, it can be inferred that what lies behind the emergence of curriculum changes, in addition to adapting to technological developments and adjusting to the government's policy changes while still considering students' needs, is a learning centre that will prioritize students' needs.

## II. RESEARCH METHOD

Qualitative research is a research process to understand human or social phenomena by creating a comprehensive and complex picture that can be presented in words, reporting detailed views obtained from informants and carried out in the natural setting of (Fadli, 2021). The research is conducted in specific settings in real life (natural) to investigate and understand phenomena: what happened, why it happened, and how it happened. This research will refer to a qualitative approach that put together a combination of literature studies (Darmalaksana, 2020) where the design is as shown below
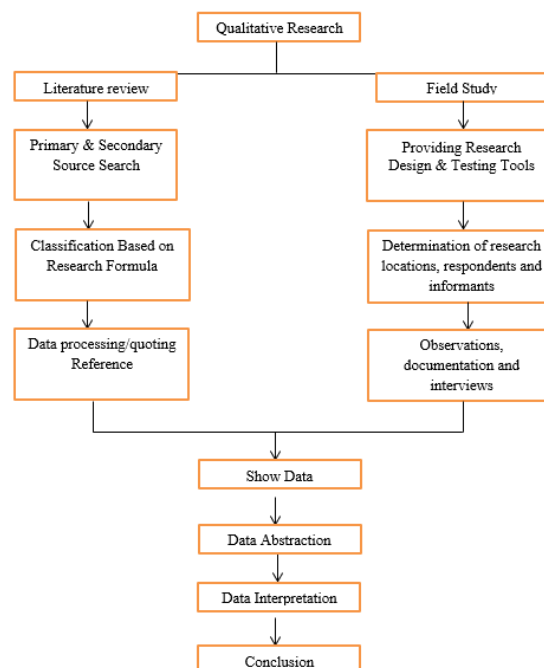


Figure 1: Qualitative Research Design Literature Study & Field Study (Darmalaksana, 2020)

Figure 1 is the scenario of the qualitative research determined by a combination of literature and field studies. The research stages begin by collecting primary and secondary library sources. This study classifies the data based on the research formula (Darmalaksana, 2020). The next stage is processing data or citing relevant references. The field study stage involves preparing research designs and testing field tools to achieve the research objectives. Research location, respondents, and informants are gathered from TK (Kindergarten) ABA VII in Kediri. The respondents are all educators and education staff as the main actors of the independent curriculum implementation program. One supervisor also acts as an auditor during the data processing. Field research is implemented using data collection techniques in the form of observation, documentation, and interviews. The results of the literature study and the results of field studies are presented as research findings, abstracted to obtain complete information, and interpreted to produce knowledge for concluding. As for the interpretation stage, data triangulation analysis, member checking, and auditing are used to make a logical conclusion and credibility can be fulfilled finally (Fadli, 2021).

This research was conducted from October 2021 to July 2022 since the government's appointment of the 'school mover' program through assigning expert trainers for the completion of the first-year assignment and a review of the curriculum for the new academic year 2022-2023. The main steps in assisting the preparation of an independent curriculum, learning planning, implementing project-based learning, and strengthening the profile of Pancasila students, require the presence of researchers directly so that the conclusions can be accounted for and reveal an actual description of the research results.

## III. RESULT AND DISCUSSION

**Independent Curriculum Study for Early Childhood Education**

The definition of curriculum, according to Law Number 20 of 2003(M. Wahyuni et al., 2018), is a set of plans and arrangements regarding the objectives, content, learning materials, and methods used to implement learning activities to achieve certain educational goals. Meanwhile, a complete description of the operational curriculum of the education unit contains the entire plan for the learning process held in the education unit as a guide for the full implementation of learning. The operational curriculum of the education unit is developed according to the context and needs of the students and the education unit to give specific meaning to it. The central government establishes the basic framework and curriculum structure as a reference for developing the operational curriculum of education units. The components in the operational

curriculum are structured to assist the thinking process and learning development within the educational units. It is where the essence of independence is developed according to what was conveyed by Ki Hajar Dewantara, that educators are like farmers who will sow seeds according to their respective natures. They are supposed to nurture and guide, not only command.(Noventari, 2020).

The application of an independent curriculum, which has the characteristics of the learning process, will be maximized because students have enough time to explore concepts and strengthen their competencies based on their respective abilities, not on the achievement targets of their class groups. Teachers can freely choose methods and tools by including the profile of Pancasila students as an inseparable part of producing long-life learners. The process can be done by cultivating the values of Pancasila in students from an early age through fun activities (Lestariningrum, 2021b). Implementing Pancasila values is undoubtedly embedded into fun play activities since being 'happy' is the essence of independent learning at an early age. At the foundation stage, educational units must support creating a comfortable, safe, and fulfilling environment to generate happiness for young learners (Handayani & Rohman, 2020). Early learners have a unique way of learning something different from adults. Playing is a learning activity for children where they can undergo the process with pleasure and without coercion. Still, it involves patterns expected to result in good development, which is vital for the child to continue to the next stage of education (Utomo, E & Haenilah, E, 2019).

Table 1: Application of the Independent Curriculum in Kindergarten ABA VII Kediri City

| No | Documentation | Description of Activity Observation & Interview to Principal |
|---|---|---|
| 1 |  | • FGD to compile curricula for school operational unit curricula are led by direct researchers as expert trainers in the school mover program and supervisor assistants.<br>• The results achieved are the formulation of CP, determining themes chosen in the project, selecting the topic programs of activities to be carried out in 1 semester<br>• Preparing for the next stage, namely independent training of learning devices (teaching modules) |
| 2 | | • Presentation of material on analyzing CP (Learning Outcomes)<br>• Presentation of material on |

| No | Documentation | Description of Activity Observation & Interview to Principal |
|---|---|---|
|  |  | compiling teaching modules (RPP)<br>• Practice compiling teaching modules for ages 5-6 years<br>• The presentation of the learning committee's work results continued with a discussion on the strengths and weaknesses.<br>• Preparation of the follow-up activities project module. |
| 3 |  | • Presentation of material on the components of the project module<br>• Understand project guidelines for early childhood education<br>• Determination of themes and topic selection<br>• Practice compiling project modules<br>• Presentation of the results of the project module exercise to obtain input from participants to find agreements on activities to be carried out<br>• Preparation of socialization activities for the independent curriculum |
| 4 |  | • Socialization of the independent curriculum as a new paradigm of learning in parenting activities with parents to get input on school programs from the parents.<br>• Formation of class associations and parental involvement activities in project program implementation<br>• Preparation of partner development (cooperation) |
| 5 |  | • The signing of the cooperation script for Kindergarten ABA VII Kediri in the fields of education, research, and community service<br>• Developing an initial follow-up program for partnerships in the field of education, namely as a place for student practice lectures, especially project learning |
| 6 |  | • The head of the research team, together with the members of research implementers (university students) planning a comparative |

| No | Documentation | Description of Activity Observation & Interview to Principal |
|---|---|---|
| |  | study at TK ABA VII <br> • Preparing a schedule of activities to be carried out as well as dividing the tasks to coordinate with schools and students of PG PAUD 2019 and 2020 regular classes |
| 7 |  <br>  | • Visiting activities by students of PG-PAUD FKIP UNP Kediri to directly see the learning process that prioritizes playing as a way of learning for children <br> • The principal, accompanied by the teachers, explains directly the implementation of project learning in the independent curriculum <br> • Participants or students can be directly involved in the activities <br> • Coordination of activity evaluation with the research team and student representatives <br> • Develop a follow-up activity plan |
| 8 |  <br>  | • Independent curriculum review 2022-2023 <br> • Checking policies on the latest PAUD level learning outcomes <br> • Preparation of annual activity program <br> • Selection of the theme of the Pancasila student profile project <br> • Preparation for the socialization of the 2022-2023 independence curriculum |

**Pancasila Student Profile Strengthening Project (P5)**

Pancasila Student Profile is in line with the vision and mission of the Ministry of Education and Culture, namely realizing Indonesian students as lifelong learners with global competence and whose behavior reflects the values of Pancasila. The six elements of the Pancasila Student Profile include faith, fear of TYME and noble character, global diversity, cooperation, independence, and critical and creative reasoning (Sherly et al., 2021). The Pancasila Student Profile can be implemented through habituation, coaching, and learning (Sulistyati, 2021). Pancasila students embody Indonesian students as lifelong learners with global competence and behave according to the values of Pancasila. According to Ki Hajar Dewantara, the influence of teaching generally liberates humans from their lives from birth, while the freedom of inner life comes from education. An independent man is a human whose life is physically and mentally not dependent on others but relies on his/her strength(RAHAYUNINGSIH, 2022).

To optimize the internalization of Pancasila values through the Pancasila Student Profile, the Ministry of Education and Technology 2021 developed the "Merdeka Mengajar" Platform, one of which discusses the Pancasila Student Profile and its implementation via smartphones or computers (Susilawati et al., 2021). Educators will easily access and also carry out independent learning and adapt to the conditions of their respective schools. Especially in the management of early childhood learning, where understanding the characteristics of students is done by understanding the advantages and disadvantages. Educators can then organize play-based learning according to the stages of development where the activeness and creativity of educators are expected (Sum & Taran, 2020). This creativity is manifested in selecting learning activities through projects and appropriate media and methods, so they are carried out in pleasant conditions.

The following are the various implementations of the Pancasila student profile project, which can be described as follows:

Table 2: Implementation of the Pancasila Student Profile Strengthening Project in
Kindergarten ABA VII Kediri City

| No | Documentation | Description of Activity Observation & Interview with Principal |
|----|---------------|----------------------------------------------------------------|
| 1 |  | <ul><li>Youtube link https://youtu.be/hNizRoV40Hk related to new paradigm learning activities</li><li>Implementation of learning process using the project's method and experiment</li><li>The teacher always gives children the opportunity to explain what they have done</li></ul> |
| 2 |  | <ul><li>Project performance to strengthen the profile of Pancasila students where children and teachers demonstrate their learning skills related to independence, courage, and creativity to be displayed with their parents</li><li>The school designs a project in collaboration with parents and guardians in the parent class association</li></ul> |

The elaboration of the independent curriculum and the implementation of the project aimed to strengthen the profile of Pancasila students have empowered the project's concept to develop students' character from an early age through the daily application of Pancasila values. Cultivating Pancasila values in early childhood (Fernando, 2020) is part of maintaining the state's ideology through the nation's next generation. Besides, teachers should improve their skills in information technology (Myori et al., 2019) to implement an independent curriculum since they require skills to open the teaching platform application, not only as users but also as material uploaders to share the best practices. Today, collaboration is essential (Sudibjo et al., 2020), which means when projects are conducted, it is vital to prioritize cooperation to solve problems through multiple techniques which will demonstrate children's creativity. Collaboration also

occurs among all educators and education staff in managing the learning process (Ramadhani & Nopriansyah, 2019). Especially for early childhood education units, classroom management must understand the uniqueness of children and pay attention to children's learning process and the basic concept of playing. The characteristics of playing are (Ardini & Lestariningrum, 2018) children can do it voluntarily without coercion, and there are activities to explore meaningful experiences that are directly involved during activities. Through the implementation of an independent curriculum, the level of early childhood education will be a solid foundation phase through lifelong learning in character internalization in the Pancasila student profile strengthening project. The character which is taught, exemplified, and accustomed to through the habits of everyday life becomes basic skills children can do in their habituation (Ginting, 2017).

## IV. CONCLUSION

Through this research, it can be concluded that the independent curriculum for early childhood learning in the foundation phase should still prioritize fun learning with embedded Pancasila values to achieve long-life learning projects. The implementation should be conducted in stages where they are not only the sole responsibility of schools but also require collaboration with parents as the first teachers within the family. Adaptation to the community is also crucial in compiling the programs to optimize implementation.

## ACKNOWLEDGMENTS

## REFERENCES

Antonius Purwanto. (2021). Kebijakan {Pembelajaran} {Tatap} {Muka} {Semester} {Genap} 2020/2021: {Latar} {Belakang}, {Panduan}, dan {Program} {Alternatif}. In Kompaspedia.

Ardini, pupung puspa, & Lestariningrum, A. (2018). BERMAIN & PERMAINAN ANAK USIA DINI (I). CV. Adjie Media Nusantara.

Darmalaksana, W. (2020). Metode Penelitian Kualitatif Studi Pustaka dan Studi Lapangan. Pre-Print Digital Library UIN Sunan Gunung Djati Bandung.

DITPSD KEMDIKBUD. (2022). Semua Sekolah Wajib Melaksanakan PTM Terbatas pada 2022 - Direktorat Sekolah Dasar. Ditpsd.Kemdikbud.Go.Id. https://ditpsd.kemdikbud.go.id/artikel/detail/semua-sekolah-wajib-melaksanakan-ptm-terbatas-pada-2022

Fadli, M. R. (2021). Memahami desain metode penelitian kualitatif. HUMANIKA, 21(1), 33–54. https://doi.org/10.21831/hum.v21i1.38075

Fernando, Z. J. (2020). Pancasila Sebagai Ideologi Untuk Pertahanan Dan Keamanan Nasional Pada Pandemi Covid-19. Jurnal Kajian Lemhannas RI, 8(3), 272–282.

Ginting, H. (2017). Peranan Pancasila Dalam Menumbuhkan Karakter Bangsa Pada Generasi Muda. Prosiding Seminar Nasional Tahunan Fakultas Ilmu Sosial Universitas Negeri Medan, 1(1), 197–201.

Handayani, E. P., & Rohman, A. (2020). Paradigma Bahagia Itu Mencerdaskan Ikhtiar Membangun Kemerdekaan Belajar Anak Usia Dini. Aksara: Jurnal Ilmu Pendidikan Nonformal, 6(3), 265. https://doi.org/10.37905/aksara.6.3.265-276.2020

Istiq'faroh, N. (2020). Arti Pendidikan. In Lintang Songo : Jurnal Pendidikan (Vol. 3, Issue 2, pp. 1–10).

Keputusan Bersama Panduan Penyelenggaraan Pembelajaran Di Masa Pandemi Coronavirus Disease 20 19 (COVID- 1 9), Kementerian Pendidikan dan Kebudayaan (2021).

Kemdikbud, P. (2021). Pembelajaran dan Asesmen. X–76.

Lestariningrum, A. (n.d.). Konsep Pembelajaran Terdefirensiasi Dalam Kurikulum Merdeka Jenjang PAUD. 179–184.

Lestariningrum, A. (2021a). Management and Sustainability Challenges of Early Childhood Education Institutions in Pandemic Era. 581(Incesh), 18–23.

Lestariningrum, A. (2021b). Pengelolaan Pembelajaran Berbasis Nilai-nilai Pancasila Masa Pandemi Pada Anak Usia Dini Abstrak. Journal Of Modern Early Childhood Education, 01(01), 11–18.

Magta, M. (2013). Konsep Pendidikan Ki Hajar Dewantara Pada Anak Usia Dini. Mutiara Magta, 7(11), 221–232.

Myori, D. E., Hidayat, R., Eliza, F., & Fadli, R. (2019). Peningkatan Kompetensi Guru dalam Penguasaan Teknologi Informasi dan Komunikasi melalui Pelatihan Pengembangan Media Pembelajaran Berbasis Android. JTEV (Jurnal Teknik Elektro Dan Vokasional), 5(2), 102–109.

Noventari, W. (2020). Konsepsi Merdeka Belajar Dalam Sistem Among Menurut Pandangan Ki Hajar Dewantara. PKn Progresif: Jurnal Pemikiran Dan Penelitian Kewarganegaraan, 15(1), 83. https://doi.org/10.20961/pknp.v15i1.44902

RAHAYUNINGSIH, F. (2022). INTERNALISASI FILOSOFI PENDIDIKAN KI HAJAR DEWANTARA DALAM MEWUJUDKAN PROFIL PELAJAR PANCASILA. SOCIAL : Jurnal Inovasi Pendidikan IPS, 1(3), 177–187. https://doi.org/10.51878/social.v1i3.925

Ramadhani, R., & Nopriansyah, U. (2019). Manajemen Berbasis Keluarga Dalam Pengelolaan Paud. Al-Athfaal: Jurnal Ilmiah Pendidikan Anak Usia Dini, 2(2), 32–46. https://doi.org/10.24042/ajipaud.v2i2.5344

Sherly, S., Herman, H., Halim, F., Dharma, E., Purba, R., Sinaga, Y. K., & Tannuary, A. (2021). SOSIALISASI IMPLEMENTASI PROGRAM PROFIL PELAJAR PANCASILA DI SMP SWASTA SULTAN AGUNG PEMATANGSIANTAR. Jubaedah : Jurnal Pengabdian Dan Edukasi Sekolah (Indonesian Journal of Community Services and School Education), 1(3), 282–289. https://doi.org/10.46306/jub.v1i3.51

Sudibjo, N., Sari, N. J., & Lukas, S. (2020). PENERAPAN PEMBELAJARAN BERBASIS PROJEK UNTUK MENUMBUHKAN PERILAKU KREATIF, MINAT BELAJAR, DAN KERJA SAMA SISWA KELAS V SD ATHALIA TANGERANG. Akademika, 9(01), 1–16. https://doi.org/10.34005/akademika.v9i01.736

Sulistyati, D. M. (2021). Proyek Profil Pelajar Pancasila.

Sum, T. A., & Taran, E. G. M. (2020). Kompetensi Pedagogik Guru PAUD dalam Perencanaan dan Pelaksanaan Pembelajaran. Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini, 4(2), 543. https://doi.org/10.31004/obsesi.v4i2.287

Susilawati, E., Sarifudin, S., & Muslim, S. (2021). INTERNALISASI NILAI PANCASILA DALAM PEMBELAJARAN MELALUI PENERAPAN PROFIL PELAJAR PANCASILA BERBANTUAN PLATFORM MERDEKA MENGAJAR. Jurnal Teknodik, 25(2), 155. https://doi.org/10.32550/teknodik.v25i2.897

Utomo, E & Haenilah, E, Y. (2019). Belajar Melalui Bermain Anak Usia Dini Meretas Pendidikan Berkelanjutan Untuk Pembangunan Berkelanjutan (SDGs). Prosiding

Seminar Nasional Pendidikan: Trend, Issue, Dan Inovasi Pembelajaran Berbasis Sustainable Development, 1(1).

Wahyuni, F., & Azizah, S. M. (2020). Bermain dan Belajar pada Anak Usia Dini. Al-Adabiya: Jurnal Kebudayaan Dan Keagamaan, 15(01), 161–179. https://doi.org/10.37680/adabiya.v15i01.257

Wahyuni, M., Yuliantina, I., & Ritayanti, U. (2018). Penyusunan Rencana Pelaksanaan Pembelajaran : Pendidikan Anak Usia Dini. Direktorat Pembinaan Pendidikan Anak Usia Dini, Kementrian Pendidikan Dan Kebudayaan, 021, 30.

# Development of Powtoon-based SCEMA Learning Media for Science Subjects in Class V Elementary School

**[1]Tridian Wahyu Aji, [2]Ajeng Rayi Sepyaningrum, [3*]Dhian Dwi Nur Wenda**
*[1,2,3]Pendidikan Guru Sekolah Dasar, Universitas Nusantara PGRI Kediri*
*E-mail: [1]Bayuaji1530@gmail.com, [2]ajengseptya26@gmail.com,*
*[3]dhian.2nw@unpkediri.ac.id*

**Abstract**— This research is motivated by the lack of students' understanding of the science subject matter of the human digestive system because the teacher only uses the media in the student worksheet. This study aims to develop a powtoon-based SCEMA media. This research is an R&D (Research and Development) research or development research in this study the model used is ADDIE which consists of Analysis, Design, Development, Implementation, and Evaluation. The data collection technique used in this study used descriptive analysis techniques for observation and interview data while calculating the score results from validation, practicality, and effectiveness in the form of numbers using statistical analysis. The results of the validation of media experts obtained data of 88.75% very feasible category, and material experts got an average of 87.5% very feasible category, the results of media practicality obtained a score of 86.25% by practitioners with very practical categories and 93.75% by student responses with very practical categories, data related to effectiveness seen from pre-test and post-test obtained 55% before and 81.25% after using learning media, based on these data there was a significant increase in pretest and posttest scores. From the results of the research that has been carried out, it can be concluded that the Learning Media in the Powtoon-based SCEMA in the fifth-grade science subjects in elementary schools is declared suitable for use as science learning media. Learning media with Powtoon-based SCEMA in the fifth-grade science subject at Musirlor Elementary School succeeded in increasing student interest and understanding.

**Keywords**—Powtoon**;** Science; SCEMA; Learning Media

*Corresponding Author:*

Dhian Dwi Nur Wenda,
Pendidikan Guru Sekolah Dasar,
Universitas Nusantara PGRI Kediri,
Email: 3dhian.2nw@unpkediri.ac.id

## I. INTRODUCTION

Education is an activity of the learning process to acquire knowledge and learning skills. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students can actively develop their potential, and have spiritual strength, self-control, and character. and country [1]. The function of education is to prepare students. "Prepare" means that students are basically not ready but need to prepare and they are preparing [2].

Science education is a science that emphasizes direct and practical giving, not just rote learning [3,4]. Science learning is to understand the universe through observations that are part of the product, process, and attitude as a learning activity [5,6]. In the science learning process, it is not only carried out in the classroom like other lessons but in science learning, practice is also carried out outside the classroom in order to get results that are balanced with the material [7,8].In particular, science learning is more fun and understandable if students experience or gain practical experience related to learning material. Science learning tends to be difficult to understand if you only use books, in other words, you don't use infrastructure, especially on the Human Digestive System material because the processes that occur are invisible or occur in the body, therefore a supporting tool is needed to make it easier for students to understand the learning material science learning, the tool is media.

Based on the results of observations made by researchers at SDN Musirlor, it is known that science learning has not been going well, it can be proven that there are learning problems in class V, namely in science subjects, the Human Digestive System material still has many shortcomings based on interviews conducted by teachers. The class and students of SDN Musirlor obtained information that the teacher only used picture media in the student worksheet, it made students feel bored and not interested in the material, causing their learning outcomes to be lacking so many did not pass the minimum completeness criteria.

To overcome this, it is necessary to develop more diverse learning to attract students' attention so that they participate more actively in the learning process, for example, the use of learning media. Media can be interpreted as anything that can be used by the resource person for sending the message content to be forwarded to the person being conveyed or the audience of the message to create a conducive learning environment where the recipient can carry out the learning process efficiently and effectively [9,10,11].

With the use of learning media, the learning material delivered can be uniform, so that the learning process runs more interestingly, students are more interactive, learning time becomes more efficient, and improves the quality of learning [12,13]. The media can give the effect of clarity of the object or material being studied so that it attracts the attention of students [14,15].

Over time the learning media is very diverse. For this reason, teachers must be able to follow the impact of these technological advances.

One of the uses of information and communication technology in education is to create innovative and interesting learning media, interactive multimedia is one of the learning media that utilizes technology and can help all types of student learning styles [16]. Interactive multimedia is a combination of several media such as images, videos, animations, graphics, sound, and text as well as the way the media is delivered is interactive so that it can create a learning experience for students like real life in the surrounding environment [17,18].

Interactive multimedia usually has buttons or controllers that can be operated by teachers and students, so users can set what they want for the next process [19,20]. One of the interactive media chosen by the author is the Powtoon-based SCEMA (Sistem Pencernaan Manusia) media. Powtoon is an IT-based web application that can be used as a learning medium in which there are interesting features such as features for making presentations or animated videos that can be used easily and attractively [21]. Powtoon has several advantages, namely, there are animated video, pictorial, and audio so that Powtoon is expected to attract the attention of students so that the learning process becomes fun.

Powtoon can have a very good effect on students' enthusiasm in the teaching and learning process and can attract students' interest in learning. Powtoon can provide understanding to students because it provides an illustration related to the material [22]. This is in accordance with previous research that video learning media on pollution and environmental damage based on the Powtoon application is effective and feasible to be used as a media for students in their learning [23]. The use of Powtoon learning media can make students understand the lesson better and can generate enthusiasm for learning. With an interesting learning atmosphere, students can influence students to interest in learning [24].

Based on the description of the previous powtoon research entitled Development of Powtoon Learning Media based on Problem Based Learning in Elementary School Class V Science Content Ecosystem Materials, shows that powtoon media is very feasible to be applied to improve student learning outcomes [25]. Based on needs analysis and analysis of previous research, researchers are interested in conducting research with the title of Developing Powtoon-based SCEMA Learning Media in Science Subjects for Class V Elementary Schools.

## II. RESEARCH METHOD

This research is an R&D (Research and Development) research or development research in this study the model used is ADDIE (Analysis, Design, Development, Implementation, and Evaluation). The method of collecting data collected in this study is descriptive data to analyze

observation and interview data and input suggestions based on a questionnaire given by practitioners while the validation scores and student learning outcomes by pretest and posttest will be analyzed using quantitative data. The subjects in this study were 8th graders for the limited trial and 30 students for the wide trial conducted at SDN Musirlor. Instruments for media experts relate to language, benefits, media functions, and appearance (writing & pictures). Instruments for material experts that contain material depth, material breadth, completeness, and language. For the second data collection, the pre-test and post-test methods were used to measure student interest in learning before and after receiving the Human Digestive System material in science subjects.

A. Calculate the percentage of each sub variable using the following formula

$$NP = \frac{S}{SR} \times 100\%$$

Information:

NP = Result value

S  = Value obtained

SR = Maximum value

Research criteria in learning media can be seen in the following table.

B. Assessment criteria table

Table 1. Assessment criteria table [26]

| No | Interval | Eligibility Criteria |
|----|----------|----------------------|
| 1 | 80% - 100% | Very Eligible/Very Good/Strongly Agree |
| 2 | 66% - 79% | Eligible/Good/Agree |
| 3 | 56% - 65% | Less Eligible/Not Good/Not Agree |
| 4 | 0% - 55% | Inappropriate/Not Good/Disagree |

## III. RESULT AND DISCUSSION

Based on the results of observations obtained data that there are learning problems in class V, namely in science subjects the Human Digestive System material still has many shortcomings. make students feel bored and not interested in the material, causing their learning outcomes to be less so that many do not pass the minimum completeness criteria. To overcome this we need a media. Based on the results of observations/interviews, one type of media will be developed to overcome this problem, namely Powtoon-based SCEMA media.

This media contains Human Digestive System material which is explained by animation and designed as attractive as possible by making animations that are in accordance with the

preferences of elementary school children, clear and solid language display, appropriate material and appropriate audio settings so that students can be active and understand the subject material. This media has the advantage of being technology-based and made as attractive as possible so that it can attract the attention of students, the finished media will be tested for validity.

Based on the results of research and development that have been carried out, three types of research data can be described, the first data being data on the validity, effectiveness, and practicality of the product. Product validity is seen from the results of expert validation carried out to 4 experts with categories of 2 media experts and 2 material experts, the results of expert validation will be analyzed to see the value of the validity of the product being developed, expert validation is also obtained input and suggestions that are used to revise the product developed. The results of the expert validation carried out will be presented in the following diagram.

**Media Validity Results**
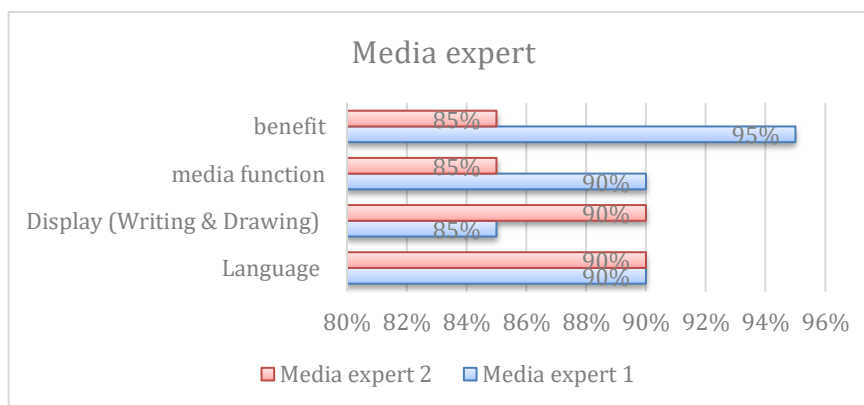


Figure 1. Media Rating by Media Expert

Figure 1 above is the result of data obtained from 2 expert validations, Based on the validation results of 2 media experts on aspects of benefits, functions, appearance, and language. Media expert 1 obtained an average score of 90%. Media expert 2 obtained an average score of 87.5%. Based on the data of the two validators, an average score of 88.75% was obtained. Based on the analysis of media experts, this media is very suitable to be used to help the learning process of the Human Digestive System. In addition to data from media experts, there is also data from material experts whose results can be seen in figure 2 as follows.

**Material Validity Results**



Figure 2. Assessment of media by Material Expert

Based on the validation results of 2 material experts which can be seen in diagram 3.2 with aspects of language, material depth, material breadth, and material completeness. Material expert 1 obtained a score of 85%. Material expert 2 obtained a score of 87.5%. As the results of the two validators obtained an average score of 86.25%. Based on the analysis of material experts, the learning media is very suitable to be used to help 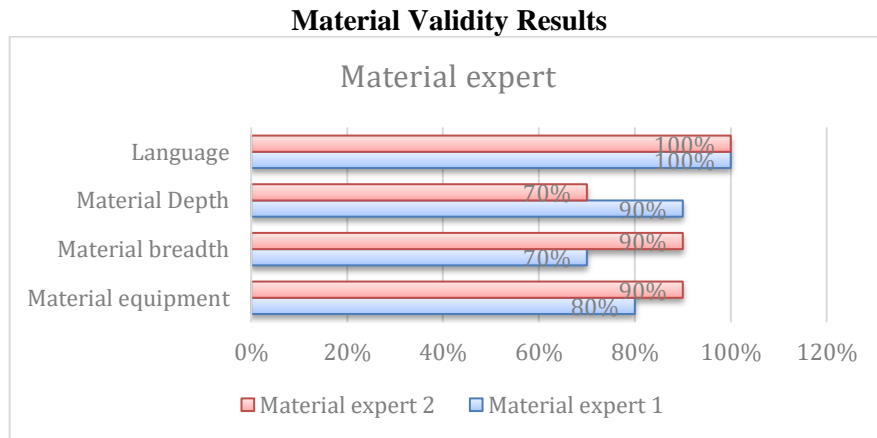the learning process of the Human Digestive System. In addition to the validity of the product in this study, practicality data obtained from teachers who implement it in the classroom will also be obtained, in more detail, the results of the practicality test based on the assessment of practitioners or teachers can be seen in diagram 3.3 below.

**Media Practical Results**
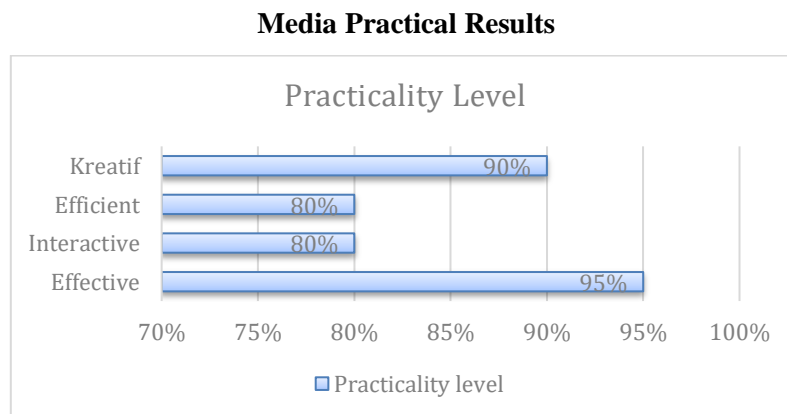


Figure 3 Practical assessment by class V teacher

Based on the diagram, it is known that the level of practicality with details of creative, efficient, interactive, and effective aspects obtained an average score of 86.25%. Based on the results of the teacher's response analysis, the developed learning media got responses in the very practical category used to help the learning process of the Human Digestive System learning process. Data was also obtained from student responses which obtained data from a questionnaire given to students and the results can be seen in the diagram shown in diagram 3.4 below.
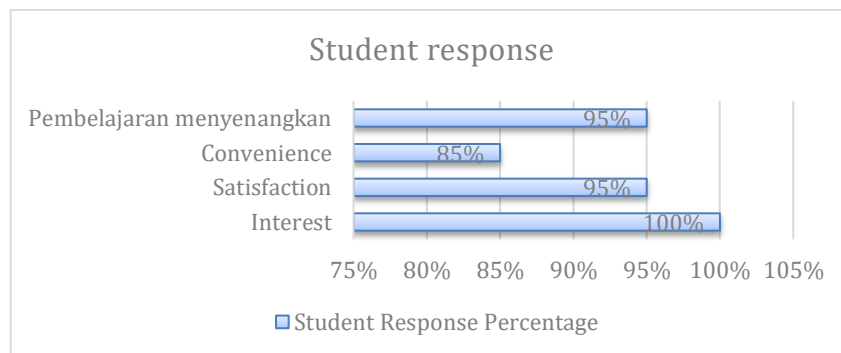
Figure 4 student response data

Based on the diagram on the aspects of interest, satisfaction, convenience, and fun learning, an average score of 93.75% was obtained in the very good category. In addition to practicality, there is also data on the effectiveness of the media with the following diagram.

**Media Effectiveness Results**
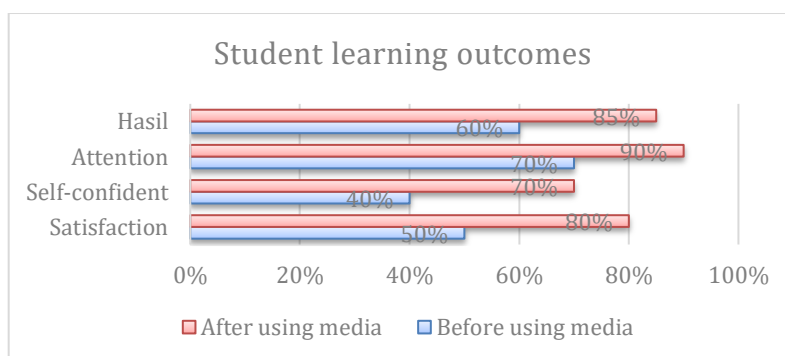


Figure 5. Results of data analysis of student learning outcomes

Based on the results of research that has been done with pretest and posttest which can be seen in Diagram 3.4 with details on aspects of results, attention, self-confidence, and satisfaction. Data related to the effectiveness seen from the results of the pre-test and post-test obtained 55% before and 81.25% after using learning media, based on these data there was a significant increase in the pretest and post-test scores so that the comparison between the pretest and posttest media could significantly improve students' ability to support student learning outcomes.

## IV. CONCLUSION

From the results of the research that has been carried out, it can be concluded that the Learning Media in the Powtoon-based SCEMA in the fifth-grade science subjects in elementary schools is declared suitable for use as science learning media. This can be seen from the results of media expert validation, a score of 88.75% was obtained, and material experts got an average of 87.5%, the results of the practicality of the media obtained a score of 86.25% by practitioners and 93.75%

by student responses, data related to effectiveness seen from the pre-test and post-test results obtained 55% before and 81.25% after using learning media, based on these data there is a significant increase in pretest and posttest scores so that the comparison between pretest and posttest media can significantly improve students' abilities to support learning outcomes student. Learning media with Powtoon-based SCEMA in the fifth-grade science subject at Musirlor Elementary School succeeded in increasing student interest and understanding.

## ACKNOWLEDGMENTS

## REFERENCES

[1] Undang- Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional Dengan Rahmat Tuhan Yang Maha Esa Presiden Republik Indonesia.

[2] O. Hamalik, "Proses belajar mengajar / Oemar Hamalik," Bumi Aksara. p. 79, 2011. [Online]. Available: http://inlislite.banjarkab.go.id/opac/detail-opac?id=16779

[3] Ika W., & Tias, U. (2017). Penerapan Model Penemuan Terbimbing Untuk Meningkatkan Hasil Belajar Ipa Siswa Sekolah Dasar. Dwija Cendekia: Jurnal Riset Pedagogik, 1(1), 50–60. Https://Doi.Org/10.20961/Jdc.V1i1.13060.

[4] Sugiarta, G. P. O., Widiana, I. W., & Tastra, I. D. K. (2016). Penerapan Model Pembelajaran Inkuiri Berbasis Portofolio Untuk Meningkatkan Hasil Belajar Ipa Siswa Kelas V. E-Journal Pgsd Universitas Pendidikan Ganesha, 6(3), 1–10. Https://Doi.Org/10.23887/Jjpgsd.V4i3.8600.

[5] Januarisman, E., & Ghufron, A. (2016). Pengembangan Media Pembelajaran Berbasis Web Mata Pelajaran Ilmu Pengetahuan Alam Untuk Siswa Kelas Vii. Jurnal Inovasi Teknologi Pendidikan, 3(2), 166. Https://Doi.Org/10.21831/Jitp.V3i2.8019.

[6] Karwati, N. P. R., Wiyasa, K. N., & Ardana, I. K. (2020). Pengaruh Model Pembelajaran Probing Prompting Berbantuan Multimedia Terhadap Hasil Belajar Ipa. Jurnal Ilmiah Pendidikan Dan Pembelajaran, Viii(23), 189–196. Https://Doi.Org/10.23887/Jipp.V2i3.16232.

[7] Ariyanto, S. Kantun, and S. Sukidin, "Penggunaan Media Powtoon Untuk Meningkatkan Minat Dan Hasil Belajar Siswa Pada Kompetensi Dasar Mendeskripsikan Pelaku-Pelaku

Ekonomi Dalam Sistem Perekonomian Indonesia," J. Pendidik. Ekon. J. Ilm. Ilmu Pendidikan, Ilmu Ekon. dan Ilmu Sos., vol. 12, no. 1, p. 122, 2018, doi: 10.19184/jpe.v12i1.7622.

[8] Dwisetiarezi, D., & Fitria, Y. (2021). Analisis Kemampuan Literasi Sains Siswa Pada Pembelajaran Ipa Terintegrasi Di Sekolah Dasar. Jurnal Basicedu, 5(4), 1961–1970. Https://Doi.Org/10.31004/Basicedu.V5i4.1136.

[9] Andriyani, N. L., & Suniasih, N. W. (2021). Development Of Learning Videos Based On Problem-Solving Characteristics Of Animals And Their Habitats Contain In Science Subjects On 6th-Grade. Journal Of Education, 5(1), 37–47. Https://Doi.Org/Http://Dx.Doi.Org/10.23887/Jet.V5i1.32314.

[10] Hanik, E. U. (2020). Self Directed Learning Berbasis Literasi Digital Pada Masa Pandemi Covid-19 Di Madrasah Ibtidaiyah. Elementary: Islamic Teacher Journal, 8(1), 183. Https://Doi.Org/10.21043/Elementary.V8i1.7417.

[11] Kustandi, C., & Sutjipto, B. (2020). Media Pendidikan Manual Dan Digital. Ghalia Indonesia.

[12] Kuswanto, J., Walusfa, Y., Artikel, S., Korespondensi, A., Ratu Penghulu No, J., Sari, K., Baru, T., Raja Tim, B., Ogan Komering Ulu, K., & Selatan, S. (2017). Pengembangan Multimedia Pembelajaran Pada Mata Pelajaran Teknologi Informasi Dan Komunikasi Kelas Viii. Innovative Journal Of Curriculum And Educational Technology Ijcet, 6(2), 58–64.

[13] Melianti, E., Risdianto, E., & Swistoro, E. (2020). Pengembangan Media Pembelajaran Berbasis Multimedia Interaktif Menggunakan Macromedia Director Pada Materi Usaha Dan Energi Kelas X. Jurnal Kumparan Fisika, 3(1), 1–10. Https://Doi.Org/10.33369/Jkf.3.1.1-10.

[14] Citra, C. A., & Rosy, B. (2020). Keefektifan Penggunaan Media Pembelajaran Berbasis Game Edukasi Quizizz Terhadap Hasil Belajar Teknologi Perkantoran Siswa Kelas X Smk Ketintang Surabaya. Jurnal Pendidikan Administrasi Perkantoran (Jpap), 8, 261–272.

[15] Pratiwi, N. P. E. Y., Pudjawan, K., & Sukmana, A. I. W. I. Y. (2018). Pengembangan Multimedia Pembelajaran Interaktif Berbasis Proyek Pada Mata Peajaran Bahasa Indonesia Pada Siswa Kelas V. Edutech Universitas Pendidikan Ganesha, 6, 123–133. Https://Doi.Org/10.23887/Jeu.V6i1.20277.

[16] Gunawan, G., Harjono, A., & Imran, I. (2016). Pengaruh Multimedia Interaktif Dan Gaya Belajar Terhadap Penguasaan Konsep Kalor Siswa. Jurnal Pendidikan Fisika Indonesia, 12(2), 118–125. Https://Doi.Org/10.15294/Jpfi.V12i2.5018.

[17] Bardi, B., & Jailani, J. (2015). Pengembangan Multimedia Berbasis Komputer Untuk Pembelajaran Matematika Bagi Siswa Sma. Jurnal Inovasi Teknologi Pendidikan, 2(1),

49–63. Https://Doi.Org/10.21831/Tp.V2i1.5203.

[18] Rasyid, M., Azis, A., & Saleh, A. (2016). Pengembangan Media Pembelajaran Berbasis Multimedia Dalam Konsep Sistem Indera Pada Siswa Kelas Xi Sma. Jurnal Pendidikan Biologi, 7(2), 69–80. Https://Doi.Org/10.17977/Um052v7i2p69-80.

[19] Gama, I. G. B. S., Mahadewi, L. P. P., & Jampel, I. N. (2016). Pengembangan Multimedia Tutorial Interaktif Sumber Daya Alam Dan Teknologi Pada Mata Pelajaran Ipa Kelas Iv Di Sdn 3 Banyuasri. Jurnal Edutech, 6(3), 1–10. Https://Doi.Org/10.23887/Jeu.V4i3.8560.

[20] Melianti, E., Risdianto, E., & Swistoro, E. (2020). Pengembangan Media Pembelajaran Berbasis Multimedia Interaktif Menggunakan Macromedia Director Pada Materi Usaha Dan Energi Kelas X. Jurnal Kumparan Fisika, 3(1), 1–10. Https://Doi.Org/10.33369/Jkf.3.1.1-10.

[21] Emalida (2017) Powtoon: Media Pembelajaran berbasis Teknologi Informasi sebagai Upaya dalam Menciptakan Pembelajaran yang Menarik dan Kreatif.

[22] Awalia, A. S. Pamungkas, and T. P. Alamsyah, "Pengembangan Media Pembelajaran Animasi Powtoon pada Mata Pelajaran Matematika di Kelas IV SD," Kreano, J. Mat. Kreat., vol. 10, no. 1, pp. 49–56, 2019, doi: 10.15294/kreano.v10i1.18534.

[23] Mutia, R., Adlim, A., & Halim, A. 2018. Pengembangan video pembelajaran IPA pada materi pencemaran dan kerusakan lingkungan. Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education), 5(2):110–116.

[24] Qurrotaini.T, Sari. T, Sundi. T . 2020 Efektivitas Penggunaan Media Video Berbasis Powtoon dalam Pembelajaran Daring

[25] Mertasari P,S. 2021 yang berjudul "Pengembangan Media Pembelajaran Powtoon berbasis Problem Based Learning pada Materi Ekosistem Muatan IPA Kelas V Sekolah Dasar"

[26] B. S. Riadi, 2014. Pengembangan Media Animasi dan Teka-Teki Silang Berbasis Android Tentang Gelombang Bunyi untuk Sekolah Menengah Atas, Skripsi, Universitas Ahmad Dahlan, Yogyakarta, 2014.

# Development of SPEDAHERU Learning Media based on Sparkol Videoscribe in Science Subject Class V Elementary School

**[1]Ajeng Rayi Septyaningrum, [2]Tridian Wahyu Aji, [3*]Dhian Dwi Nur Wenda**
*[1,2,3]Pendidikan Guru Sekolah Dasar, Universitas Nusantara PGRI Kediri*
*E-mail: [1]ajengseptya26@gmail.com, [2]Bayuaji1530@gamil.com,*
*[3]dhian.2nw @unpkediri.ac.id*

**Abstract**— The lack of availability of learning media makes it difficult for students to understand the material on the digestive system of food in ruminants in science subjects. This study aims to develop SPEDAHERU learning media based on Sparkol Videoscribe. This research method uses research and development (R&D) with the ADDIE model. The research steps include: analysis, design, development, implementation, and evaluation. The data collection technique used in this study used descriptive analysis techniques for observation and interview data by calculating the percentage of results from validation, effectiveness, and practicality in the form of numbers using statistical analysis. The results of the validation of media experts obtained an average of 86.25% in the very feasible category, and material experts received an average of 85% in the very feasible category. The results of the practicality of the media obtained 85% by practitioners in the very practical category and 91.25% by student responses in the very practical category. The data related to the effectiveness seen from the pretest and posttest obtained a score of 60% before and 82.5% after using learning media. Based on these data, there was a significant increase in pre-test and post-test. From the results of the research conducted, it can be concluded that the learning media in SPEDAHERU based on sparkol videoscribe in the fifth grade science subject of elementary school is declared suitable for use as a science learning medium. The learning media using sparkol videoscribe-based SPEDAHERU for the fifth grade science subject at SDN Manggis 2 succeeded in increasing students' interest and understanding.

**Keywords**— Sparkol Videoscribe; Science; SPEDAHERU; Learning Media

*Corresponding Author:*

Dhian Dwi Nur Wenda,
Pendidikan Guru Sekolah Dasar,
Universitas Nusantara PGRI Kediri,
Email: 3dhian.2nw@unpkediri.ac.id

# I. INTRODUCTION

Education is a planned effort to create a quality learning atmosphere and learning process so that students can develop their potential to have a good, creative, intelligent personality and the skills they need that are appropriate in society, nation and state. Education will form capable, creative, independent, and responsible human beings [1,2]. The educational process in educational units is held interactively, inspiring, fun, challenging, and motivating encouraging students to participate actively, creatively and independently [3].

Natural Sciences is concerned with systematically finding out about nature based on the results of experiments and observations made by humans. Science is a collection of sciences that have special characteristics, namely studying factual natural phenomena, physical in the form of reality or events, and causal relationships [4]. Science can also be interpreted as a branch of science about nature, such as animals, the environment, plants, and other objects that can be found in the surrounding environment or actual natural conditions [5,6]. In learning science, students are expected to be able to explore themselves and nature, both from their own experiences and those of others.

The era of the development of science and technology is currently having a considerable impact on life, especially in the field of education. Technological advances can be used to improve the welfare of the nation and state, as well as educate its citizens [7,8]. The rapid development of science and technology demands quality in education to improve human resources [9,10]. A superior and quality human resources can be achieved by creating an effective learning process. Effective learning is learning that can make it easier for students to learn something useful, such as facts, skills, values, concepts, and how to live in harmony with others or a desired learning outcome [11].

In fact, at this time, learning has not been effective. This can be proven by the number of students who have not passed the minimum completion criteria because teachers have not been able to create an interesting and fun learning atmosphere for students. Teachers tend to only give assignments and rely on textbooks in learning, so that students are less able to understand. Learning that only uses the assignment method and is teacher-centered makes students passive in learning [12,13]. Thus, to overcome this, we need a learning media that is able to increase the attractiveness of learning for students.

Media can be interpreted as a means of distributing or disseminating important information and messages during the learning process, especially at the elementary school level [14,15,16]. Media can also be interpreted as an intermediary between teachers and students. Teachers can use learning media to deliver material addressed to students [17,18]. Teachers must also use the media

to increase the motivation of students' learning activities [19,20,21]. One of the media that can make it easier for students to learn is SPEDAHERU (Digestive System in Ruminant Animals), based on Sparkol Videoscribe.

Sparkol Videoscribe is software that is used to create whiteboard-like animated videos. Sparkol videoscribe can also be interpreted as an animated video learning medium which consists of several series of images arranged into a complete video [22]. Videoscribe can be an attraction for students in the learning process [23,24]. An educator can innovate by making video scribes to describe and explain complex concepts in a learning process [25,26]. As for the advantages of Sparkol Videoscribe, the advantages of this media are that the use of words and images is presented simultaneously, so that students will be more interested in learning because there are animations, sounds, and the media presented is very simple. Media in the form of video-based videos can help students who have difficulties [27,28].

Based on the description of the previous sparkol videoscribe research entitled Improving Students' Understanding of Energy Sources through Sparkol Videoscribe-Based Learning Media. In this study, based on the results of the data analysis of the assessment results provided by material, media, and product testing experts, it was found that the developed media were of very good quality [29]. Based on needs analysis and analysis of previous research, researchers are interested in conducting research with the title "Development of Sparkol Videoscribe-based SPEDAHERU learning media in science subjects for class V Elementary School."

## II. RESEARCH METHOD

This study uses the research and development (R&D) method or research development in this study, which is used is ADDIE (Analysis, Design, Development, Implementation, and Evaluation). The method of collecting data collected in this study is in the form of descriptive data for analysis of observation and interview data as well as input suggestions based on a questionnaire given by practitioners, while the score validation results and student learning outcomes by pre-test and post-test will be analyzed using quantitative data. The subjects in this study were 7 grade students for the limited trial and 28 students for the extensive trial conducted at SDN Manggis 2. Media experts relate to language, display, audio, quality. Instruments for material experts that contain the structure of the material, the accuracy of the material, the suitability of the content, and the use of the language used for the second data collection, pretest and posttest were used to measure students' interest in learning before and after receiving the material on the digestive system of food in ruminant animals in science subjects.

A. Calculate the percentage of each sub variable using the following formula:

$$NP = \frac{S}{SR} X100\%$$

Information :

NP = Result value

S = Value obtained

SR = Maximum value

The research criteria in learning media can be seen in the following table.

B. Assessment Criteria Table

Table 1. Assessment criteria table [30]

| No. | Interval | Eligibility Criteria |
|---|---|---|
| 1. | 80% - 100% | Very Eligible/Very Good/Strongly Agree |
| 2. | 66% - 79% | Eligible/Good/Agree |
| 3. | 56% - 65% | Less Eligible/Not Good/Not Agree |
| 4. | 0% - 55% | Inappropriate/Not Good/Disagree |

## III. RESULT AND DISCUSSION

Based on the results of observations, we obtained data that there are learning problems in class V, namely in science subjects the material for the digestive system of food in ruminant Animals still has many shortcomings. It just makes students less interested in the material, causing poor learning outcomes and also many who do not pass the minimum completeness criteria. To overcome this, it is necessary to have a media. Based on the results of observations and interviews, one type of media will be developed to overcome this problem, namely the Sparkol Videoscribe-based SPEDAHERU media.

This media contains material on the digestive system of food in ruminant animals which is explained by animation and designed as attractively as possible by making animations that match the preferences of elementary school children, displaying clear and solid language so that it is easy to understand, appropriate materials, and appropriate audio settings so that they can make students are active and understand the material. This media has the advantage that it is technology-based and made as attractive as possible so that it can attract the attention of students. The finished media will be tested for validity.

Based on the results of research and development that has been carried out, three types of research data can be described, the first data being the validity, effectiveness, and practicality of the product. Product validity can be seen from the results of expert validation carried out to 4 experts with categories of 2 media experts and 2 material experts, the results of expert validation will be analyzed to see the value of the validity of the product being developed, expert validation is also obtained input and suggestions that are used to revise the product. developed. The results of the expert validation that will be carried out are presented in the following diagram.

**Media Validity Results**
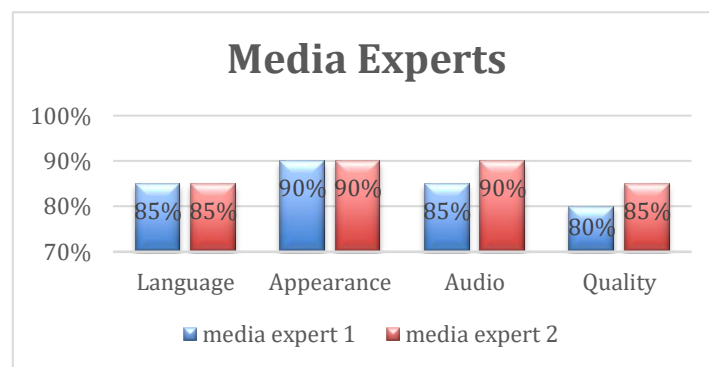


Figure 1 Media Ratings by Media Experts

Figure 1 above is the result of the data obtained from the two expert validations. Based on the validation results from the two media experts on aspects of language, display, audio, quality. Media expert 1 got an average score of 85%. Media experts 2 obtained an average percentage of 87.5%. The average percentage based on the two validators obtained an average score of 86.25%. Based on the analysis of media experts, this media is very suitable to be used to help the learning process of the digestive system of food in ruminant animals. Here are the results from material experts with the following diagram:

**Material Validity Results**
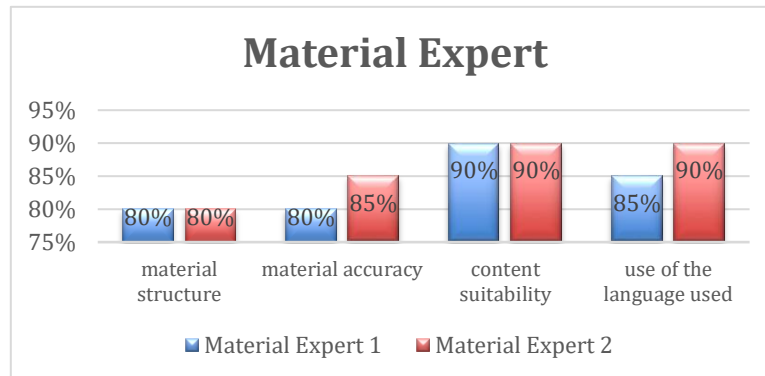


Figure 2 Material Assessment by Material Expert

Based on the validation results from the two material experts, it can be seen in figure 2, with aspects of the structure of the material, the accuracy of the material, the suitability of the content, the use of the language used. Media expert 1 obtained an average score of 83.75%. Meanwhile, media expert 2 obtained an average score of 85%. The average percentage of assessments achieved from the two material expert validators is 85%. Based on the analysis of material experts, the learning media is very suitable to be used to help the learning process of the digestive system of food in ruminant animals. In addition to the validity of the product in this study, practicality data will also be obtained from teachers who implement in class, in more detail the results of the practicality test based on the assessment of practitioners or teachers can be seen in diagram 3.3 below.

**Media Practice Results**
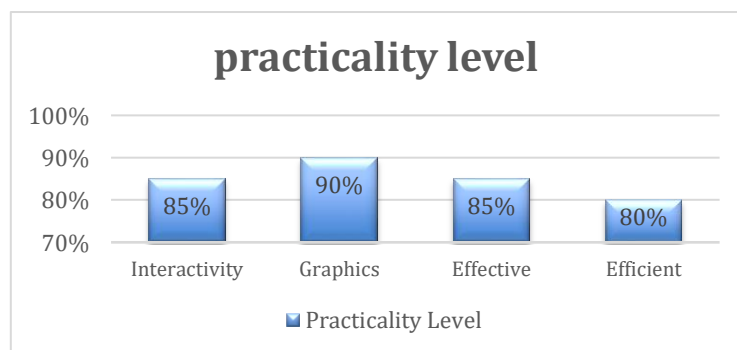


Figure 3 Practical assessment by class teacher v

Based on the diagram, it is known that the level of practicality with details of creative, efficient, interactive, and effective aspects obtained an average score of 85%. Based on the results of the teacher's response analysis, the learning media developed got responses in the very practical category used to help learning the learning process of the digestive system of food in ruminant animals. In addition to the teacher's response, data from the student's responses were also obtained which is shown in Figure 4 below.
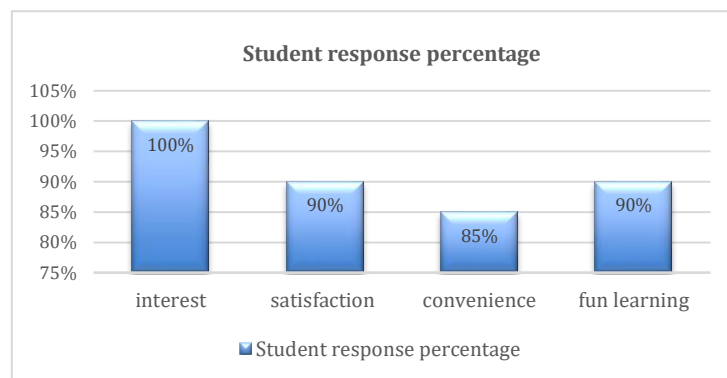


Figure 4 Student response data

Based on the diagram on the aspects of interest, satisfaction, convenience, and fun learning, an average score of 91.25% was obtained in the very good category. In addition, there is also data on the effectiveness of the media with the following diagram.
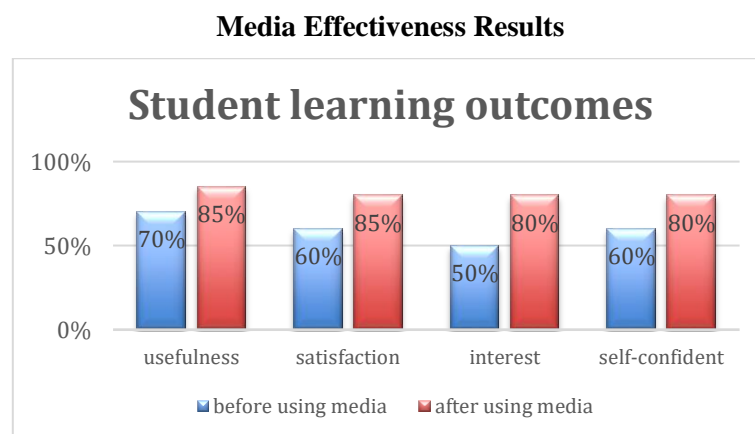
**Media Effectiveness Results**



Figure 5 Results of data analysis of student learning outcomes

Based on the results of research that has been carried out pretest and posttest can be seen in figure 5 with details on aspects of usefulness, satisfaction, interest, and confidence. The result before using learning media obtained a score of 60% and 82.5% after using learning media. Based

on data analysis from student responses, learning media is very suitable to be used to help the learning process of the digestive system of food in ruminant animals.

## IV. CONCLUSION

From the results of the research that has been used, it can be concluded that the learning media in SPEDAHERU based on sparkol videoscribe in the fifth grade science subjects in elementary schools is declared suitable for use as science learning media. This can be seen from the results of the media expert validation obtained a score of 86.25% and material experts get an average score of 85%, the results of the practicality of the media obtained a score of 85% by practitioners and 91.25% by student responses, the results of the effectiveness that the post-test score is more better than the pre-test value where the post-test score obtained a score of 82.5% and the pre-test 60%. The learning media using SPEDAHERU based on sparkol videoscribe in the fifth grade science subject at SDN Manggis 2 succeeded in increasing students' interest and understanding.

## ACKNOWLEDGMENTS

## REFERENCES

[1] Chairiyah, "Implementasi Pendidikan Karakter melalui Nilai-nilai Kearifan Lokal di SD Taman Siswa Jetis Yogyakarta," J. Pendidik. Ke-SD-an, vol. 4, no. 1, pp. 208–215, 2017

[2] Sutrisno. (2016). Berbagai Pendekatan Dalam Pendidikan Nilai dan Pendidikan Kewarganegaraan. Jurnal Dimensi Pendidikan Dan Pembelajaran, 4(1). https://doi.org/https://dx.doi.org/10.24269/dppv4il.56.

[3] Kemendikbud. Peraturan Mentri Pendidikan dan Kebudayaan nomor 22 tahun 2016. https://repositori.perpustakaan.kemdikbud.g.id

[4] Wisudawati, Asih Widi. 2017. Metedelogi Pembelajaran IPA. Jakarta : Bumi Aksara

[5] Kimianti, F.S., & Prasetyo, Z. K. (2019). Pengembangan E-Modul IPA Berbasis Problem Based Learning Untuk Meningkatkan Literasi Sains Siswa. Kwangsan: Jurnal Teknologi Pendidikan, 7(2), 91.

[6] Puspasari, dkk. (2019). Implementasi Etnosains dalam Pembelajaran IPA di SD Muhammadiyah Alam Surya Mentari Surakarta. Science Education Journal (IJNSE).

[7] Kuswanto, J., & Wasulfa, Y. (2017). Pengembangan Multimedia Pembelajaran pada Mata

Pelajaran Teknologi Informasi dan Komunikasi Kelas VII. Innovative Journal of Curriculum and Educational Technology IJCET, 6(2), 58-64.

[8] Warsita, B. (2017). Peran dan Tantangan Profesi Pengembangan Teknologi Pembelajaran Pada Pembeljaran Abad 21. Kwangsan: Jurnal Teknologi Pendidikan, 5(2).

[9] Lase, D. (2019). Pendidikan di Era Revolusi Industri 4.0. Jurnal Sundermaan, 1(1)..

[10] Willya, Poluakan, Dikayuana, Wibowo, & Raharjo. (2019). Generasi Milenial Pada Era Industri 4.0. Focus: Jurnal Pekerjaan Sosial, 2 (2)..

[11] Wargg, E.C. (2012). Classroom Teaching Skill. Nicholas Publishing Company (Belajar dan Pembelajaran). Bandung: ALFABETA

[12] Pertiwi, I.N., Sumarno, & Mansur, M. (2019). Pengaruh Model Make A Match Berbantu Media Kartu Bergambar terhadap Kemampuan Membaca dan Menulis, E-Journal PGSDPendidikan Ganesha Mimbar PGSD, 7(3), 261-270.

[13] Widiatmika, D. G., Sujana, I. W., & Ganing, N. N. (2017). Pengaruh Model Discovery Learning          Berbantuan Media Audio Visual Terhadap Kompetensi. MIMBAR PGSD Undiksha,          5(2),          1-8.

[14] Japa, Suarjana, & Widiana, W. (2017). Media Geogebra Dalam Pembelajaran Matematika. International Journal of Natural Science and Engineering, 1(2), 40-47.

[15] Paramita, D. K., Garminah, & Wibawa, I. M. C. (2016). Penerapan Model PembelajaranKooperatif Tipe NHT Berbantuan Media Audio Visual Untuk Meningkatkan Hasil Belajar IPA. Mimbar PGSD Undiksha, 4 (1), 1-10.

[16] Devi, P. S., & Bayu, G.W. (2020). Berpikir Kritis dan Hasil Belajar IPA Melalui Pembelajaran Problem Based Learning Berbantuan Media Visual. MIMBAR PGSD Undiksha, 8(2), 238-252.

[17] Diana, R., & Niken, S. H. (2018). Flipbook Berbasis Literasi Islam : Pengembangan Media Pembelajaran Fisika dengan 3d Pageflip Professional Flipbook Based On Islamic Literacy : The Development Of Physics Learning Media Using 3d Pageflip Professional."4(2):234-44. Jurnal Inovasi Pendidikan IPA, 4(2).

[18] Alviolita, & Huda. (2019). Media Pop Up Book Dalam Pembelajaran Cerita. Jurnal Pendidikan Bahasa Indonesia, 7(1).

[19] Novita, Sukmanasa, & Pratama. (2019). Penggunaan Media Pembelajaran Video Terhadap Hasil Belajar Siswa SD. Indonesian Journal of Primary Education, 3(2), 64-72.

[20] Puspitorini, Subali, & Jumadi. (2014). Penggunaan Media Komik Dalam Pembelajaran IPA Untuk Meningkatkan Motivasi Dan Hasil Belajar Kognitif dan Afektif. Cakrawala Pendidikan, 33(3), 413-420. Retrieved from

[21] Asis Nur Azizah. (2018). Pengembangan Media Pembelajaran Sparkol Videoscribe dalam

Meningkatkan Minat Belajar Siswa pada Mata Pelajaran Ekonomi Materi Perdagangan Internasional di SMA Batik 2 Surakarta. Kreano, Jurnal Matematika Kreatif-Inovatif, 8(2).

[22] Rahmatika, & Ratnasari. (2018). Media Pembelajaran Matematika Bilingual Berbasis Sparkol Videoscribe. Desimal: Jurnal Matematika, 1(3), 385-393.

[23] Sutrisno, T., Agung , Y. A., Tri Sutrisno, & Yudha Anggana Agung . (2013). Pengembangan Media Videoscirbe Berbasis E-Learning Pada Mata Pelajaran Komunikasi Data dan Interface Di SMK Sunan Drajat Lamongan. Jurnal Pendidikan Teknik Elektro, 05(03), 1068-1074.

[24] Hasan, A. A., & Baroroh, U. (2019). Pengembangan Media Pembelajaran Bahasa Arab Melalui Aplikasi Videoscribe Dalam Meningkatkan Motivasi Belajar Siswa. Lisanuna:  Jurnal Ilmu Bahasa Arab Dan Pembelajarannya, 9(2).

[25] Muskani, R. T., Badariah, S., & Mansur, M. (2019). Pembelajaran Tematik Menggunakan Media Video Scribe Pada Siswa Kelas IV Sekolah Dasar. Elementary: Islamic Teacher Journal,     7(1).

[26] Febriana, C. (2017). Pengaruh Media Video Terhadap Motivasi Belajar dan Hasil Belajar Kognitif Pembelajaran IPA Kelas V Sekolah Dasar. Jurnal Prima Edukasia, 5(1), 11-21..

[27] Purwanti, B. (2015). Pengembangan Media Video Pembelajaran Matematika dengan Model Assure. Jurnal Kebijakan Dan Pengembangan Pendidikan, 3(1), 42-47.

[28] Sudiarti, I. G. P., & Sandra, I. (2016). Pengaruh Model Belnded Learning berbantuan Video Animasi Terhadap Kemampuan Pemecahan Masalah dan Pemahaman Konsep Siswa. JurnalPendidikan Dan Pengajaran, 49(2).

[29] Made Agus, Nyoman Laba. (2021). Improving Students' Comprehension About Energy Souces Through Sparkol Videoscribe-Based Learning Media.

[30] B. S. Riadi, 2014. Pengembangan Media Animasi dan Teka-Teki Silang Berbasis Android Tentang Gelombang Bunyi untuk Sekolah Menengah Atas, Skripsi, Universitas Ahmad Dahlan, Yogyakarta, 2014.

# Study about Online Game Addiction
# Junior High School Students in Kediri City

**Galang Surya Gumilang**
*Department of Guidance and Counseling, Universitas Nusantara PGRI Kediri*
*E-mail: galang_konselor@unpkediri.ac.id*

**Abstract**—This study aims to determine: (1) online game addiction of junior high school students in Kediri City, (2) junior high school students' learning achievement, (3) and the relationship between online game addiction and learning achievement. Mixed Methods Design is used as a combination or combination of quantitative and qualitative research approaches including qualitative and quantitative data in a single study. The strategy used, namely the Congruent Embedded Strategy, is an interesting research strategy, namely in one stage of data collection, researchers are able to collect two types of data together. The results of the quantitative research show that students who are addicted to online games have 3 students (16.03%) including very high, 4 students (14.36%) including high, 13 students (41.86%) including moderate, 4 students (11.9%) is low, and 5 students (12.66%) is very low. In addition, there are 12 students who have low learning achievement, namely getting the "less" and "very poor" categories so that they get an unsatisfactory ranking. While there are 6 students who get the "enough" category and 12 other students get the "very good" and "good" categories. From these results, there is no significant relationship between online game addiction and learning achievement because the value of the hypothesis test is 0.291. On the qualitative side, from 30 students it was found that (1) His early playing online games, (2) The average time spent playing 2-4 hours, (3) His parents did not allow him to play online games, and (4) Achievement low learning.

**Keywords**— Addiction; Online Game; Learning Achievement

*Corresponding Author:*

Galang Surya Gumilang,
Department of Guidance and Counseling,
Universitas Nusantara PGRI Kediri,
Email: galang_konselor@unpkediri.ac.id

## I. INTRODUCTION

The development of online games is a result of the development of Information Technology (IT). When it first appeared in 1960, computers could only be used for two people to play games[1]. Then came computers with time-sharing capabilities so that more players could play the game and didn't have to be in the same room (Multiplayers Games) [2]. Then in 1970 when packet-based computer networking emerged, computer networks were not only limited to Local Area Networks (LAN) but also included Wireless Area Networks (WAN) and became the internet. Addiction to online games in adolescence has an influence when living everyday life [3]. The causes of online game addiction are usually influenced by peers or playmates who may have become close friends [4,5]. They choose to play online games because it has very attractive features supported by the latest technology systems such as bright graphics (AT RADEON, NVIDIA GEFORCE) and now the most advanced at this time is a powerful Intel Core i7 Processor with a large gaming capacity which makes them smitten and satisfied when playing online games [6].

## II. RESEARCH METHOD

This study was designed using a **mixed method design** as a combination or combination of quantitative and qualitative research approaches including qualitative and quantitative data in a single study [7]. The strategy used is a congruent embedded strategy because it is a mixed methods strategy that applies one-stage quantitative and qualitative data collection at the same time a mixed-methods strategy that applies one-stage quantitative and qualitative data collection at one time [8]. For clarity, here is a picture of the congruent embedded strategy:
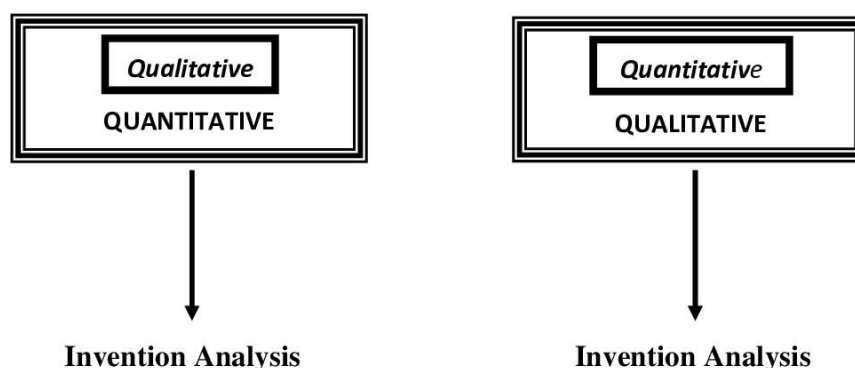


**Figure 1. Congruent Embedded Strategy**

The research subjects were students of Junior High School in Kediri City, and experienced addiction to online games. Data was taken through two stages, namely the initial data collection

stage quantitatively using questionnaires and qualitative supporting data collection using interview guidelines. The data were tested for hypotheses using Spearman correlation. Qualitative testing uses data reduction analysis, data presentation, and conclusion drawing. While the combined analysis, there are two stages, namely the first by separating the analysis of quantitative and qualitative data. Next, the second stage is to combine two quantitative and qualitative data. As a step in merging the data, a comparison of the data is carried out, and it is published in tabular form so that the comparison is clear.

## III. RESULT AND DISCUSSION

The results of the quantitative research show that students who are addicted to online games have 3 students (16.03%) including very high, 4 students (14.36%) including high, 13 students (41.86%) including moderate, 4 students (11.9%) is low, and 5 students (12.66%) is very low.

There were 12 students who experienced a decrease in learning achievement, namely getting the "less" and "very poor" categories so that they got an unsatisfactory ranking. While there are 6 students who get the "enough" category and 12 other students get the "very good" and "good" categories. From these results, there is no significant relationship between online game addiction and learning achievement. On the qualitative side, from 30 students it was found that (1) His early playing online games, (2) The average time spent playing 2-4 hours, (3) His parents did not allow him to play online games, and (4) Achievement low learning.

Researchers distributed questionnaires to all Junior High School students in grades VII, VIII, and IX in Kediri City. Then, the researcher then tabulated the raw data in Microsoft Excel and gave a score of 4 3 2 1 for each positive item and 1 2 3 4 for each negative item. After processing the data from the results of the questionnaire, it was then known who were addicted to online games from various classes. In addition, researchers also conducted interviews with the subject. Students who were indicated to be addicted to online games were interviewed by asking 27 questions that had been made in the interview guide. In the questions that have been structured and planned, the questions relate to online games, starting from what is the definition of online games, the beginning of playing online games, to the current state of learning achievement when addicted to online games. Based on the results of student screening with quantitative initial data, 30 subjects (students) from 395 students in grades VII, VIII, and IX were found because from the results of scoring data from the questionnaire, they were proven to be addicted to online games.

The results of quantitative initial data collection using a questionnaire instrument, it is known that the level of online game addiction is 3 students (16.03) including very high, 4 students (14.36) including high, 13 students (41.86) including moderate, 4 students (11.9) is low, and 5 students

(12.66) is very low. The researcher immediately grouped 30 students who were addicted to online games to be interviewed in order to get data correctly and definitely. Data from interviews in real support data from the initial measurement using an online game addiction questionnaire. Thus, it can be concluded that the initial data collection quantitatively through online game addiction questionnaires and qualitative supporting data collection by launching questions that have been arranged in a balanced and mutually supportive interview guide because quantitative data is supported by qualitative data.

There are 12 students who experience low learning achievement, namely getting the "less" and "very poor" categories so that they get an unsatisfactory ranking. While there are 6 students who get the "enough" category and 12 other students get the "very good" and "good" categories. This is probably due to online game addiction. From the homeroom teacher of each class, said that the learning achievement of 30 students in the odd semester of 2021/2022 experienced a drastic decline and may also be influenced by online game addiction, which causes students to be less focused during teaching and learning because of online game thinking.

Online game addiction is a form of individual activity that is carried out repeatedly and always focuses on playing online games and has a negative impact on users. According to the DSM-IV-TR the criteria for online game addiction include: (1) constantly thinking about activities or playing games, (2) always increasing the length of time playing to get satisfaction or rewards with the same amount being assessed less, ( 3) unable to control, stop or reduce activity, feel restless when stopping or reducing activity, (4) playing games to escape from problems or relieve discomfort (anxiety, guilt, helplessness, depression), (5) after losers often come back again to get money to replace their losses, (6) lie to family, therapists or other people to cover up their increased activities, (8) do not care about illegal activities, so they can still play games, (9) damage or lose relationships with friends friendships, jobs, education, and career opportunities to keep playing games, and (10) relying on others for money to stay and play games (Parker, Taylor, [9,10,11]. Learning achievement is the average value of students from all subjects during teaching and learning activities at school and is interpreted in the form of numbers [12,13]. In this study learning achievement is embodied in the form of class rankings [14].

To find out the relationship between online game addiction and learning achievement by testing the hypothesis using the Spearman Correlation. The results of the hypothesis test state that there is no significant relationship between online game addiction and learning achievement by looking at the significance of 0.291. This is because learning achievement is influenced by factors other than online games.

## IV. CONCLUSION

Based on the research that has been carried out by the author at junior high school students in Kediri City, the conclusions can be drawn as follows:

1. The level of online game addiction of students at Junior high school students is 3 students (16.03) including very high, 4 students (14.36) including high, 13 students (41.86) including moderate, 4 students (11.9) including low, and 5 students (12.66) including very low. The researcher immediately grouped 30 students who were addicted to online games to be interviewed in order to get data correctly and definitely.

2. The results of the learning achievement of BSS SMP students, there are 12 students who experience low learning achievement, namely getting the "less" and "very poor" categories so that they get an unsatisfactory ranking. While there are 6 students who get the "enough" category and 12 other students get the "very good" and "good" categories. This is probably due to addiction to online games. From the homeroom teacher of each class, said that the learning achievement results of 30 students in the odd semester of 2021/2022 experienced a drastic decline and may also be influenced by the online game addiction factor, which causes students to focus less during teaching and learning activities because they think about online games.

3. The results of the Hypothesis Test using the Spearman correlation are known to have a significance value of 0.291. It can be concluded that there is no significant relationship between online game addiction and learning achievement. This is because learning achievement is influenced by factors other than online games.

### REFERENCES

[1] Allison, S. E., von Wahlde, L., Shockley, T., & Gabbard, G. O. (2006). The Development of The Self in the Era of The Internet and Role-Playing Fantasy Games. American Journal of Psychiatry, 163(3), 381-385.

[2] Chiu, S. I., Lee, J. Z., & Huang, D. H. (2004). Video Game Addiction in Children and Teenagers in Taiwan. Cyber Psychology & Behavior, 7(5), 571-581.

[3] Kim, E. J., Namkoong, K., Ku, T., & Kim, S. J. (2008). The Relationship Between Online Game Addiction and Aggression, Self-Control and Narcissistic Personality Traits. European Psychiatry, 23(3), 212-218.

[4] Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Gender Differences and Related Factors Affecting Online Gaming Addiction Among Taiwanese Adolescents. Journal of Nervous and Mental Disease, 193(4), 273-277.

[5] Jeong, E. J., & Kim, D. W. (2010). Social Activities, Self-Efficacy, Game Attitudes, and Game Addiction. Cyberpsychology, Behavior & Social Networking, 14(4), 213-214.

[6] Lemmens, J.S., Valkenburg, P.M & Petter J. (2009). Development and Validation of A Game Addiction Scale for Adolescents. Media Pshychology, 12(1), 83-88.

[7] Gay, L. R., Mills. G. E., & Airasian, P. 2009. Educational Research: Competencies For Analysis and Applications (9th Edition). New Jersey: Pearson Education, Inc

[8] Creswell, J.W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (4th Edition). New York: Thousand Oaks California

[9] Parker, J. D. A., Taylor, R. N., Eastabrook, J. M., Schell, S. L., & Wood, L. M. (2008). Problem Gambling in Adolescence: Relationships with Internet Misuse, Gaming Abuse and Emotional Intelligence. Personality and Individual Differences, 45(2), 174-180.

[10] Caplan, S. E., Williams, D., & Yee, N. (2009). Problematic Internet Use and Psychosocial Well-Being Among MMO Players. Computers in Human Behavior, 25(6), 1312-1319.

[11] Mehroof, M., & Griffiths, M. D. (2010). Online Gaming Addiction: The Role of Sensation Seeking, Self-Control, Neuroticism, Aggression, State Anxiety, and Trait Anxiety. Cyber Psychology & Behavior, 13(3), 313-316.

[12] Chumbley, J., & Griffiths, M. (2006). Affect and The Computer Game Player: The Effect of Gender, Personality, and Game Reinforcement Structure on Affective Responses to Computer Game-Play. Cyber Psychology & Behavior, 9(3), 308-316.

[13] Peters, C. S., & Malesky, L. A. (2008). Problematic Usage Among Highly-Engaged Players of Massively Multiplayer Online Role Playing Games. Cyber Psychology & Behavior, 11(4), 480-483.

[14] Porter, G., Starcevic, V., Berle, D., & Fenech, P. (2010). Recognizing Problem Video Game Use. Australian and New Zealand Journal *of Psychiatry*, 44(2), 120-128.

# Building Organizational Citizenship Behavior Through College Alumni Relationship Management

**Hengki Hendra Pradana**
*Islamic Psychology, Nahdlatul Ulama University Blitar*
*E-mail: hengkihendra007@gmail.com*

**Abstract**— This study aims to (1) determine what factors influence alumni to carry out Organizational Citizenship Behavior in organizations they have participated in. (2) To find out how alumni relationship management at universities can stay competitive. This study uses a specific qualitative approach and uses a qualitative descriptive method. This research was conducted in the area of one of the universities in Surabaya, because the university is a campus known as a warehouse campus for activists. Data collection techniques using in-depth interviews (in-depth interviews) and observation. The subjects in this study were 4 people, 3 student alumni who had joined the organization and still contributed to the organization and the academic community at the University and 1 university leader. The results of the study said that the factor that influenced alumni who did OCB, namely Altruism IU intended to help students become confident and fluent in public speaking. Conscientiousness providing training never asks for anything in return, even though the subject is one of the national level trainers, because the subject wants to make the generations below him better. Sportsmanship Subject has a very tight schedule, once a week the subject goes out of the island to provide training, but still prioritizes students and for the sake of maintaining the name of the alumni association at the college. Courtesy at that time IU also served as chairman of the BEM and old seniors also often helped IU during her time. Civic Virtue hopes that the subject will always invite and provide training to the younger brothers of their own organization so that the next generation will follow in the footsteps of the subject. Proving the quality of yourself as an alumni of college graduates in Surabaya, so that there is bargaining value for outsiders who see the alumni of the college and there is bargaining value for outsiders who see it, the campus itself will also look for and see individuals if they have high capability.

**Keywords**—Organizational Citizenship Behavior; Customer Relationship Management

***Corresponding Author:***

Hengki Hendra Pradana,
Islamic Psychology,
Nahdlatul Ulama University Blitar,
Email: hengkihendra007@gmail.com

# I. INTRODUCTION

In order to form good human resources is a responsibility that never ends, starting at the age of toddlers, entering elementary school, junior high school, high school and up to the highest education at the University level starting from S1, S2 and up to S3. Education entering the undergraduate level is also lacking to create human resources so that Indonesia can compete in the era of globalization (Sudirno & Si, 2014). Universities have a very large role and contribution in improving the quality of human resources (HR) in a country. Thus, it is very clear that higher education is an educational institution that organizes education levels with clear and firm goals, both in the academic and professional spheres that can work or work at the local, regional, national and international levels.

Educators or who are often referred to as lecturers at universities have important and very large main tasks and functions and are also regulated in laws and regulations. The definition of a lecturer according to Law no. 5 of 2005 interprets that lecturers are not only professional educators and scientists who have the main task of channeling, developing, and also disseminating science, technology, arts and culture through community service and research in the realm of education, the real role of lecturers is to be able to apply the tri dharma. higher education institutions which include education, research, and community service as regulated in the National Education System Law (Sisdiknas), number 20, 2003 (Sudirno & Si, 2014).

The role of lecturers and students basically determines the learning procession during lectures in higher education, if the lecturer conveys material to students seriously it will determine the level of success in the lecture forum, or vice versa, the student's task is to follow the learning process given by the lecturers, so many benefits that will be obtained by students. sometimes there are also many students who feel they are lacking in receiving the materials provided by the lecturers in the lecture bench, so these students try to find experiences that are outside of lectures, implement the theories gained in class to an intra or extra organization that is often found in universities, such as BEM, which in fact are intra organizations and are usually wrapped with extra organizations such as PMII or others. They are trained for event management, leadership, SWOT analysis, problem solving, loyalty and many more, of course very rarely found in lectures. Many alumni have forged and improved their potential in an organization so that many become people who can be proud of this country, it is not uncommon for alumni who are successful in their fields to be invited to universities that have been made to study, even alumni voluntarily take the time to come and attend the invitation even though there are still many tasks he carries, because the level of totality and loyalty that has been learned in the organization is still attached

to the alumni, all for the sake of the organization and the good name of the university, because the alumni feel indebted Budi, they can't forget the processes they went through during their lectures.

OCB is an individual who functions to carry out a job that exceeds his authority, with the social community directly to a group or organization (Schnake, 1991). OCB has two important components, including compliance, where individuals have the intention to follow the rules that exist in the organization, and altruism, individuals who are willing to help or help other individuals without asking for anything in return (Sudirno & Si, 2014).

Alumni Relationship Management (ARM) is an approach which means that alumni are partners of the University and the progress of a University is also supported by the role of alumni, so that both parties manage their relationship effectively. Alumni Relationship Management (AMR), which aims to increase the long-term growth of the University's profitability. Relations with alumni (Alumni relations), where this includes activities carried out by the University such as providing information to alumni, explaining procedures, procedures, and timing of events. So that the University maintains good ties with alumni.

In achieving the goals of universities and organizations, the role of human resources is no less important. The role of alumni who are loyal to the organization will make the organization continue to grow, so that it is reflected in the work environment occupied by the alumni. The positive behavior of alumni or members of the organization can support individual performance and also organizational performance for better organizational development. Organizational Citizenship Behavior (OCB) is a form of individual voluntary behavior that does not expect a form of reward, but sees how effective the performance is for the organization. OCB is very effective for an organization, because it includes a form of doing things that are not in accordance with their work without asking for anything in return or doing something sincerely. Organizational Citizenship Behavior is very important to help support the effectiveness of the organization in the long term. Here the role of alumni is as old customers who have proven the quality of education in an organization or at a university, so that the organization or university makes partners and maintains good communication and relationships then has been released and socialized in the community, indirectly the community will see the quality of the alumni who have studied in an organization or college, so that the alumni are marketing and become sample materials that are seen by others.

Based on the description that has been put forward in the background of the research above, the focus of this research is:

a. What factors influence alumni to carry out Organizational Citizenship Behavior in the organizations they have participated in?

b. What is the role of alumni to help management at universities to remain competitive?

1.4 Research Objectives

Based on the formulation of the problem above, the research objectives are:

a. To find out what factors influence alumni to carry out Organizational Citizenship Behavior in organizations they have participated in.

b. To find out how alumni relationship management at universities can stay competitive.

1.5 Research Benefits

By doing this research, the authors hope that the results of existing research can bring many benefits, both from a theoretical and practical point of view for the development of community science.

a. Theoretical Benefits

The results of this study can provide new information, insight and knowledge that can enrich scientific treasures, especially in the field of industrial and organizational psychology regarding the organizational model of citizenship behavior through customer relationship management in universities.

b. Practical benefits

1. For researchers, this research can increase the knowledge of researchers, especially in the field of social psychology, more specifically the theory of Organizational Citizenship Behavior (OCB).

2. For students, it is hoped that they will be able to provide a wider discourse and additional knowledge about the organizational model of citizenship behavior through customer relationship management in higher education.

3. For further researchers, the results of this study are expected to reveal things that researchers want to know.

## II. RESEARCH METHOD

The approach used in this research is a qualitative descriptive study. Qualitative research is a research and understanding process based on a methodology that investigates a social phenomenon, the reason the researcher uses a qualitative descriptive approach is because the researcher wants to describe the situation to be studied more specifically, more deeply and more transparently so that it can provide an overview of the role of alumni to the University that has been a place of study. John W. Creswell., 1998). The approach applied in this research is to use a qualitative approach with in-depth interviews. Qualitative itself is a form of process based on a methodology that discusses existing social phenomena.

The stages carried out by researchers are:

1. Develop research design

2. Select research field

3. Manage permits

4. Explore and assess the field

5. Select and use informants

6. Prepare Research Equipment

7. Research Ethics Issues

Qualitative data analysis said that the process runs as follows (Moleong, j, 2006):

a) Taking notes that produce field notes, with it being coded so that the data source can still be traced,

b) Collecting, sorting, classifying, synthesizing, making an overview, and create an index,

c) Think, by making the categories of data meaningful, searching for and discovering patterns and relationships, and making general findings. 3.4 Data collection

techniques Researchers used in-depth interviews and observations on the intended subject.

a) Student alumni who have been active in organizations and still care and help the academic community of higher education

b) Chair of the Student Executive Board/Bem

c) University Leaders

Table 1 Subject Criteria

| SUBJECT | GENDER | AGE | WORK |
|---------|--------|-----|------|
| IU | Male | 30 years | Trainer |
| LH | Male | 30 years old | Lecturer |
| F | Male | 23 years old | Student |
| MH | Male | 47 years old | Lecturer |

## III. RESULT AND DISCUSSION

The current condition is that the University still cannot focus on hegemony all alumni who have graduated, only alumni only those who have emotional closeness to the academic community who still play a role and communicate well, for example BEM members who are still actively communicating with their seniors, so that students can ask for help from alumni who feel they have basics needed to provide studies. studies for students and alumni often refuse the rewards given by students who have been given education.

Research Results argues that there are several factors that influence alumni to carry out Organizational Citizenship Behavior in organizations they have participated in, namely: 1. First Subject

a) Altruism

IU is one of the seniors from one of the campuses in Surabaya who is still often invited to events seminar held by BEM, IU is a public speaking speaker trainer who still pays attention to younger students to be trained in public speaking, IU intends to help students become confident and fluent in public speaking IU also helps one of the BEM work programs, namely in the PSDM area . "My hope is that when I help younger students to practice speaking in public without hesitation and more confident, at least I will be present in the middle of the BEM agenda at least I will be a role model for them".

b) Conscientiousness

IU every time invited by the faculty bureaucracy or from the BEM to provide training never asks for anything in return, even though the subject is one of the national level trainers who are often invited everywhere even outside Java. But the subject never wanted to bother the organization's younger siblings regarding finances. Because the subject wants to make the generations below him better. In fact, many students offer sponsorships to help with events. "I never asked for anything in return when I was asked for help by my younger students, because when I was the head of the BEM I felt how difficult it was to organize, so I felt the same way back then. can be successful in carrying out its work program.

c) Sportsmanship

Almost once a week, BEM members invite discussion over coffee with IU to discuss BEM's scheduled events. Even though the subject can be said to have a very tight schedule, once a week the subject goes out of the island to provide training, but in order to maintain the alma mater and the names of the BEM members, the subject does not care about his tiredness and still wants to accompany his friendly brothers and sisters to IU, and maintain the name of the bond. alumni of

the college. "Very often, my student friends come to me to discuss nearby events, even though my work schedule is tight, I still make time for them.

d) Courtessy

IU is an alumni who really appreciates the organization she has participated in, because IU is indebted to the people in the organization, at that time IU also served as chairman of the BEM and old seniors also often helped IU during her time. So that UI also did the same thing when IU's position was already a successful senior. "The reason I help my younger siblings is because when I was the chairman of the BEM I was also often assisted by seniors, when I was confused and in trouble, I would definitely look for seniors to ask for opinions and discuss at a coffee shop. So I know what it's like to run a work program and feel the difficulties."

e) Civic Virtue

When the subject becomes a student of his time, the subject often attends training and seminars on public speaking, so that when he has graduated from college the subject can become a trainer on behalf of the campus that is called to be a presenter, the hope is that the subject always invites and provides training to the younger members of the organization itself so that the next generation will follow in the footsteps of the subject so that the welfare of the alumni can be better and build networks so that when the juniors who have graduated do not feel confused looking for relationships and jobs. "When I was in college in semester 6, I had attended training to become a trainer, so my title is Ch,Cht. I often fill in trainings and proud to introduce myself, I am an alumni of one of the campuses in Surabaya, so I hope there is a special value for the alma mater in the eyes of outsiders. I hope for the younger siblings, at least there will be a next generation like me so that there is a regeneration process, at least one generation has one student who follows in my footsteps".

2. The second subject

The role of alumni to help management at universities to remain competitive according to LH is to prove the quality of yourself as an alumni who graduated from one of the campuses in Surabaya, so that there is bargaining value for outsiders who see it, the campus itself will also seek and see individuals if they have high capabilities. One of them was a subject named LH who received a bachelor's-master's scholarship and became the best graduate of S1 and S2 at a university in his time, and was immediately recruited by the East Java Kominfo because LH loved the world of the press and not long after, LH passed the cpns selection and is now a lecturer at one of the a well-known university in kediri. LH is very often a speaker at Talk Shows by bringing the name of the campus that has forged him and the organization he has participated in, namely PMII, is proud to show that LH is a product that is printed by the campus where he studies. Indirectly, LH helps market products from the campus that he once occupied in the learning

process to the general public to create a positive stigma to the community, this is a positive value that will be accepted by the campus. "When I was filling out a seminar outside, I proudly introduced my campus alma mater and the student organizations that I participated in, thank God I also got academic achievements from S1-S2 even though I was busy organizing, after I graduated college I immediately worked at the Communications and Information Technology then I tried to register Thank God CPNS passed the selection, this indicates that my campus product is not trivial and can compete on the national level, my younger students from the same campus as me should be able and able to prove like I am today".

3. The third subject

F is the chairman of BEM currently serving in the 2019 period, he really feels the role of alumni and is greatly helped by alumni, because there are many activities that invite alumni to collaborate with BEM for the advancement of human resources in campus or faculty lines, for example activities seminars invite alumni themselves, conduct training also utilize alumni, and much more, ideally the work programs organized by BEM also affect the progress of the University or Faculty, because the driving role in the academic community must be well established. "Indirectly, alumni also act as external pillars for this campus," said F as the head of BEM.

4. The fourth subject of

MH as the university leader feels grateful to the alumni who have contributed to building PSDM for students who are studying in lectures, because the role of alumni is to form hard skills and soft skills for their younger siblings to prepare themselves early to have direction after graduating college tomorrow. The hope in the future is that alumni will not forget where they studied first, even though they have been successful, they can still be hegemonized in an alumni association organization at the university. Basically, alumni are also influential in terms of motivation for students to want to learn and students see alumni as public figures so that later students will also be like their seniors .

"I am grateful when alumni still pay attention to their younger siblings, so that there is a good emotional relationship between students and alumni from here. relations for the benefit of post-graduate graduation".

## IV. CONCLUSION

The research results say that there are several factors that influence alumni to carry out Organizational Citizenship Behavior in organizations:
Altruism IU intends to help students become confident and fluent in public speaking. Conscientiousness providing training never asks for anything in return, even though the subject

is one of the national level trainers, because the subject wants to make the generations below him better. Sportsmanship Subject has a very tight schedule, once a week the subject goes out of the island to provide training, but still prioritizes younger students and for the sake of maintaining the name of the alumni association at the university. Courtessy at that time IU also served as chairman of the BEM and old seniors also often helped IU during her time. Civic Virtue hopes that the subject will always invite and provide training to the younger siblings of their own organization so that the next generation will follow in the footsteps of the subject.

LH said the role of alumni to help management at universities to remain competitive is to prove the quality of oneself as an alumni of one of the campuses in Surabaya, so that there is bargaining value for outsiders who see alumni of the state university, for example being a speaker at the event. Talk Show by bringing the name of the campus and the organization.

According to F, as the chairman of BEM for the 2019 period, he really felt the role of alumni and was greatly helped by the existence of alumni, because there were many activities that invited alumni to collaborate with BEM for the advancement of human resources within the campus or faculty. outside of campus.

MH as the leader of the University feels grateful to the alumni who have contributed to building PSDM for students who are studying in lectures, because the role of alumni is to form hard skills and soft skills for their younger siblings.

## REFERENCES

Chang, CC, Tsai, MC, & TMS (2011). The Organizational Citizenship Behaviors and Organizational Commitments of Organizational Members Influence the Effects of Organizational Learning. International Journal of Trade, Economics and Finance, 2(1).

Chiaburu, DS, Oh, IS, Berry, CM, Li, N., &, & Gardner, RG (2011). The five-factor model of personality traits and organizational citizenship behaviors: a meta-analysis. Journal of Applied Psychology, 96(https://doi.org/10.1037/a0024004), 1140–1160.

David L. Tumipseed. (2012). Handbook of Organizational Behavior: A Review of Good Soldier Activity in Organizations. Nova Science Publishers, Inc.

Husniati, R., & Pangestuti, DC (2018). Organizational Citizenship Behavior (OCB) for UPN "Veteran" Jakarta Employees. Journal of Indonesian Community Service, 1(1), 234–242.

John W. Creswell. (1998). Qualitative Inquiry And Research Design: Choosing Among Five Traditions. SAGE Publications.

Joo, YJ & Soonkwan, H. (2008). Organizational Citizenship Behavior (OCB), TQM, and Performance at the Maquiladora. International Journal of Quality & Reliability Management, 25(8), 793-808.

Kinicki, Angelo and Williams, BK. (2008). Management A Practical Introduction. McGraw-Hill.

Kumar, K., Bakhshi, A., and Rani, E. (2009). Linking theBig Five Personality Domains to Organizational Citizenship Behavior. International Journal of Psychological Studies, Vol 1 N o, 73–81.

Luthans, F. (2011). Organizational Behavior: An Evidence-Based Approach. McGraw-Hill. Moleong, j, L. (2006). Qualitative Research Methodology. PT. Rosdakarya Youth.

Munandar, AS (2014). Industrial and Organizational Psychology. 2014. University of Indonesia. Jakarta, 247.

Nadim Jahangir, Mohammad M. Akbar, and MH (2004). "Organizational Citizenship Behavior: Its Nature and Antecences". BRAC University Journal, Vol. 1, No., 75–85.

Omer, T. & Umut, K. (2007). Materialistic Attitude as an Antecendent of Organizational Citizenship Behavior. Management Research News, 30, 581-596.

Oplatka, I. (2009). Organizational Citizenship Behavior In Teaching: The Consequences For Teachers, Pupils, And The School. The International Journal of Educational Management, 23.5, 375-389.

Organs, DW et. al. (2006). Organizational Citizenship Behavior. Its Nature, Antecdents, and Consequences. Sage Publications, Inc.

Podsakoff, PM, MacKenzie, SB, Paine, JB, & B., & DG (2000). Organizational Citizenship Behaviors: A Critical Review of the Theoritical and Empirical Literature and Suggestions for Future Research. Journal of Management, 26(3), 513-563.

Schnake, M. (1991). "Organizational Citizenship: a review of the Proposed Model and Research Agenda." 44, 753–739.

Sudirno, HD, & Si, M. (2014). Application of Organizational Citizenship Behavior in Human Resource Management in Higher Education. Scientific Journal of Management & Accounting, 1(1), 90–104.

Turnipseed, DL, & Rassuli, A. (2005). Performance perceptions of organizational citizenship behaviors at work: a Bi-level study among managers and employees. British Journal of Management, 6(https://doi.org/10.1111/j.1467-8551.2005.00456.x), 231–244.

Hero. (2014). Leadership. Behavioral science. Alphabeta Publisher.

# Pabbitte Passapu Dance as A Facility of Education In Bulukumba District

**1*Ragil Tri Oktaviani,. 2Sepbianti Rangga Patriani. 3Isna Khuni Mu'alimah.**

*1,3PGSD, Universitas Nahdlatul Ulama Blitar, 2Seni Rupa PGRI Adibuana Surabaya email: 1ragil.trioktaviani91@gmail.com, 2nirangga@unipasby.ac.id, 3uriezna@gmail.com*

*Corresponding Author

**Abstract**— Learning in various educational disciplines including art education has guidelines, methods and approaches to achieve learning objectives. Art education is one of the disciplines that really need to be taught to students. One of them is the Pabbite Passapu dance, which was born from the interior of the Kajang tribe, Bulukumba Regency, which was originally shown for ritual ceremonies, now it is developed as a means of entertainment, welcoming guests, and mandatory material for dance in several schools in Kajang. The research method in this article uses a qualitative descriptive method, with an interdisciplinary approach. Some of the schools in Kajang Luar, one of which is Madrasah Aliyah DDI Baburridha which applies the Pabbitte Passapu dance as a material that needs to be included in learning the arts and culture of dance. As for the application of dance which is taught by the drill method, the teacher demonstrates the dance moves and the students follow the movement. After the dance is taught, the students will be asked to do a small performance in the school field. This is so that all elements of the Kajang community do not forget their ancestral heritage. Pabbitte passapu dance which is an art of the Kajang tribe has a (physical) form and contains values. The Pabbitte Passapu dance form begins with the name, theme, type/type/nature, motion, accompaniment/music, number of dancers, as well as costumes and props.

**Keywords**— Pabbitte Passapu Dance;Education; Kajang

**Corresponding Author:**

Ragil Tri Oktaviani,
PGSD,
Universitas Nahdlatul Ulama Blitar,
Email: ragil.trioktaviani91@gmail.com

## I. INTRODUCTION

Education in its meaning according to the 1988 GBHN concerning national education explains that national education which is rooted in the culture of the Indonesian nation and based on Pancasila and the 1945 Constitution is directed at increasing intelligence and the dignity of the nation, realizing people to have faith and fear of God Almighty, quality and independent. This definition describes the formation of a complete human being as an educational goal, taking into account the unity of aspects including physical, spiritual, cognitive, affective, and psychomotor aspects (Tirtarahardja, 2010:38).

Literally the explanation of education above becomes the main basis to be applied to students so that they understand that one of the goals of learning is to educate themselves, hone their abilities to become more qualified human beings. For this reason, every school certainly needs to apply interesting learning methods. Learning is essentially a process of interaction between students and the environment, resulting in better changes (Mulyasa, 2004:117).

Learning in various educational disciplines including art education has guidelines, methods and approaches to achieve learning objectives (Robbins, 2007: 19). The success of achieving these learning objectives depends on optimizing the components of the learning system which consists of a curriculum which includes syllabus, materials, strategies, facilities and infrastructure, evaluation, students and teachers (Hurlock: 1999)

Art education is one of the disciplines that really need to be taught to students. The existence of art education is a conscious effort that is not only to pass on artistic abilities as a manifestation of cultural transformation from generation to generation carried out by artists or art performers, but has developed into an education that has begun to be institutionalized both formally and non-formally, even the inheritance of artistic abilities is not always done by artists or artists, but can be done by art educators or anyone who has artistic ability and is able to teach (Jazuli, 2016:15).

One of them is the Pabbite Passapu dance that was born from the interior of the Kajang tribe, Bulukumba Regency. This dance was originally performed for ritual ceremonies, for example at the marriage of the Kajang traditional tribe, harvesting agricultural products, and the changing ceremony of the Ammatoa (Kajang traditional leader). However, along with the times, the Kajang tribe began to develop into Kajang Dalam and Kajang Luar, so that the pabbitte passapu dance was no longer only performed for traditional ritual ceremonies, but was performed as a means of entertainment, welcoming guests, and compulsory dance material in several schools in Kajang.

The existence of the Pabbitte Passapu dance, which has now developed, has become an interest in discussing the problem of how to implement the Pabitte Passapu dance learning and the form of the Pabbitte Passapu dance.

## II. RESEARCH METHOD

This article is the development of the discussion of the thesis entitled "The Development of Pabbitte Passapu Dance: From the Traditional Marriage Ceremony of the "Kajang Dalam" Tribe to a Stage Performance Art". This thesis uses qualitative research methods with a descriptive multidisciplinary analysis approach (Ragil's Thesis, 2016). However, the review of the results of this study only focused on textual and contextual presentations. Therefore, to bring back the scientific study of the Pabbitte Passapu dance, this article discusses the art of Pabbitte Passapu dance as a means of education.

The article of Pabbitte Passapu dance as a means of education in Kajang, Bulukumba Regency uses a qualitative method. Qualitative research method is a research method used to examine the condition of natural objects, where the researcher is the key instrument, data collection techniques are carried out by triangulation, data analysis is inductive, and qualitative research results emphasize 'meaning' rather than generalization. The qualitative research method is descriptive data (Sugiyono, 2012:1-13). For this reason, the research method in this article uses a qualitative descriptive method, with an interdisciplinary approach.

The selection of qualitative descriptive research methods with an interdisciplinary approach with the consideration that the results of this study are not only theoretical but also explicitly explain factually and practically the findings obtained during the research process. According to experts in the field of art, interdiscipline is the methodological basis for conducting research in the arts and arts education (Tjetjep Rohendi, 2012: 67). In accordance with the use of the research methods that have been presented, the data processing and analysis process does not use statistical formulas or analysis, but relies on the depth and breadth of the researcher's insight.

## III. RESULT AND DISCUSSION

Bulukumba is the southernmost and easternmost region in South Sulawesi, with a topography of lowlands and undulating hills. Geographically, Bulukumba Regency is located about 153 km from Makassar (the capital city of South Sulawesi province). Bulukumba Regency consists of 10 sub-districts, namely: Ujungbulu (district capital), Gantarang, Kindang, Rilau Ale, Bulukumpa, Ujung Loe, Bontobahari, Bontotiro, Kajang, and Herlang. Seven of these sub-districts include coastal areas that have developed into tourism development centers and the other three sub-districts as fisheries and agricultural centers. The seven sub-districts

include: Gantarang, Ujung Bulu, Ujung Loe, Bontobahari, Bontotiro, Kajang, and Herlang. As well as three sub-districts which are centers of agricultural and plantation development, namely: Kindang, Rilau Ale, and Bulukumpa (Bappeda, 2010:9).

Kajang District, which is one of the centers of tourism development in Bulukumba Regency, is inhabited by one inland ethnic group, namely the "Kajang Dalam" tribe. The total area of Kajang District is 129.06 km, which consists of two sub-districts and 17 villages. The two sub-districts in question are the Tana Jaya village as the capital of the sub-district, and the Laikang village. The 17 villages in question are: Bonto Biraeng, Bonto Rannu, Lembang, Lembang Lohe, Possi Tana, Lembanna, Tambangan, Sangkala, Pattiroang, Batu Nilamung, Bonto Baji, Malleleng, Tana Toa, Sapanang, Mattoanging, Lolisang, and Pantama (Central Bureau of Statistics Bulukumba Regency, 2014:1).

Based on the explanation above, Kajang District is one of the centers for tourism development in Bulukumba Regency. Before being divided into two, this Kajang was considered a primitive tribe, because their way of life still relied on a certain belief. However, the entry of local and foreign tourists into the tribe, eventually the mindset of the Kajang people developed. So that there are people who want to experience life outside of the Kajang Tribe environment, for that based on deliberation with Ammatoa (customary leaders), Kajang is finally divided into two Kajang Dalam and Kajang Luar.

The people living in Kajang Luar are more modern, as evidenced by the fact that the houses they live in are no longer wooden houses with thatched roofs, but are built with stone houses, ceramic/cement floors, and zinc/ceiling roofs. Already using electric lighting in the form of lights and televisions, as well as using mobile phone technology. In Kajang Luar also many schools have been established. However, the clothes they use on a daily basis still maintain le'leng or black clothes, both tops and bottoms, and some wear clothes other than black. (Pictures are Ragil's personal documentation).


Figure 1. The house of the Kajang tribe in Figure


2. The house of the Kajang Dalam tribe


Figure 3. Sarong weaving as daily wear

Some of the schools in Kajang Luar, one of which is Madrasah Aliyah DDI Baburridha which applies the Pabbitte Passapu dance as a material that needs to be included in learning the arts and culture of dance. This is important so that students, especially those within the Kajang area, do not forget the history of the dance story. As for the application of dance which is taught by the drill method, the teacher demonstrates the dance moves and the students follow the movement. After the dance is taught, the students will be asked to do a small performance in the school field. This is so that all elements of the Kajang community do not forget their ancestral heritage.

In addition, giving dance lessons to students will train students to learn to express themselves through feelings, thoughts, and desires so that it creates pleasure and satisfaction. Become a means of creative development to think critically and confidently. Increase the sensitivity of taste so that awareness occurs and is responsive to the symptoms that occur around it. Cultivate self-confidence and responsibility to be able to adapt and be able to communicate in various situations. Develop cultural insight to have a caring attitude that he is part of the community in which he lives (Jazuli, 2016: 113-117).

The pabbitte passapu dance that was born in the Kajang tribe does have a story that tells the life of the Kajang people in the past. Based on the meaning, pabbitte passapu is a dance using the passapu property, the arrangement of which is an imitation or imitation of the movement of a rooster when it is being fought. The word pa means 'to play'; bitte means to join; and the passapu is a headband worn by the community and customary holders of the "Kajang Dalam" tribe as a complement to daily clothing.

Quoted from the thesis entitled "Development of the Pabbitte Passapu Dance: From the Traditional Marriage Ceremony of the "Kajang Dalam" Tribe to a Stage Performance Art" that the relationship between the Pabbitte Passapu dance and the life of the Kajang tribe is because the Kajang people used to have a ritual ceremony that always had luxury, showing their arrogance. until they bet with a win-lose system in cock gambling or known as cockfighting. However, when the losing player did not accept his defeat, a fight broke out until bloodshed, for that after several centuries had passed Ammatoa as a traditional leader forbade cock gambling, but to remember that this incident would not happen again, Ammatoa symbolized the movement of cockfighting into the pabbitte dance movement. passapu (Thesis Ragil, 2016: 76-79).

Pabbitte passapu dance which is the art of the Kajang tribe has a (physical) form and contains values. The pabbitte passapu dance form begins with the name, theme, type/type/nature, motion, accompaniment/music, number of dancers, as well as costumes and properties (Hadi, 2003:86).

a. The name of the dance, where pabbitte passapu comes from the term Kajang people who have a habit of fighting roosters. In the course of time, after the customary rules forbidding the activity of fighting roosters, the activities were replaced by complaining about headbands. In this case, the headband is a symbolic representation of the rooster. So the name was adjusted to pabbitte passapu, which means to tie the headbands of the men in the "Kajang Dalam" tribe.

b. The theme or content of the Pabbitte Passapu dance is strength, prestige, and egoism, which are expressed in the fight. The headband used as a dance property is a symbol of courage as well as self-respect to win. The brave nature is expressed through the stomping of the feet and the movement of the hands swinging forward to describe the behavior of fighting cocks. Expressions of arrogance and selfishness are manifested in the form of movements of the waist, asking, and fighting.

c. Pabitte Passapu dance is included in the category of folk dance types. It is said to be a folk dance because the structure and form of movement are still simple, there are not many expressions of complicated movement variations. However, when examined in text and context, it is also loaded with meaning and value, and contains a ritual function (Hadi, 2007: 15). This type of dance is dramatic, namely dramatizing the fight of several roosters through dance movements. In the dramatic type, dance can be performed by a dancer (solo dance) or several dancers (Hadi, 2011:64).

d. In the Pabbitte Passapu dance there are movement patterns consisting of three parts, namely the opening motion, the content movement, and the closing motion. This opening motion is called the Mussawara' motion, which is a movement pattern that describes the preparation of the roosters. They seem to be negotiating the stakes. The content movement consists of five movement patterns, namely: Ma'baca-baca motion, Nippasiasseng movement, Ammasang taji ri bangkeng movement, Abbitte rua movement, and Abbitte se're movement. This closing motion is called Appalak and Siba'ji, which is a movement pattern that describes the attitude of the cockfender who does not accept defeat, then asks for the treasure that has been bet. But the winning linker refuses, so a fight ensues.

e. Musical accompaniment to the Pabbitte Passapu dance is a song accompanied by the blows of two manronrong (traditional drums of the Kajang tribe), which are performed by two women in their 50s. The sung poems contain messages and warnings for the people of Kajang not to do things that harm themselves. The following is an example of a sung poem.

**(song lyrics 1 the *mussawara*' motion)**

*Bosia ritala'-tala', rammang.*
*Ribangkeng bukki, mannanro.*

*Nakku, mapaempo tarurangi.*

*Kunjung i kau, haju sampara kalen'nu.*

**(song lyrics 2 the *pakkaramula, nipasiasseng,* dan *ammasang taji* motion)**

*Jarra-jarraki paboto' pakanre bakke manu'.*

*nakapukki inrang, Haillee..*

*Nisahungpi panrollea, panatoo sibaruga, Pasingarendee..*

*Apa kurang ri kajang, kattung na ringgi,*

*Tali-tali na rupiah, Hailee.*

**It means**:

(**verse I**)

Rain on the roofs.

At the foot of the mountain sat remembering events.

Indeed you are Sampara, you deliberately make yourself a gambler.

(**verse II**)

Beware of being a gambler, because you will become a chicken scavenger.

As a result of losing in gambling, you are in debt.

Joining panrollea (chicken name) in the crowd, watching the death of chickens..

What is lacking in Kajang, the weaver is replaced with ringgit, the threads are replaced with rupiah..

f. The number of Pabbitte Passapu dance dancers follows the number of students being taught, because Pabbitte Passapu in this case is emphasized as a means of education.

g. The costumes and props in the pabbitte passapu dance are the daily clothes of the Kajang people, consisting of black clothes, sarongs and headbands.

Picture 4. MA DDI Baburridha student dancing the *pabbitte passapu*

## IV. CONCLUSION

Art education is one of the disciplines that really need to be taught to students. One of them is the Pabbite Passapu dance that was born from the interior of the Kajang tribe, Bulukumba Regency. This dance was originally performed for ritual ceremonies, for example at the marriage of the Kajang traditional tribe, harvesting agricultural products, and the changing

ceremony of the Ammatoa (Kajang traditional leader). However, along with the times, the Kajang tribe began to develop into Kajang Dalam and Kajang Luar, so that the pabbitte passapu dance was no longer only performed for traditional ritual ceremonies, but was performed as a means of entertainment, welcoming guests, and compulsory dance material in several schools in Kajang.

Madrasah Aliyah DDI Baburridha is one of them that applies the Pabbitte Passapu dance as a material that needs to be present in learning the arts and culture of dance. This is important so that students, especially those within the Kajang area, do not forget the history of the dance story. As for the application of dance which is taught by the drill method, the teacher demonstrates the dance moves and the students follow the movement. After the dance is taught, the students will be asked to do a small performance in the school field. This is so that all elements of the Kajang community do not forget their ancestral heritage.

In the Pabbitte Passapu dance there are movement patterns consisting of three parts, namely the opening motion, the content movement, and the closing motion. This opening motion is called the Mussawara' motion, which is a movement pattern that describes the preparation of the roosters. They seem to be negotiating the stakes. The content movement consists of five movement patterns, namely: Ma'baca-baca motion, Nippasiasseng movement, Ammasang taji ri bangkeng movement, Abbitte rua movement, and Abbitte se're movement. This **closing motion** is called Appalak and Siba'ji, which is a movement pattern that describes the attitude of the cockfender who does not accept defeat, then asks for the treasure that has been bet. But the winning linker refuses, so a fight ensues.

## ACKNOWLEDGMENTS

## REFERENCES

Koesoema. D. 2007. Pendidikan Karakter Strategi Mendidik Anak Di Zaman Global. PT Grasindo, anggota Ikapi: Jakarta.

Badan Perencanaan dan Pembangunan Daerah, Kabupaten Bulukumba Dalam Angka 2010. Bulukumba, 2010.

Badan Pusat Statistik Kabupaten Bulukumba, Kecamatan Kajang Dalam Angka 2014.

Bulukumba, 2014.

Hadi, Sumandyo. Aspek-Aspek Dasar Koreografi Kelompok. Yogyakarta: Elkaphi (Lembaga Kajian Pendidikan dan Humaniora Indonesia), 2003.

Hurlock, 1999. Quantum Learning/ Membiasakan Belajar Nyaman dan Menyenangkan. Bandung: Kaifa.

Jazuli, M. 2016. Paradigma Pendidikan Seni. CV. Farishma Indonesia. Sukoharjo.

Mulyasa, 2004. Kurikuum Berbasis Kometensi. Konsep, Karakteristik, dan Implementasi. Bandung: PT. Rosda Karya.

Oktaviani, Ragil Tri. 2016. Tesis Berjudul Tari Pabbitte Passapu Sebagai Sarana Pendidikan Di Kajang Kabupaten Bulukumba. Surakarta: ISI Surakarta.

Pratiwi, Putri, dkk. 2022. Jurnal Boting Langi vol 1 nomor 1 Tari Pabbitte Passapu Sebagai Bahan Ajar Tari Tradisi Daerah Setempat Di Madrasah Aliyah DDI Baburiddha Kajang Bulukumba. Makassar: Universitas Negeri Makassar.

Rohidi, Rohendi, Tjetjep. 2011. Metodologi Penelitian Seni. Cipta Prima Nusantara: Semarang.

————————————— 2000. Kesenian dalam pendekatan kebudayaan. STSI Press. Bandung.

Sugiyono. 2012. Memahami Penelitian kualitatif. Alfabeta cv. Bandung.

Umar, Tirtarahardja dkk. 2010. Pengantar Pendidikan. Direktur Jenderal Pendidikan Tinggi: Jakarta.

# Modeling to Increase Self-Care Independence of Children with Intellectual Disability

[1*]**Defi Astriani**, [2]**Alaiya Choiril Mufidah**
[1,2,]*Islamic Psychology, University of Nahdlatul Ulama Blitar*
*E-mail: [1]defi45astriani@gmail.com, [2]aalaya228@gmail.com*

*Corresponding Author

**Abstract**— DM (female / 15 years) complained of by her parents that she had poor self-care ability. Based on the results of interviews, observations, CPM and VSMS tests, she was diagnosed with severe intellectual disability and the social maturity of her was not appropriate for their age. The problem that the she currently has is the independence of caring for oneself that is lacking. This makes she become dependent on others. The intervention aims to improve self-care independence (dressing and brushing teeth) through modeling techniques. This intervention was carried out in five sessions. The results of the intervention showed that she experienced an increase in independence in terms of caring for themselves. Self-care for the subject can be seen from the increasing score in the pre-test and post-test on each indicator made, which is the indicator of dressing and brushing teeth. Follow up was done a week after the intervention. Where the results of the follow-up show that she can independently take care of herself and is no longer assisted by his parents.

**Keywords**— Modeling; Self-care independence; Intellectual disability

*Corresponding Author:*

Defi Astriani,
Islamic Psychology,
University of  Nahdlatul Ulama Blitar,
Email: defi45astriani@gmail.com

## I. INTRODUCTION

Intellectual disability (ID), also known as general learning disabilities and mental retardation (RM) is a common neurodevelopmental disorder characterized by impaired intellectual and adaptive functions. This is defined by an IQ below 70 and a deficit of two or more adaptive behaviors that affect daily life. From this understanding, it can be concluded that intellectual disability is a dysfunction or limitation both intellectually and adaptive behavior that can be measured or seen that causes a reduced capacity to act in certain ways (Carr, Linehan, O'Reilly, Walsh, & McEvoy, 2016).

Children with intellectual disabilities have limitations in language acquisition. They are not experiencing articulation damage, but the processing center (vocabulary) is not functioning as it should. For that reason they need concrete words that are often heard. In addition, differences and similarities must be shown repeatedly. Simple exercises such as working on big and small concepts, need to use a concrete approach. In addition, mentally retarded children are less able to consider something, distinguish between good and bad, and distinguish right from wrong. This is all because of their limited abilities so that mentally retarded children cannot imagine in advance the consequences of an act  (Somantri, 2007).

In this case, DM has limitations in adaptive social functions. She experienced difficulties in social relations. At school she only saw her friends playing and occasionally only smiled, could not walk straight and had problems with fine motor skills (for example, holding a pencil incorrectly). Physically she also looks different from his friends, where the subject's eyes are less focused when looking.

Problems related to independence in caring for themselves experienced by DM is caused because parents have never trained or taught the subject about how to care for themselves properly. Everyday subject's needs and activities are always helped by parents and cause the subject to have difficulty developing their skills in caring for themselves and being dependent on parents. This shows the lack of independence of DM in caring for her so that Modeling interventions are needed to overcome this.

Modeling technique is a part of the techniques that exist in Behavior therapy. Behavioral therapy is a scientific view of human behavior. Behaviorism is characterized by the attitude of limiting the methods and procedures of the observed data (Corey, 2013). Modeling or imitation is "the direct, mechanical reproduction of behavior", the reproduction of direct and mechanical behavior (Baran, 2000). Modeling technique is learning to react by observing others who are

reacting and imitating. How to learn through the process of observation, imitation, and piloting and the formation of new behavior, reinforcing the behavior that has been formed.

Therefore this intervention uses modeling techniques to increase the independence of caring for children with intellectual disability. There have been many studies that test the effectiveness of this technique and the results can effectively improve child self-care skills (Akhmetzyanova, 2014; Gardner & Wolfe, 2013; Susilowati, Rustiyaningsih, & Hartini, 2018; Youngmee, 2014). And the hypothesis of this intervention is that there is an increase in children's independence after being given treatment in the form of modeling.

## II. RESEARCH METHOD

The research is used Quasi experiment method. The assessment is used to establish the correct diganosa through a series of methods including interviews, observation and psychological tests. Interviews were conducted on the subject, the teacher and also the family to obtain more in-depth information about the problems experienced by the subject. Observations were made to obtain information on the subject's behavior and activities. The psychological tests used are as follows:

1. Colored Progressive Matrices (CPM) is used to measure the level of intelligence of the subject. Vineland Social Maturity Scale

2. Vineland Social Maturity Scale (VSMS) is a social maturity test to see the level of social development and at the age stage of the subject's social maturity

## III. RESULT AND DISCUSSION

After the entire stage of the intervention is carried out, the results obtained on the independence of caring for oneself on the subject slowly begin to change. Evidenced by an increase in the number of activities or daily activities carried out based on behavioral indicators that have been made previously. Habit indicators are based on aspects of self-care independence (dressing and brushing teeth) and based on interviews with subjects' parents. Improvements made to the activities carried out by the subject and agreed based on behavioral indicators that have been made as a result of the intervention process.

The subject experienced an optimal increase in the ability to dress, it can be seen from the fulfillment of the subject's criteria in the pre-test, post-test and follow-up. Where in the pre test there are still many indicators that the subject has not been able to do, and the results of the post test there are several indicators that can be done but still need help. However, these skills

increase at follow-up, where all indicators can be done by the subject independently without the need for help from others.

Subject has an optimal increase in the ability to brush her teeth, it can be seen from the fulfillment of the subject's criteria in the pre-test, post-test and follow-up. Where in the pre test there are still many indicators that the subject has not been able to do, and the results of the post test there are several indicators that can be done but still need help.

Follow-up or evaluation, also called follow-up, is a step to see the extent to which programs or actions are designed and agreed upon and have been implemented. With the follow-up can be controlled to the extent that the effectiveness of interventions carried out will be overcome or not. In the follow-up, besides re-observing after the treatment is done. However, also re-interviewing with secondary data sources namely parents to find out the extent of subject changes. The results of the follow-up show that these skills have improved, where all indicators can be done by the subject independently without the need for help from others.

Interventions are given to increase self-care independence of students with intellectual disabilities, namely modeling techniques. Modeling is one of the techniques in behavioral therapy that emphasizes learning procedures. In principle, behavioral therapy itself aims to obtain new behaviors, eliminate old self-destructive behaviors and manage and maintain the healthier behaviors needed (Gardner & Wolfe, 2013; Sherer et al., 2001).

This intervention was given to increase the independence of caring for children with intellectual disability which was carried out in six sessions. After conducting the pre-test, the subject is given an intervention in the form of applying video modeling to increase the independence of caring for the subject and the intervention shows an increase in self-care skills.

Operant conditioning is the right theoretical basis for explaining modeling techniques through reinforcement given to the subject can increase self-care independence in subjects with intellectual disability. The formation of behavior according to Skinner depends on the consequences that follow the behavior and the individual tends to maintain a behavior if there are pleasant consequences for him for the behavior (Olson & Hergenhahn, 2011).

Reinforcer in the form of giving food or praise to the subject not only becomes material reinforcement but also as social reinforcement. From the reinforcer given, the subject feels he gets attention from the social environment that he did not get from his previous family. The consequences designed to follow the expected behavior are called engineering consequences that are part of the modeling strategy (Watson & Tharp, 2007).

Provision of interventions through the process of observation, imitation, and modeling as well as the formation of new behavior (modeling) and strengthen the behavior that has been formed. Changes in behavior on the subject make the subject more independent and no longer

dependent on others, especially in terms of caring for themselves, namely dressing and brushing teeth.

## IV. CONCLUSION

Based on the results of the intervention it can be concluded that the modeling technique can increase the independence of caring for children with intellectual disability. Descriptions of increasing dress independence can be seen from the subject's ability to use clothes, insert arms, straighten the collar, wear and button the skirt. While the increase in independence of brushing can be seen from the ability of the subject to hold a toothbrush, put toothpaste on the brush, rinse, brush the mouth and start brushing teeth. Increased independence in caring for oneself in walking in five sessions with the addition of several methods such as rewards, and individual guidance so as to achieve predetermined success.

## REFERENCES

Akhmetzyanova, A. I. (2014). The development of self-care skills of children with severe mental retardation in the context of Lekoteka. World Applied Sciences Journal, 29(6), 724–727.

Association, A. P. (2013). Diagnostic and statistical manual of mental disorders. BMC Med, 17, 133–137.

Baran, S. D & Dennis (2000). Mass Communication Theory. Foundations, Ferment and Future. Cengage Learning: Boston, MA: Wadsworth. ISBN-13, 970–978.

Carr, A., Linehan, C., O'Reilly, G., Walsh, P. N., & McEvoy, J. (2016). The handbook of intellectual disability and clinical psychology practice. Routledge.

Corey, G. (2013). Groups: Process and practice. Cengage Learning.

Gardner, S., & Wolfe, P. (2013). Use of video modeling and video prompting interventions for teaching daily living skills to individuals with autism spectrum disorders: A review. Research and Practice for Persons with Severe Disabilities, 38(2), 73–87.

Olson, M. H., & Hergenhahn, B. R. (2011). An introduction to theories of personality. Prentice Hall.

Sherer, M., Pierce, K. L., Paredes, S., Kisacky, K. L., Ingersoll, B., & Schreibman, L. (2001). Enhancing conversation skills in children with autism via video technology: Which is better,"self" or "other" as a model? Behavior Modification, 25(1), 140–

158.

Somantri, S. (2007). Psikologi Anak Luar Biasa. 2007. Bandung: Refika Aditama.

Susilowati, L., Rustiyaningsih, A., & Hartini, S. (2018). Effect of self development program and training using video modeling method on dressing skills in children with intellectual disability. BELITUNG NURSING, 420.

Wantah, M. J. (2007). Pengembangan kemandirian anak tunagrahita mampu latih. Jakarta: Departemen Pendidikan Nasional.

Watson, D. L., & Tharp, R. G. (2007). Self-directed behavior (9th Eds.). Cengage Learning.

Youngmee, K. (2014). The Development of Multimedia on Dressing Skill Practice for Children with Moderate Mental Retardation. Humanitis, Sciences and Art, 14(2), 141–163.

# Design of a Arduino-Based Wind Power Generator as a STEM Learning Media

**[1*]Ratika Sekar Ajeng Ananingtyas, [2]Ragil Ellang Sakti, [3]Muhammad Helmi Hakim, [4]Zullaikho Tri Lestari**

*[1,3,4]Fisika, Universitas Nahdlatul Ulama Blitar*
*[2]Intrumentasi, Sekolah Tinggi Meteorologi, Klimatologi, dan Geofisika*
*E-mail: [1]ratikasekar@gmail.com, [3]ragil.ellang.sakti@stmkg.ac.id,*
*[3]helmihakim7@gmail.com, [4]zullaikho00@gmail.com*

**Abstract**— The development of media that can show phenomena approaching the actual situation is very necessary especially in supporting STEM learning. Therefore, a learning media was developed in the form of an arduino-based wind power generator. The development was carried out by adapting the 4D method (Define, Design, Develop, and Dissemination) and has an accuracy level of measuring the value of the electric power generated by 97.75%. This value indicates that the developed media is able to show how wind power generators can convert wind into electrical energy close to the original phenomenon. Thus, the arduino-based wind power generator developed is considered feasible to support STEM learning.
**Keywords**— Arduino; Wind Power Generator; STEM

*Corresponding Author:*

Ratika Sekar Ajeng Ananingtyas,
Fisika,
Universitas Nahdlatul Ulama Blitar,
Email: ratikasekar@gmail.com

## I. INTRODUCTION

Advances in technology expect humans to be more productive but must be balanced with efficiency. The industrial revolution 4.0 demands automatic digital technology that is useful for humans. In addition, we have now entered the era of society 5.0 where humans and technology must synergize and run machines automatically together (Gladden, 2019; Ristekdikti, 2018; Salgues, 2018). Therefore, as a developing country, it is necessary to follow technological developments both formally through education and informally in the community through training.

Implementation of the development of science and technology through formal education is needed to produce a superior generation that is ready to face the world. One of the learning models that can accommodate these needs is STEM (Science, Technology, Engineering, and Mathematic) learning (Xie, Fang, & Shauman, 2015). STEM has five main principles, namely the integration of STEM content, problem-centered learning, inquiry-based learning, design-based learning, and cooperative learning (Thibaut et al., 2018).

STEM learning invites students to be able to apply integrated science, technology, engineering, and mathematics [6]–[8]. One of the principles of STEM is inquiry-based learning which invites students to find facts based on findings that are in accordance with the actual situation (Kennedy & Odell, 2014; The Stem Education Review Group, 2016). However, there are not many learning media that support STEM well. In supporting this, the development of media that can show phenomena approaching the actual situation is very necessary. Therefore, a learning media was developed in the form of an Arduino-based wind power generator. With the development of this media, it is hoped that it can help students to learn in a real and integrated way.

## II. RESEARCH METHOD

The development of an Arduino-based wind power generator is carried out by adapting the 4D method (Define, Design, Develop, and Dissemination). At the definition stage, a literature review and analysis of previous research is carried out. At the design stage, an initial sketch of the form of learning media was developed. At the develop stage, the learning media is made using the following tools and materials: arduino as a converter of the resulting quantity parameters; a potentiometer used to vary electrical resistance to produce varying power; an ammeter to measure the current generated; 2 fans as a wind source and generator drive; LCD screen to display the value of resistance, current, and electric power; from this value the amount of electrical energy produced can be calculated. At the develop stage, a system test is also carried out to find out

whether the system is working properly and in accordance with the equation that should be used to calculate electrical power. To see the performance of Arduino, the precision and accuracy test of the data displayed on the LCD screen is compared with the results of manual calculations using the electric power equation. At the final stage or dissemination, the user is introduced to the developed media to test its usefulness.
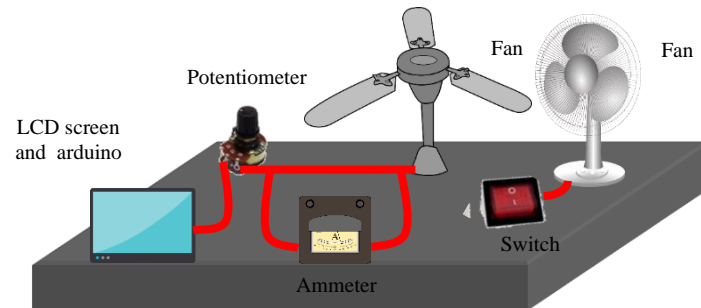


Figure 1. Design of a Arduino-Based Wind Power Generator

### III. RESULT AND DISCUSSION

The results of research and development that have been carried out are as follows.

1.  At the definiton stage, it is known that there are not many media that support STEM learning, therefore the media developed is able to facilitate students to better understand science, technology, engineering, and mathematics that are integrated in the developed media. In the field of science, students can learn about energy conversion from new renewable energy resources, namely wind which is converted into electrical energy, in the conversion process the power value is determined through physical quantities, namely current strength and electrical resistance. In the field of technology, students can get to know IT technology through Arduino which makes electrical power calculations automatic. In the engineering field, students can learn from the process of applying science and technology in solving human problems, namely the conversion of new and renewable energy with simple tools and materials. In the field of mathematics, students can prove whether the results of the Arduino calculations match the proper electric power equation.

2.  At the design stage, the design is carried out by recording the needs for tools, materials, and system code on the Arduino through the Arduino IDE. This stage requires several processes, especially in the coding section because trial and error needs to be done.
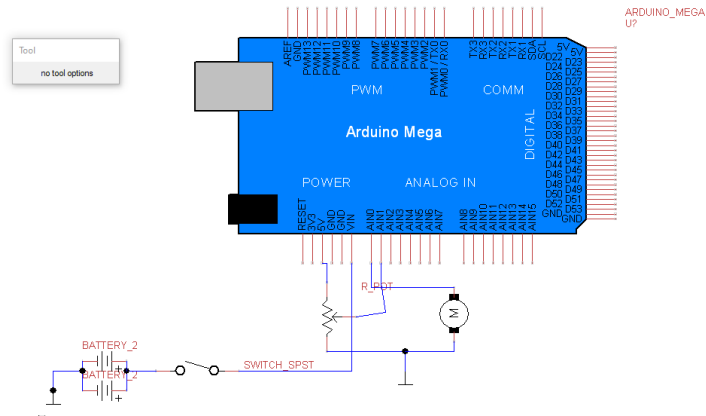
Figure 2. Arduino board design and other devices



Figure 3. Data display of electrical resistance, electric current, and output electric power on LCD screen



Figure 4. Coding used by arduino via arduino IDE

3.  After the design is complete, the learning media is developed according to the appropriate design and code as shown in fig.5.

Figure 5. The final product of an Arduino-based wind power generator in STEM learning

System testing is carried out at this stage to find out whether the system is running well, especially on Arduino performance as shown in Table 1 and 2.

Table 1. Arduino-based wind generator system test results.

| | Electrical Resistance ($\Omega$) | Electric current (A) | Electric Power (W) |
|---|---|---|---|
| Data on LCD screen | 61 | 0.55 | 17 |
| | 71 | 1.43 | 134 |
| | 72 | 1.71 | 219 |
| | 62 | 1.17 | 84 |
| | 62 | 1.58 | 150 |
| Manual calculation results | 61 | 0.55 | 18.45 |
| | 71 | 1.43 | 145.19 |
| | 72 | 1.71 | 210.53 |
| | 62 | 1.17 | 84.87 |
| | 62 | 1.58 | 154.78 |

Table 2. Result of precision test of arduino performance on wind generator.

| Electric Power (P) | Average Electric Power ($\bar{P}$) | $P$-$\bar{P}$ |
|---|---|---|
| 17 | | -103 |
| 134 | | 14 |
| 219 | 120 | 99 |
| 84 | | -36 |
| 150 | | 30 |
| **Precision value of data on screen** | | **0.8** |
| 18.45 | | -104.314 |
| 145.19 | | 14.396 |
| 210.53 | 122.764 | 87.766 |
| 84.87 | | -37.894 |
| 154.78 | | 32.016 |
| **Precision value of manual calculation** | | **0.803** |

From table 2, the precision value of the data displayed on the LCD screen is 0.8, which is close to the manual calculation precision value, which is 0.803. This shows that Arduino can work according to code commands.

In addition to the precision test, the system accuracy test was carried out on the Arduino used with reference to table 2. The results of the accuracy test are as follows.

$$\% \ error = \frac{\bar{P}_{calculated} - \bar{P}_{screen}}{\bar{P}_{calculated}} x100\%$$

$$\% \ error = \frac{122.764 - 120}{122.764} x100\%$$

$$\% \ error = 2.25\%$$

From the calculation results above, it is obtained that the percentage error is 2.25% so that the accuracy of Arduino in determining the value of the electric power of the wind power generator is 97.75%.

4. The last stage, namely dissemination, is carried out after all development processes are completed. The introduction of the developed media was carried out at one of the Vocational High Schools that needed media for STEM learning. From the results of the feasibility test carried out on users, namely 30 Vocational High School students, it was found that the learning media was very suitable for use in STEM learning with an average feasibility value of 3.862 from maximum value of 5.

The learning media in the form of a wind generator that has been developed has an accuracy level of measuring the value of the electric power generated by 97.75%. This value indicates that the developed media is able to show how wind power generators can convert wind into electrical energy close to the original phenomenon. Digital technology-based learning media really need to be developed to improve critical thinking skills and real life experiences in the classroom (Buckingham, 2015). In this regard, STEM learning requires an inquiry process (Hsu, Sung, & Sheen, 2020), namely the discovery of concepts or materials that can be facilitated through learning media. Thus, the arduino-based wind power generator media developed is considered feasible to support STEM learning.

## IV. CONCLUSION

The development of learning media in the form of a arduino-based wind power generator is an innovation to answer the need for media that supports STEM learning, the media developed has been accurate and feasible to use to support learning. Suggestions that can be given from this research are that it is necessary to develop a larger size so that the energy or power produced is

also greater and to develop other power generation media to better introduce how generators work in complementing STEM learning.

## REFERENCES

Ananingtyas, R. S. A. (2020a). Analisis Uji Keterbacaan Modul Fisika Berbasis STEM Education Materi Usaha dan Energi. Briliant: Jurnal Riset Dan Konseptual. https://doi.org/10.28926/briliant.v5i4.564

Ananingtyas, R. S. A. (2020b). DEVELOPMENT OF A PHYSICS MODULE ON WORK AND ENERGY BASED ON STEM EDUCATION FOR VOCATIONAL HIGH SCHOOL STUDENTS. Jurnal Pendidikan S, 8(4). https://doi.org/http://dx.doi.org/10.17977/jps.v8i4.13661

Ananingtyas, Ratika Sekar Ajeng; Sakti, Ragil Ellang; Hakim, Muhammad Helmi; Putra, F. N. (2022). Pengembangan Media Pembelajaran Berbasis Arduino pada Pembelajaran STEM dalam Meningkatkan Literasi Sains dan Digital. Briliant: Jurnal Riset Dan Konseptual, 7(1), 178–186.

Buckingham, D. (2015). Defining digital literacy: What do young people need to know about digital media? Nordic Journal of Digital Literacy.

Gladden, M. E. (2019). Who will be the members of Society 5.0? Towards an anthropology of technologically posthumanized future societies. Social Sciences. https://doi.org/10.3390/socsci8050148

Hsu, S., Sung, C. C., & Sheen, H. J. (2020). Developing an interdisciplinary bio-sensor STEM module for secondary school teachers: An exploratory study. Voprosy Obrazovaniya. https://doi.org/10.17323/1814-9545-2020-2-230-251

Kennedy, T. J., & Odell, M. R. L. (2014). Engaging Students In STEM Education. Science Education International.

Ristekdikti. (2018). Era Revolusi Industri 4.0 Saatnya Generasi Millenial Menjadi Dosen Masa Depan.

Salgues, B. (2018). Society 5.0. In Society 5.0. https://doi.org/10.1002/9781119507314

The Stem Education Review Group. (2016). A Report on Science, Technology, Engineering and Mathematics (STEM) Education: Analysis and Recommendations. Department of Education and Science.

Thibaut, L., Ceuppens, S., De Loof, H., De Meester, J., Goovaerts, L., Struyf, A., … Depaepe, F. (2018). Integrated STEM Education: A Systematic Review of Instructional Practices in Secondary Education. European Journal of STEM Education. https://doi.org/10.20897/ejsteme/85525

Xie, Y., Fang, M., & Shauman, K. (2015). STEM Education. Annual Review of Sociology. https://doi.org/10.1146/annurev-soc-071312-145659

# Implementation of Multicultural Islamic Education Values in Indonesia

[1*]**Arif Muzayin Shofwan, **[2]**Dessy Farantika, **[3]**Rizanatus Solikah**
[1,2,3]*Pendidikan Islam Anak Usia Dini, Universitas Nahdlatul Ulama Blitar*
*E-mail: *[1]*arifshofwan2@gmail.com, *[2]*farantika.dessy@gmail.com,*
[3]*rizana.sholika@gmail.com*

*Corresponding Author

**Abstract**—Most Indonesian people who embrace Islam seem appropriate to instill the values of multicultural Islamic education. In addition, the Indonesian people feel that it is appropriate to instill a multicultural Islamic education, because it has a diversity of religions, ethnicities, cultures, customs, and the like. This qualitative descriptive paper with a literature study will reveal techniques for inculcating multicultural values in Islamic education in Indonesia. This research data analysis uses content analysis by sorting out data according to the research objectives. The findings in this paper are the inculcation of the values of multicultural Islamic education can be done by considering the following points. First, the cultivation of the values of multicultural Islamic education can be done by considering the principles and development of multicultural values in Islamic religious education subjects, for example: Al-Quran subjects, Fiqh subjects, Moral subjects, and Islamic Cultural History subjects. . Second, the cultivation of the values of multicultural Islamic education must prioritize the role and role model of education practitioners. Third, the cultivation of multicultural Islamic educational values must be facilitated by educational institutions, both quantitatively and qualitatively.

**Keywords**— Multicultural Values; Islamic Religious Education;  Tolerance

---

*Corresponding Author:*

Arif Muzayin Shofwan,
Pendidikan Islam Anak Usia Dini,
Universitas Nahdlatul Ulama Blitar,
Email: arifshofwan2@gmail.com

## I. INTRODUCTION

The majority of Indonesian people are Muslim. Thus, instilling the values of multicultural Islamic education is one of the obligations of educational practitioners. The Ministry of Religion Team (2012: 8) states that multicultural Islamic education is a process of inculcating several relevant Islamic values so that students can live side by side peacefully and harmoniously in the reality of pluralism and behave positively, so that they can manage diversity into a force to achieve progress, without obscuring and eliminate religious values, self-identity, and culture. Thus, it can be understood that the term "without obscuring and eliminating religious values, self-identity, and culture" is significant in the process of inculcating the values of multicultural Islamic education in Indonesia.

Instilling the values of multicultural Islamic education is considered successful if it meets the following criteria, First, developing the ability of students to behave in a manner that recognizes, accepts, respects, and celebrates cultural diversity. Second, directing and emphasizing learning on democratic life. Third, teach and emphasize learning that leads to justice, free from racism, sexism, and other forms of social domination and intolerance.

Manfaat (2013: 41) states that multicultural education can be said to be successful if the educational process can give birth to people with multicultural character. Humans are said to be multicultural in character if they are able to know, appreciate, and celebrate the reality of cultural diversity. Furthermore, if people who know, appreciate, and celebrate the culture live together, then ideally a harmonious and peaceful life will be created. Thus, the role of educational institutions in Indonesia is felt to be able to become a means of building a civilization that is more substantive, contextual, positive and more socially active in a country full of diversity.

Based on the description above, this research will generally discuss the cultivation of the values of multicultural Islamic education in Indonesia. Meanwhile, specifically, this research will discuss the following matters, among others: (1) the principles and development of multicultural values in Islamic religious education subjects, for example; (2) the importance of the role and role model of education practitioners in instilling the values of multicultural Islamic education (3) the importance of the role of educational institutions in Indonesia in instilling the values of multicultural Islamic education.

## II. RESEARCH METHOD

This research uses a qualitative descriptive approach uses a literature study in conducting its research. According to Bungin, the literature study is research conducted in libraries, and researchers deal with various kinds of literature according to the objectives and problems being questioned (Bungin, 2001: 32). Meanwhile, Nazir stated that literature study is a technique of collecting data by conducting a review study of books, literature, notes, and reports that have to do with the problem being solved (Nazir, 2003: 27).

Because this research is a literature study, the sources of data used are the following, among others: books, journals, magazines, newspapers, various reports, and documents (both unpublished and published). Library data can also be in the form of non-printed works such as audio recordings such as cassettes, video films such as microfilm, microfibers, and other electronic materials such as floppy disks or magnetic tapes and electronic cladding (catride) related to computer technology (Zed, 2014: 6). Of course, the data sources will be sorted according to the goals and problems, namely the cultivation of multicultural values in Islamic religious education.

## III. RESULT AND DISCUSSION

Instilling the values of multicultural Islamic education must pay attention to the principles that are the reference in the Islamic education curriculum which according to Al-Syaibany (1979: 485), among others: (1) Islam-oriented, including its teachings and values, then anything related to the curriculum, including philosophy, goals, contents, teaching methods, methods of treatment and relationships that apply in educational institutions based on Islamic religion and morals; (2) the overarching principle of the objectives and contents of the curriculum; (3) the principle of a relative balance between the objectives and contents of the curriculum; (4) the principle of interaction between student needs and community needs; (5) the principle of maintaining individual differences among students, both in terms of talents, interests, abilities, needs and so on; (6) the principle of development and change in accordance with existing demands without neglecting absolute values; and (7) the principle of linkage between subjects, experiences and activities contained in the curriculum, as well as the linkage between curriculum content and the needs of students and society.

In addition, the cultivation of the values of multicultural Islamic education must be based on the principles of Islamic education in general as offered by Daradjat (1992: 125-127) as follows, among others: (1) the principle of relevance, namely in the sense of the suitability of education in the environment. student life, relevance to present and future life, relevance to job demands; (2)

the principle of effectiveness, namely the effectiveness of teaching teachers, or the effectiveness of student learning; (3) the principle of efficiency, which is efficient in terms of time, effort and cost; (4) the principle of flexibility, namely there is a kind of space that gives a little freedom to act, both oriented to flexibility in choosing educational programs and in developing teaching programs.

Zuhaili (1999: 104) states that the curriculum used must be serious and constructive, correct, and aims to inject into the minds of the youth (students) useful things in their religion and world. Because the Islamic education curriculum must come from the Qur'an and Sunnah, the traditions of the pious past people, and Muslim scholars who have brought light for centuries. Based on this, in inculcating the values of multicultural Islamic education there are several materials in the Islamic religious education curriculum that will be developed as explained by Muliadi (2012: 55), including:

**Al-Quran Subjects**

Namely, determining the choice of verses, in addition to verses about faith, it is also necessary to add verses that can provide the understanding and inculcate attitudes when interacting with people of different religions, so that as early as possible a tolerant, inclusive attitude is embedded in students, namely : (1) material related to the acknowledgment of the Qur'an about the existence of plurality and competing in goodness (Q.S. Al-Baqarah: 148); (2) materials related to the recognition of peaceful coexistence in inter-religious relations (Q.S. Al-Mumtahanah: 8-9); (3) materials related to justice and equality (Q.S. An-Nisa: 135).

**Jurisprudence Subjects**

Namely, fiqh material can be expanded with the study of governmental fiqh (fiqh siyasah). This fiqh contained concepts of nationality that have been exemplified at the time of the prophet, companions, or later caliphs. At the time of the prophet, for example, how did Prophet Muhammad SAW manage and lead the multi-ethnic, multi-cultural, and multi-religious Medina community. The situation of the people of Medina at that time was not much different from the Indonesian society which was also multi-ethnic, multi-cultural, and multi-religious.

**Moral Subjects**

Namely, moral material that focuses on the study of good and bad behavior towards Allah, the Apostle, fellow human beings, oneself, and the environment - it is important for laying the foundations of nationality. Because, the survival of a nation depends on morals, if a nation underestimates morals, then the nation is extinct. In the Qur'an has been told about the destruction of the people of the Prophet Lut due to the collapse of moral foundations. In order for multicultural Islamic education to be effective, the role of Islamic religious teachers is very decisive. Besides

always developing varied teaching methods, not monotonous. Most importantly, Islamic religious teachers also need to set an example.

**Islamic Cultural History Subjects**

Namely, the material for the history of Islamic culture, which is material based on historical facts and realities, can be exemplified by the social interaction practices applied by the Prophet Muhammad when he built the Medina community. From the historical side of the Medina development process carried out by the Prophet Muhammad SAW found facts about the recognition and appreciation of the values of pluralism and tolerance. The material of Islamic Cultural History needs to be added with a description of the development process of the Medina community in the material "The State of the Medina Community After the Hijrah", which can be traced from the Medina Charter. The Medina Charter is proof that Prophet Muhammad SAW succeeded in enforcing the values of justice, the principle of equality, law enforcement, guaranteeing welfare for all citizens and protecting minority groups.

In addition, the role and example of a teacher in inculcating the values of multicultural Islamic education are very important: (1) a teacher must be able to be democratic, both in his attitude and words, not showing a discriminatory attitude; (2) a teacher should have a high concern for certain events that have to do with religion; (3) a teacher should explain that the core of religious teachings is to create peace and prosperity for all mankind. Thus, he can explain that all forms of violence such as bombings, military invasions, and the like are something that is forbidden by religion; and (4) a teacher should be able to provide an understanding of the importance of dialogue and deliberation in solving various problems related to cultural, ethnic, and religious diversity or sects (Maulani, 2012: 41-42).

Susanti (2012: 318) states that the role of teachers in multicultural education is very important and significant. A teacher must organize and organize the contents, processes, situations, and activities of the school in a multicultural manner, where every student from various ethnicities, races, and genders has the opportunity to develop themselves and respect each other's differences. Muhammad and Somadayo (2014: 92) added that the role of a teacher must be responsive to every expression that contains elements of discrimination. With such a teacher's role, the planting of multicultural Islamic educational values will be able to run optimally starting from the process to the results to be achieved.

In addition, educational institutions play a role in facilitating the cultivation of multicultural Islamic educational values in two ways, namely; First, quantitative methods, including; (1) multiply references or reading materials on the development of multicultural Islamic education; (2) increase socialization activities regarding the concept and urgency of multicultural Islamic education, both orally and in writing; (3) create forums or groups that focus on the

multiculturalism movement, especially in Islamic educational institutions; and (4) building a culture based on the spirit of multiculturalism, both through Islamic educational institutions and Islamic education forums in the community. Second, qualitative methods, including; (1) building a more established theoretical foundation or epistemology of multicultural Islamic education; (2) sharpening the values of multiculturalism in the curriculum; (3) improving the understanding and ability of educators on multiculturalism materials; (4) the development of a local culture that is full of moral values and does not conflict with the principles of Islamic teachings; and (5) strengthening in terms of policies and financing or budget related to the authorities (Zain, 2013: 15-18).

## IV. CONCLUSION

Based on the discussion above, it can be concluded as follows. First, the cultivation of the values of multicultural Islamic education can be done by considering the principles and development of multicultural values in Islamic religious education subjects, for example: Al-Quran subjects, Fiqh subjects, Moral subjects, and Islamic Cultural History subjects. .

Second, the cultivation of the values of multicultural Islamic education must prioritize the roles and role models of teachers. A teacher and education practitioner must set an example of democratic values, high concern, create peace, provide an understanding of the importance of dialogue and deliberation in solving cultural, ethnic, and religious problems or beliefs.

Third, the cultivation of multicultural Islamic educational values must be facilitated by educational institutions, both quantitatively and qualitatively. Quantitatively, this can be done by increasing references, socialization, and forums that build the spirit of multiculturalism. Qualitatively, this can be done by building a theoretical basis for multicultural Islamic education, sharpening the values of multiculturalism, and increasing understanding of multicultural Islamic religious education.

## REFERENCES

Al-Syaibany. Falsafah Pendidikan Islam, terj. Hasan Langgulung. Jakarta: Cet.I, Bulan Bintang, 1979.

Bungin, Burhan. Metodologi Penelitian Sosial Format-format Kuantitatif dan Kualitatif. Surabaya: Airlangga University Press, 2001.

Daradjat, Zakiah. Ilmu Pendidikan Islam. Jakarta: Bumi Angkasa, 1992.

Manfaat, Budi. Praktik Pendidikan Multikultural di Pondok Pesantren Dar Al-Tauhid Cirebon. Holistik, Vol. 14 Number 01, 2013/1435H, 2013.

Maulani, Amin. Transformasi Learning dalam Pendidikan Multikultural Keberagamaan. Jurnal Pembangunan Pendidikan: Fondasi dan Aplikasi, Vol. 1, No. 1, Juni 2012.

Muhammad, Syahril dan Samsu Somadayo. The Implementation on Multicultural Education Values in Fostering Inter Ethnic Harmony (A Naturalistic Qualitative Study in State Junio High School 1 Ternate). Journal of Education and Practice, Vol. 5, No. 2, 2014.

Muliadi, Erlan. Urgensi Pembelajaran Pendidikan Agama Islam Multikultural di Sekolah. Jurnal Pendidikan Islam, Vol. 1, No. 1, Jun 2012.

Nazir, Moh. Metode Penelitian,. Jakarta: Ghalia Indonesia, 2003.

Susanti, Rini Dwi. Menguak Multikulturalisme di Pesantren (Telaah atas Pengembangan Kurikulum). Jurnal Ad-Din, Vol. 4, No. 2, Juli-Desember 2012

Tim Kemenag, Panduan Integrasi Nilai Multikultural dalam Pendidikan Islam. Jakarta: PT. Kirana Cakra Buana bekerjasama dengan Kementrian Agama RI, Asosiasi Guru Pendidikan Agama Islam Indonesia (AGPAII), TIFA Foundation dan Yayasan Rahima, 2012.

Zain, Hefni. Pengembangan Pendidikan Islam Multikultural Berbasis Manajemen Sumber Daya Manusia. Tadris, Vol. 8, No. 1, Juni 2013.

Zed, Mestika. Metode Penelitian Kepustakaan. Jakarta: Yayasan Pustaka Obor Indoonesia, 2014.

Zuhaili, Muhammad. Pentingnya Pendidikan Islam Sejak Dini, terj. Arum Titisari. Jakarta: A.H. Ba'adillah Press, 1999.

# The Significance of the Values of Multicultural Islamic Education in the Al-Quran and Al-Hadith

[1*]**Dessy Farantika**, [2]**Arif Muzayin Shofwan**, [3]**Lailatul Azizah**
[1,2,3]*Pendidiikan Islam Anak Usia Dini, Universitas Nahdlatul Ulama Blitar*
*E-mail: [1]farantika.dessy@gmail.com, [2]arifshofwan2@gmail.com,
[3]azizah.lailatul@gmail.com*

*Corresponding Author

**Abstract**—Islamic education is a strategic place to teach the values of multicultural education. This qualitative descriptive writing with literature study will reveal the significance of the values of multicultural education in the Al-Quran and Al-Hadith. Some significant multicultural values with Al-Quran and Al-Hadith can be found as follows, among others: togetherness in Surah Al-Hujurat verse 13; gentleness in Surah Ali Imran verse 159; social unity in Surah Al-Anbiya verse 92, Surah Al-Baqarah verse 213, and Surah Al-Maidah verse 2; tolerance in Surah Al-Baqarah verse 256, Surah Al-Kafirun verse 6, and Surah Yunus verse 99; mutual respect in Surah Ash-Shura verse 15; be progressive in Surah Ar-Ra'du verse 11 and Surah Al-Maidah verse 104; brotherhood in Surah Al-Hujurat verse 10, Surah Ali Imran verse 195, and hadith narrated by Bukhari and Muslim; humanity in Surah Al-Baqarah verse 279 and Surah Al-Hujurat verse 11; democratic in Surah Ash-Shura verse 38 and Surah Ali Imran verse 159; good debate in Surah Al-Ankabut verse 46 and Surah An-Nahl verse 125; creativity in Surah Al-Baqarah verse 148; love of the homeland in Surah Hud verse 117; and justice in Surah An-Nisa verse 135.
**Keywords**— Islamic Education; Multicultural; Inclusive; Tolerant

*Corresponding Author:*

Dessy Farantika,
Pendidikan Islam Anak Usia Dini,
Universitas Nahdlatul Ulama Blitar,
Email: farantika.dessy@gmail.com

# I. INTRODUCTION

Islamic religious education associated with multicultural education can be a reference for developing the core values of Islamic religious teachings that are "rahmatan lil alamin" in the midst of a multicultural and diverse Indonesian society. The problem is whether Islamic religious education is following Islamic values and is following the situation and conditions in Indonesia, which is rich in the value of cultural diversity.

It appears that the main problem in Islamic religious education is the lack of socialization of multicultural values that can increase the multicultural competence of the community so that it can be inclusive and tolerant of other communities. Therefore, the author is interested in exploring multicultural values that have been widely spread in the Al-Quran and Al-Hadith.

Based on the description above, this research generally aims to reveal the significance of the values of multicultural education in the Al-Quran and Al-Hadith.

While specifically, this research has two objectives as follows. First, find the basic foundations or doctrines of multicultural Islamic education following the Al-Quran and Al-Hadith. Second, finding the values of multicultural Islamic religious education that can immediately be applied in society.

With the discovery of these two things, they will likely be able to be developed into the form of a curriculum in madrasas, schools, and universities in Indonesia. Thus, Islamic religious education based on the Al-Quran and Al-Hadith can be immediately conveyed to a multicultural society in all respects such as the Indonesian nation.

# II. RESEARCH METHOD

This qualitative research uses a library research approach in doing so. A literature study is a study to collect information and data from several things in the library, such as books, magazines, and others (Mardalis, 1999). While Nazir (1988) stated that literature study is a technique of collecting data by reviewing books, literature, notes, and various necessary notes.

This study uses several methods in its discussion, namely; deduction, induction, and comparison. The deduction method is a way of thinking that departs from general things to specific conclusions. The induction method is thinking that departs from specific facts or events to general conclusions. The comparative method is a method that can be used to find similarities and differences in something that is the object of research or discussion. (Hadi, 1989).

## III. RESULT AND DISCUSSION

To discuss multicultural education associated with the Al-Quran and Al-Hadith, of course, one must first know the definition of Islamic education. Because the values of multicultural education associated with the Al-Quran and Al-Hadith certainly cannot be separated from what is called Islamic education. Tafsir (1991) states that Islamic education is guidance for someone to develop optimally following Islamic teachings.

Meanwhile, Mahfud (2012) explains the definition of multicultural education by citing the opinion of Anderson and Crusher stating that multicultural education can be interpreted as education about cultural diversity. Citing the opinion of James Bank who defines multicultural education as "people of color" education. This means that multicultural education wants to explore differences as a necessity (sunatullah).

From the various understandings above, it can be concluded that multicultural Islamic education is education based on the foundations of Islam (Al-Quran and Al-Hadith) which wants to explore differences as a necessity (*sunatullah*), so that "*rahmatan lil alamin*" Islam will be realized in space. real (contextual), not in a vacuum (textual). The values of significant multicultural Islamic education with the Al-Quran and Al-Hadith as guidelines for Muslims are as follows, among others:

**First, the value of togetherness**

Islam teaches its people about the value of togetherness, getting to know each other (ta'aruf) in differences in ethnicity, nation, language, skin color, and type as well as recognizing equality, equal rights, and obligations between fellow human beings.

The Word of Allah SWT: "O mankind, indeed We created you from a male and a female and made you into nations and tribes so that you may know one another. Verily, the most honorable among you in the sight of Allah is the most pious among you" (Surah Al-Hujurat: 13).

**Second, the value of gentleness**

Islam teaches its people to be gentle with other people of different religions, different nations, different ethnicities, and others. And forgive them when they are guilty, ask forgiveness for them, and consult with them for the sake of upholding democratic life.

The Word of Allah SWT: "So because of Allah's mercy, you treat them gently. If you were strict, they would have distanced themselves from those around you. Therefore, forgive them, seek forgiveness for them, and consult with them in this matter." (Surah Ali Imran: 159).

**Third, the value of social unity**

Islam teaches its people that all humans are creatures who have social unity. The word of Allah SWT: "Indeed this ummah is your ummah, one ummah and I am your Lord, so worship me" (Surah Al-Anbiya: 92).

In another verse, it is stated: "Verily all mankind is one people" (Surah Al-Baqarah: 213). As beings who have social unity, they are expected to always cooperate socially, carry out humanitarian activities, help each other in goodness and piety, and not help each other in sins and transgressions.

It is explained in the word of Allah SWT: "And help you in doing good and piety, and do not help in sins and transgressions, and fear Allah all of you" (Surah Al-Maidah: 2).

**Fourth, tolerance value**

Islam teaches its people the value of tolerance (*tasamuh*) and freedom of thought, and there is no coercion to choose one religion.

The Word of Allah SWT: "There is no compulsion to enter religion. Verily, the right way is clearer than the wrong way." (Surah al-Baqarah: 256).

Likewise in the word of Allah SWT, it is stated: "To you is your religion, and to me is my religion" (Surah Al-Kafirun: 6).

In another verse: "Are you going to force people so that they all become believers?" (Surah Yunus: 99).

**Fifth, the value of mutual respect**

Islam teaches that human beings respect each other and work together between religious adherents and adherents of belief in God Almighty, so that true harmony and peace are fostered. Islam does not condone disputes, let alone quarrels between adherents of different religions.

The affirmation of the above is found in the word of Allah SWT: "Allah is our Lord and your Lord. For us, our deeds and for you, your deeds. There is no fight between us and you. Allah gathers between us and to Him (we) return" (Surah Ash-Shura: 15).

**Sixth, the value of being progressive**

Islam teaches us to move forward (progressive), as well as eradicate the freeze (static) and always develop an attitude of flexibility (dynamic).

Regarding the above, Allah SWT has said: "Verily Allah will not change a people until they change the situation that is in themselves" (Surah Ar-Ra'du: 11).

Regarding the eradication of static (static) attitudes, it is reflected in the word of Allah SWT which reads: "Has it been said to them, let's follow what Allah revealed to the Messenger. They said, suffice for us what we found our fathers taught him. Did they follow their forefathers, even though their forefathers knew nothing and were not guided?" (Surah Al-Maidah: 104).

**Seventh, the value of brotherhood**

Islam teaches its people about the brotherhood of members of the community who believe in all their diversity. Both the internal brotherhood of religious people and external religious communities.

About brotherhood is reflected in the word of Allah SWT: "Indeed the believers are brothers" (Surah Al-Hujurat: 10).

Another verse states: "... Some of you are descendants of some others..." (Surah Ali Imran: 195).

Likewise in the words of the Prophet Muhammad: "...Muslims are brothers of other Muslims" (Narrated by Bukhari Muslim).

Another hadith reads: "...Be you servants of Allah who are brothers" (Narrated by Bukhari Muslim).

**Eighth, human values**

Islam teaches its people about human values and does not allow them to persecute, arbitrarily, oppress and discriminate against humans, religion, ethnicity, nation, or other people.

The above is confirmed in the word of Allah SWT: "...You (not) may persecute, nor be persecuted" (Surah Al-Baqarah: 279).

Nor is it permissible to insult and look down on an unbeliever like us.

The above has been explained in His word: "O you who believe, let not one people insult another (because) it may be that they (the insulted) are better than them (who insults) and let not the women (insulting) other women (because) it may be that women (who are insulted) are better than women (who insult) "(Surah Al-Hujurat: 11).

**Ninth, democratic values**

Islam teaches its people about the attitude of prioritizing deliberation in making decisions for the common interest, nation, state, or other worldly affairs. Thus, there will be an open (inclusive) attitude that is part of the ideals of multicultural education in a pluralistic society.

The above is emphasized in the word of Allah SWT: "...And their affairs are (decided) by deliberation between them (before carrying out their will)" (Surah Ash-Shura: 38).

In another verse it is stated as follows: "... and consult about (worldly) matters" (Surah Ali Imran: 159).

By prioritizing deliberation, students will learn to be open (inclusive) in all forms of diversity.

**Tenth, good debate value**

Islam teaches its people, that if there is a religious issue with another religion, or the like, to argue in a good way (mujadalah bil ahsan). Islam does not extremely allow debate, cheating, or the like so that which can lead to the estrangement of diversity among others.

The above is reflected in the words of Allah SWT: "And do not argue with the people of the book except in the best way" (Surah Al-Ankabut: 46).

In another verse, it is stated: "... And debate them in the best way..." (Surah An-Nahl: 125).

**Eleventh, value creativity**

Islam teaches its people to compete in goodness (fastabiqul khairat), and develop creativity, both internally by religious people, and externally by religious people. Islam does not teach us to be extreme, if for example in the competition in the global era, they lose in terms of technology with other people. Awareness of being humble and always learning from both internal and external religious communities must be instilled, so that in this global era of competition, victory is natural.

The basis of this competition is stated in the word of Allah SWT: "For every ummah there is a Qibla (itself) which he faces to him. So you compete (in making) goodness. Wherever you are, Allah will surely gather you (on the Day of Resurrection). Verily, Allah has power over all things" (Surah Al-Baqarah: 148).

**Twelfth, the value of love for the homeland**

Islam teaches its people to always make improvements to their country (the noble values of a nation) as proof of love for their homeland and nation.

The improvement of the above can be done by promoting peace across religions, ethnicities, ethnicities, and cultures. Because the destruction of a country is the responsibility of the people of the country themselves in doing good in the country.

The word of Allah SWT: "And your Lord will never destroy the lands unjustly, while the people do good" (Surah Hud: 117).

**Thirteenth, the value of justice**

Islam teaches its people to be enforcers of justice. Upholding justice (truth) towards himself and others, from relatives to other people of different ethnicity, nation, religion, culture, and others indiscriminately.

The word of Allah SWT: "O you who believe, be you, enforcers of justice (truth)..." (Surat an-Nisa: 135).

The multicultural situation is a necessity that cannot be avoided by humans on this earth, not least for Muslims themselves. Diversity is a necessity (*sunnatullah*) that should be addressed wisely.

## IV. CONCLUSION

Based on the discussion above, several conclusions can be drawn as follows. First, there are many doctrines about multicultural Islamic religious education that come from the Al-Quran and Al-Hadith. However, this kind of thing sometimes escapes the attention of the public. Therefore, to implement the doctrines (teachings) of multicultural Islamic religious education, it is necessary to formulate experts, considering that planting the doctrine of multicultural Islamic education feels appropriate in Indonesian society, where the majority of the people are Muslim.

Second, the findings of the values of multicultural Islamic religious education based on the Al-Quran and Al-Hadith can be used in the development of Islamic religious education in schools, madrasas, and universities. Therefore, developing multicultural Islamic religious education is the task of experts. Thus, the task of the experts in the field is very urgent to create a society that can be open (inclusive) and tolerant in the current flow of globalization.

## REFERENCES

Hadi, Sutrisno. Metodologi Research Jilid 1. Yogyakarta: Andi Offset, 1989.

Mahfud, Choirul. Pendidikan Multikultural. Yogyakarta: Pustaka Pelajar, 2012.

Mardalis. Metode Penelitian Suatu Pendekatan Proposal. Jakarta: Bumi Aksara, 1999.

Nazir, Moh. Metodologi Penelitian. Jakarta: Ghalia Indonesia, 1988.

Pascasarjana UMM. Pedoman Penulisan Artikel Ilmiah, Tesis & Disertasi. Malang: PPS Universitas Muhammadiyah Malang, 2014.

Tim Penterjemah Al-Quran Departemen Agama Republik Indonesia. Al-Quran dan Terjemahan. Jakarta: Depag RI, 2014.

Tim Kemenag. Panduan Integrasi Nilai Multikultural dalam Pendidikan Islam. Jakarta: PT. Kirana Cakra Buana, 2012.

# Dirac Equation for Posch-Teller Potential in Radial Section Symmetry Spin Case using Asymptotic Iteration Method

**[1*]Yuniar Alam, [2]Yuanita Amalia Hariyanto**
*[1]Fisika, Universitas Nahdlatu Ulama Blitar*
*[2,]Farmasi, Universitas Sam Ratulangi*
*E-mail: [1]yuniaralam@unublitar.ac.id, [2]yuanita.amalia03@gmail.com*
*Corresponding Author

**Abstract**— This study aims to determine the value of the energy spectrum and wave function for the Posch-Teller potential in the case of radial spin symmetry. The solution to the Dirac equation using the asymptotic iteration method is done by reducing the second-order differential equation to a hypergeometric type differential equation by means of variable substitution to obtain a relativistic energy equation. The relativistic energy of the system is calculated using matlab software. This study is limited to the case of spin symmetry in the radial section.

**Keywords**—Dirac Equation; Potential Posch-Teller; Asymptotic Iteration Method

*Corresponding Author:*

Yuniar Alam,
Fisika,
Nahdlatul Ulama University Blitar,
Email: yuniaralam@unublitar.ac.id

## I. INTRODUCTION

In 1928 the British physicist Paul Dirac investigated the relativistic covariance wave equation known as the Dirac equation(Y. Alam, Suparmi, Cari, & Anwar, 2016)(Yuniar Alam, 2015). The Dirac equation describes the corresponding basis for the spin elemental particle ½ for an electron. The Dirac equation is consistent with both the principles of quantum mechanics and the special theory of relativity(Suparmi, 2012). Direct solution of the Dirac equation of a system of particles by determining the energy(Meyur, 2011)(Pramono, Suparmi, & Cari, 2016) and wave function(Suparmi, 2013)(Guzmán Adán, Orelma, & Sommen, 2019) of a particle affected by a potential(Y. Alam et al., 2016) whose potential energy is a function of position(S. M. Ikhdair, Hamzavi, & Rajabi, 2013). The solution to the Dirac(Chen, 2019) equation can be solved by reducing the Dirac equation to a Second Order Differential equation.

There are several types of potential in quantum(Alvarez-Castillo, 2008) to describe particle dynamics in quantum mechanics. Some examples of these potentials are the Coloumb, Morse, Rosen-Morse, Manning Rosen, Poschl-Teller group, Gendensthein group, Symmetrical Top, Eckart, Scraft and Kepler group in the hypersphere. This paper uses a different method from previous research. This paper presents the solution of the Dirac equation for the q-deformed Posch-Teller potential in the case of radial spin symmetry(Salvat & Fernández-Varea, 2019) using the asymptotic iteration method.

## II. RESEARCH METHOD

**Asymptotic Iteration Method**

The asymptotic iteration method(Husein, 2014) is the method used to obtain an exact solution of a second order linear homogeneous differential:

$$y_n''(x) - \lambda_o(x)y_n'(x) + s_o(x)y_n(x) = 0 \tag{1}$$

Where $\lambda_o \neq 0$ and $s_o$ the first derivative show the relationship with x, another parameter i.e. n is defined as a radial quantum number. To obtain a general solution to this equation, differentiating Equation (1), which depends on x, is obtained

$$y_n''' = \lambda_1(x) + s_1(x)y_n(x) \tag{2}$$

If defined

$$\lambda_k(x) = \lambda_{k-1}'(x) + s_{k-1}(x) + \lambda_{k-1}\lambda_o(x) \tag{3}$$

$$s_k(x) = s_{k-1}'(x) + s_o(x)\lambda_{k-1}(x) \tag{4}$$

$$k = 1,2,3,..... \tag{5}$$

$$\lambda_k(x)s_{k-1}(x) - \lambda_{k-1}(x)s_k(x) = 0 = \Delta_k,$$
$$k = 1,2,3,....$$

(6)

with and is a function of c∞ (coefficient of differential equation). The asymptotic iteration method(Pratiwi, Suparmi, Cari, & Husein, 2017) is applied directly to some problems if a wave function is known in advance and satisfies the boundary conditions of zero (0) and infinity point (∞). Equation (1) can be easily iterated until (*k+1*) and (*k+2*)(Andrade, Silva, Ferreira, & Rodrigues, 2014), *k=1,2,3,*. . . so that obtained

$$y_n^{k+1}(x) = \lambda_{k-1}'(x)y_n'(x) + s_{k-1}(x)y_n(x)$$

(7)

$$y_n^{k+2}(x) = \lambda_k'(x)y_n'(x) + s_k(x)y_n(x)$$

(8)

With

$$\lambda_k(x) = \lambda_{k-1}'(x) + s_{k-1}(x) + \lambda_o(x)\lambda_{k-1}(x)$$

(9)

$$s_k(x) = s_{k-1}'(x) + s_o(x)s_{k-1}(x)$$

(10)

From equation (2) obtained the relationship:

$$\frac{y_n^{(k+2)}(z)}{y_n^{(k+1)}(z)} = \frac{\lambda_k(z)\left[y_n' + \dfrac{s_k(z)}{\lambda_k(z)}f(z)\right]}{\lambda_{k-1}(z)\left[y_n' + \dfrac{s_{k-1}(z)}{\lambda_{k-1}(z)}f(z)\right]}$$

(11)

For *k* large enough, if

$$\frac{s_k(z)}{\lambda_k(z)} = \frac{s_{k-1}(z)}{\lambda_{k-1}(z)} = \alpha(z)$$

(12)

While the eigenfunctions for equation (1) can be solved using(Soylu, Bayrak, & Boztosun, 2008)

$$y_n(x) = C'e^{-\int \alpha_n(x)dx}$$

(13)

Another form of equation (1) is written as follows

$$y''(x) = 2\left(\frac{tx^{N+1}}{1-bx^{N+2}} - \frac{c+1}{x}\right)y'(x) - \frac{wx^n}{1-bx^{N+2}}$$

(14)

Equation (14) is an AIM type differential solution that will be used to determine the wave function equation of the Dirac equation. Equation (14) can be solved by using the equation:

$$y_n(x) = (-1)^n C'(N+2)^n (\sigma)_n {}_2F_1\left(-n, p+n, \sigma, bx^{N+2}\right)$$

(15)

With

$$(\sigma)_n = \frac{\Gamma(\sigma+n)}{\Gamma(\sigma)}$$

(16)

$$\sigma = \frac{2c+N+3}{N+2}$$

(17)

and

$$p = \frac{(2c+1)b + 2t}{(N+2)b} \tag{18}$$

Here $C'$ is the radial normalization constant and dan $_2F_1$ is a hypergeometric function.

## III. RESULT AND DISCUSSION

The relativistic Schrodinger equation is referred to as the Gordon Client equation for integer spins and the Dirac equation for spin . Quantitative description of the relativistic(S. M. Ikhdair & Hamzavi, 2012) particle motion which is affected by the field force which is represented as the potential energy of the spinning particle(Salvat & Fernández-Varea, 2019) is expressed in the form of a differential equation called the Dirac equation. The Dirac equation for vector potential V(r) and scalar S(r) is written as follows:

$$\{c\vec{\alpha}.\vec{p} + \beta(Mc^2 + s(r))\}\psi(r) = \{E - v(r)\}\psi(r) \tag{19}$$

With the relativistic mass M of the particle, E the total energy, and the linear momentum operator, the values of and are expressed in terms of the equation

$$\vec{\alpha} = \begin{pmatrix} 0 & \vec{\sigma} \\ \vec{\sigma} & 0 \end{pmatrix} \tag{20}$$

$$\beta = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \tag{21}$$

With $\vec{\alpha}$ Pauli $I$ matrix 2x2 identitas identity matrix

$$\sigma_1 = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \sigma_2 = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix},$$

$$\sigma_3 = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \tag{22}$$

The spin dirac can be written as follows:

$$\psi(r) = \begin{pmatrix} f_{nk}(r) \\ g_{nk}(r) \end{pmatrix} = \begin{pmatrix} \dfrac{F_{nk}(r)}{r} Y_{jm}^l(\theta, \varphi) \\ i\dfrac{G_{nk}(r)}{r} Y_{jm}^{\bar{l}}(\theta, \varphi) \end{pmatrix} \tag{23}$$

With $F_{nk}(r)$ is the dirac upper spin(Sari, Suparmi, & Cari, 2015) component and $G_{nk}(r)$ is the lower

Dirac pseudospin(S. Ikhdair & Sever, 2007) component. $Y_{jm}^{l}(\theta, \varphi)$ is the spherical harmonic

spin(Ding & Liu, 2015)(Potential, 1929), $l$ is the orbital quantum number and $l$ is the orbital

pseudospin quantum number, $m$ is the projection of the angular momentum(Taşkın, 2009)(S. M.

Ikhdair & Hamzavi, 2013) on the $z$-axis. By substituting equation (23) into equation (19), we get

$$\left(\frac{d}{dr} + \frac{k}{r}\right) F_{nk}(r) = \tag{24}$$
$$\left(E - V(\vec{r}) + Mc^2 + S(\vec{r})\right) G_{nk}(r)$$

$$\left(\frac{d}{dr} - \frac{k}{r}\right) G_{nk}(r) = \tag{25}$$
$$\left(E - V(\vec{r}) - Mc^2 - S(\vec{r})\right) F_{nk}(r)$$

After elimination $F_{nk}(r)$ and $G_{nk}(r)$ from equation (24) and equation (25), two differential

equations similar to the Schrodinger(Ikot, Awoga, & Antia, 2013)(S. M. Ikhdair & Sever, 2007)

equation for components $F_{nk}(r)$ and components $G_{nk}(r)$ are obtained.

$$\left(\frac{d^2}{dr^2} - \frac{k(k+1)}{r^2}\right) F_{nk}(r) + \left(E + Mc^2\right)$$
$$\left(\frac{d}{dr} + \frac{k}{r}\right) F_{nk}(r) = \tag{26}$$
$$\left[\left(E + Mc^2\right)\left(E - Mc^2\right)\right] F_{nk}(r)$$

$$\left(\frac{d^2}{dr^2} - \frac{k(k-1)}{r^2}\right) G_{nk}(r) + \left(Mc^2 + E\right)$$

$$\left(\frac{d}{dr} + \frac{k}{r}\right) G_{nk}(r) = \tag{27}$$
$$\left[\left(E - 2V(\vec{r}) - Mc^2\right)\left(E - Mc^2\right)\right] G_{kr}(r)$$

With $S(\vec{r}) = V(\vec{r})$ $\quad$ (28)

Dirac equation for the case of spin symmetry $c = \hbar = 1$ so that the equation becomes

$$\left[\frac{d^2}{dr^2} - \frac{k(k+1)}{r^2}(E + M)(E^2 - M^2)\right] F_{nk}(r) = 0 \tag{29}$$

If $S(\vec{r}) = V(\vec{r})$ is the q-deformed Poschl-Teller potential(Deta & Suparmi, 2015), which is defined as

$$V_{PT}(r) = \alpha^2 \left( \frac{v_o}{\sinh_q^2 \alpha r} + \frac{v_1}{\cosh_q^2 \alpha r} \right) \tag{30}$$

$$\left( \frac{d^2}{dr^2} - [E+M]\alpha^2 \left( \frac{v_o}{\sinh_q^2 \alpha r} + \frac{v_1}{\cosh_q^2 \alpha r} \right) + [E^2 - M^2] - l(l+1) \right) \frac{F_{nk}(r)}{r^2} = 0 \tag{31}$$

By substituting the variables $\cosh_q^2 \alpha r = z$ in equation (31) and also for example $\frac{1}{r^2} \cong \frac{\alpha^2}{\sinh_q^2 \alpha r}$ ,

then we get the form of

$$z(q-z)\frac{d^2 F_{nk}(r)}{dr^2} + \frac{1}{2}(q-2z)\frac{dF_{nk}(r)}{dr} -$$

$$\left\{ [E+M]\left( \frac{v_o}{4(q-z)} + \frac{v_1}{4z} \right) - \frac{[E^2 - M^2]}{4\alpha^2} + \frac{l(l+1)}{4(q-z)} \right\} F_{nk}(r) = 0 \tag{32}$$

Furthermore, equation (32) is reduced to an equation of the hypergeometric type through the example of a wave function.

$$F_{nk}(z) = z^\delta (q-z)^\gamma f \tag{33}$$

After manipulating equations (32) and (33), we get

$$f'' = \left( \frac{(2\delta + 2\gamma + 1)z - \left(2\delta + \frac{1}{2}\right)q}{z(q-z)} \right) f' + \left( \frac{\frac{[E^2 - M^2]}{4\alpha^2} + (\delta + \gamma)^2}{z(q-z)} \right) f \tag{34}$$

Equation (34) is a second order equation. By comparing equation (34) with equation (1), we can write $\lambda_o$ and $s_o$, then we can calculate $\lambda_k$ and $s_k$ .

$$\lambda_o = \frac{\left((2\delta + 2\gamma + 1)z - \left(2\delta + \frac{1}{2}\right)q\right)}{z(q-z)}$$

$$s_0 = \frac{\left((\delta + \gamma)^2 + \frac{[E^2 - M^2]}{4\alpha^2}\right)}{z(q-z)}$$

$$\lambda_1 = \left[ \frac{\left(2\delta + \frac{1}{2}\right)}{z^2} + \frac{\left(2\gamma + \frac{1}{2}\right)}{(q-z)^2} \right] + \left[ -\frac{\left(2\delta + \frac{1}{2}\right)}{z} + \frac{\left(2\gamma + \frac{1}{2}\right)}{(q-z)} \right]^2 + \left[ \frac{C}{z} + \frac{C}{(q-z)} \right]$$

$$s_1 = \left[ \frac{C}{z^2} + \frac{C}{(q-z)^2} \right] + \left[ \frac{C}{z} + \frac{C}{(q-z)} \right] \left[ -\frac{\left(2\delta + \frac{1}{2}\right)}{z} + \frac{\left(2\gamma + \frac{1}{2}\right)}{(q-z)} \right]$$

By combining the above results with equation (6), we get

$$\Delta_o = s_o\lambda_1 - s_1\lambda_o = 0 \rightarrow \varepsilon_o = (\delta + \gamma)^2$$
$$\Delta_1 = s_1\lambda_2 - s_2\lambda_1 = 0 \rightarrow \varepsilon_1 = (\delta + \gamma + 1)^2 \tag{35}$$
$$\Delta_2 = s_2\lambda_3 - s_3\lambda_2 = 0 \rightarrow \varepsilon_2 = (\delta + \gamma + 2)^2$$

And so on, with $\varepsilon_r = (M^2 - E^2)\dfrac{1}{4\alpha^2}$ From equation (35), it can be regenerated to

$$\varepsilon = (\delta + \gamma + n_r)^2 \tag{36}$$

With $n_r$ is a radial quantum number, so the eigen energies are

$$\varepsilon = \left(\frac{1}{2}q\sqrt{[E+M]v_1 + \frac{1}{4}q} \pm \frac{1}{2}q\sqrt{[E+M]v_o + l(l+1) + \frac{1}{4}q} + n_r + \frac{1}{2}q^2\right)^2 \tag{37}$$

$$\tag{38}$$

$$(M^2 - E^2)\frac{1}{4\alpha^2} = \left(\frac{1}{2}q\sqrt{[E+M]v_1 + \frac{1}{4}q} \pm \frac{1}{2}q\sqrt{[E+M]v_o + l(l+1) + \frac{1}{4}q} + n_r + \frac{1}{2}q^2\right)^2$$

As for the function $f$   $f = (-1)^n C'(1)^{n_r}\left(2\delta + \frac{1}{2}\right)_{nr} {}_2F_1\left(-n_r, 2\delta + 2\gamma + n_r, 2\delta + \frac{1}{2}, q\right)$ $\tag{39}$

So that the total radial function can be written $F = Z^\delta(q-z)^\gamma(-1)^n C'(1)^{n_r}\left(2\delta + \frac{1}{2}\right)_{nr} {}_2F_1\left(-n_r, 2\delta + 2\gamma + n_r, 2\delta + \frac{1}{2}, q\right)$

$$\tag{40}$$

The energy results obtained for the case of spin symmetry can be seen in Table 1.

Table 1. Poschl-Teller potential energy spectrum for the symmetrical spin case with
$M = 5; v_1 = 1; v_2 = 0,75; \alpha = 0,2.$

| Untuk k=l | | | $E_{nk}$ |
|---|---|---|---|
| l | n | k | |
| 0 | 0 | 0 | 4.66350 |
| 1 | 0 | 1 | 4.61978 |
| 2 | 0 | 2 | 4.53329 |
| 3 | 0 | 3 | 4.40430 |
| 4 | 0 | 4 | 4.23110 |
| 0 | 1 | 0 | 4.50477 |
| 1 | 1 | 1 | 4.44916 |
| 2 | 1 | 2 | 4.34050 |
| 3 | 1 | 3 | 4.18046 |
| 4 | 1 | 4 | 3.96748 |
| 0 | 2 | 0 | 4.30662 |
| 1 | 2 | 1 | 4.23756 |
| 2 | 2 | 2 | 4.10344 |
| 3 | 2 | 3 | 3.90697 |
| 4 | 2 | 4 | 3.64569 |
| 0 | 3 | 0 | 4.06434 |
| 1 | 3 | 1 | 3.97946 |
| 2 | 3 | 2 | 3.81493 |
| 3 | 3 | 3 | 3.57365 |
| 4 | 3 | 4 | 3.25007 |

The energy in table 1 can be graphed as shown in Figure 1.
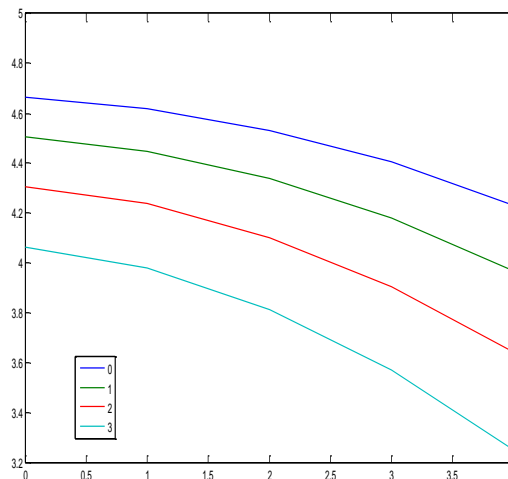


Figure 1. The results of the energy spectrum calculation for the symmetry case at a certain nr.

## IV. CONCLUSION

The solution of the Dirac equation for the q-deformed Posch-Teller potential in the case of spin symmetry in the radial section is done by reducing the second-order differential equation into a differential equation of hypergeometric type through variable substitution and the appropriate wave function. By comparing the second-order differential equation and the hypergeometric type with the second-order linear homogeneous differential equation for the asymptotic iteration method, the relativistic energy equation and weight function are obtained. The relativistic wave function is obtained from the weight function and expressed in the form of asymptotic iterations. The relativistic energy spectrum of the system was calculated using the Matlap software.

## REFERENCES

Alam, Y., Suparmi, Cari, & Anwar, F. (2016). Analysis of D Dimensional Dirac equation for q-deformed Posch-Teller combined with q-deformed trigonometric Manning Rosen Non-Central potential using Asymptotic Iteration Method (AIM). Journal of Physics: Conference Series, 776(1). https://doi.org/10.1088/1742-6596/776/1/012082

Alam, Yuniar. (2015). Solusi Persamaan Dirac Bagian Radial Pada Kasus Pseudospin Simetri Untuk Potensial Posch-Teller Hiperbolik Terdeformasi-Q Menggunakan Metode Iterasi Asimtotik. Prosiding Seminar Nasional Pendidikan Sains, (5), 2015–2601.

Alvarez-Castillo, D. E. (2008). Exactly Solvable Potentials and Romanovski Polynomials in Quantum Mechanics. (March).

Andrade, F. M., Silva, E. O., Ferreira, M. M., & Rodrigues, E. C. (2014). On the κ-Dirac oscillator revisited. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics, 731, 327–330. https://doi.org/10.1016/j.physletb.2014.02.054

Chen, Y. (2019). The Dirac operator on locally reducible Riemannian manifolds. Journal of Geometry and Physics, 139(11301202), 17–24. https://doi.org/10.1016/j.geomphys.2019.01.004

Deta, U. A., & Suparmi. (2015). The properties of Q-deformed hyperbolic and trigonometric functions in quantum deformation. AIP Conference Proceedings, 1677. https://doi.org/10.1063/1.4930629

Ding, S., & Liu, B. (2015). Dirac-harmonic equations for differential forms. Nonlinear Analysis, Theory, Methods and Applications, 122, 43–57. https://doi.org/10.1016/j.na.2015.03.021

Guzmán Adán, A., Orelma, H., & Sommen, F. (2019). Hypermonogenic solutions and plane waves of the Dirac operator in Rp×Rq. Applied Mathematics and Computation, 346, 1–14. https://doi.org/10.1016/j.amc.2018.09.058

Husein, A. S. (2014). Review Asymtotic Iteration Method : Pendekatan yang Powerful untuk Analisis Perambatan Gelombang Elektromagnetik dalam Lapisan Dielektrik Tak Homogen. 1–30.

Ikhdair, S. M., & Hamzavi, M. (2012). Relativistic New Yukawa-Like Potential and Tensor Coupling. Few-Body Systems, 53(3–4), 487–498. https://doi.org/10.1007/s00601-012-0475-2

Ikhdair, S. M., & Hamzavi, M. (2013). Approximate relativistic solutions for a new ring-shaped Hulthén potential. Zeitschrift Fur Naturforschung - Section C Journal of Biosciences, 68 A(3–4), 279–290. https://doi.org/10.5560/ZNA.2012-0109

Ikhdair, S. M., Hamzavi, M., & Rajabi, A. A. (2013). Relativistic bound states in the presence of spherically ring-shaped q-deformed woods-saxon potential with arbitrary l-states. International Journal of Modern Physics E, 22(3), 1–16. https://doi.org/10.1142/S0218301313500158

Ikhdair, S. M., & Sever, R. (2007). Exact solutions of the radial Schrödinger equation for some physical potentials. Central European Journal of Physics, 5(4), 516–527. https://doi.org/10.2478/s11534-007-0022-9

Ikhdair, S., & Sever, R. (2007). Exact polynomial eigensolutions of the Schrödinger equation for the pseudoharmonic potential. Journal of Molecular Structure: THEOCHEM, 806(1–3), 155–158. https://doi.org/10.1016/j.theochem.2006.11.019

Ikot, A. N., Awoga, O. A., & Antia, A. D. (2013). Bound state solutions of d-dimensional Schrödinger equation with Eckart potential plus modified deformed Hylleraas potential.

Chinese Physics B, 22(2). https://doi.org/10.1088/1674-1056/22/2/020304

Meyur, S. (2011). Bound State Energy Level for Three Solvable Potentials. 38, 347–356.

Potential, M. (1929). Wavefunctions of the Morse Potential. 1–6.

Pramono, S., Suparmi, A., & Cari, C. (2016). Relativistic Energy Analysis of Five-Dimensional q -Deformed Radial Rosen-Morse Potential Combined with q -Deformed Trigonometric Scarf Noncentral Potential Using Asymptotic Iteration Method. Advances in High Energy Physics, 2016. https://doi.org/10.1155/2016/7910341

Pratiwi, B. N., Suparmi, A., Cari, C., & Husein, A. S. (2017). Asymptotic iteration method for the modified poschl-teller potential and trigonometric Scarf II non-central potential in the Dirac equation spin symmetry. Pramana - Journal of Physics, 88(2). https://doi.org/10.1007/s12043-016-1326-3

Salvat, F., & Fernández-Varea, J. M. (2019). RADIAL: A Fortran subroutine package for the solution of the radial Schrödinger and Dirac wave equations. Computer Physics Communications, 240, 165–177. https://doi.org/10.1016/j.cpc.2019.02.011

Sari, R. A., Suparmi, A., & Cari, C. (2015). Analisis Persamaan Dirac untuk Potensial Eckart pada Kasus Spin Simetri Bagian Radial menggunakan Metode Iterasi Asimtotik. (April), 150–153.

Soylu, A., Bayrak, O., & Boztosun, I. (2008). Exact solutions of Klein-Gordon equation with scalar and vector Rosen-Morse-type potentials. Chinese Physics Letters, 25(8), 2754–2757. https://doi.org/10.1088/0256-307X/25/8/006

Suparmi, A. (2012). Approximate Solution of Schrodinger Equation for Modified Poschl-Teller plus Trigonometric Rosen-Morse Non-Central Potentials in Terms of Finite Romanovski Polynomials. IOSR Journal of Applied Physics, 2(2), 43–51. https://doi.org/10.9790/4861-0224351

Suparmi, A. (2013). Energy Spectra and Wave Function Analysis of q-Deformed Modified Poschl-Teller and Hyperbolic Scarf II Potentials Using NU Method and a Mapping Method. Advances in Physics Theories and Applications, 16(2005), 64–75. https://doi.org/10.7176/apta-16-8

Taşkın, F. (2009). Approximate solutions of the Schrödinger equation for the Rosen-Morse potential including centrifugal term. International Journal of Theoretical Physics, 48(9), 2692–2697. https://doi.org/10.1007/s10773-009-0059-1

# Tcomparison Of Profit Optimization Using Linear Programmming and Cutting Plane Methods (Case Study : Home Industry Potatora Bakery)

**1*Vebhista Intan Tutuarima, 2 Risang Narendra, 3 Rachmadania Akbarita**
*1,2,3Universitas Nahdlatul Ulama*
*E-mail: 1intantutuarima18@gmail.com, 2ridang@gmail.com, 3akbarita@gmail.com*
*Corresponding Author

**Abstract**—This study aims to compare the profit optimization of bread production in Home Industry Potatora Bakery by forming a linear program whose function is to maximize the profit of bread production and the constraint function in the form of raw material for bread products in 45 gram packaging and bread production time. The data used is data on bread production at Home Industry Potatora Bakery in 2022. The methods used in this study are Linear Programming and Cutting Plane methods. The results of the optimization calculation using the linear programming method, namely the maximum profit in a day is Rp. 557,188.5 in the production of 2 types of bread, which include 337 packs of Boi Chocolate Bread and 143.75 Streussel Strawberry Bread. As for the results of optimization calculations using the cutting method, namely the maximum profit of Rp. 557,870 in the production of 2 types of bread, which includes 338 packs of Boi Chocolate Bread and 144 Streussel Strawberry Breads. Based on the calculation results, it can be said that the benefits obtained by using the plane cutting method are more leverage than the linear programming method.

**Keywords**—Linear Programming; Optimization;Profit;Production; Linear Programming Method; Cutting Plane Method

***Corresponding Author:***

Vebhista Intan Tutuarima,
Universitas Nahdlatul Ulama Blitar,
Email: intantutuarima18@gmail.com

# I. INTRODUCTION

The bread industry is part of the ready-to-eat food industry by utilizing wheat flour as the main ingredient in its production process. In Indonesia, there are many small bakery industries that are still growing despite the economic crisis. Small bread industry is around 60%, large industry is around 20% and the rest is medium industry. Seeing the rapid development of the bread industry, product innovation is needed as a business improvement [1]. One of them is making bread products with various variations. Currently, in Blitar City, there are many home bakery industries. One of them Home Industry Potatora Bakery.

Potatora Bakery is one of the businesses engaged in the food industry in making bread. This company was founded in 2016 with its address at Jalan Beliton Barat No.36 B Karangtengah, Blitar City. The Potatora Bakery company produces various types of bread, namely Boi Chocolate Bread, Cheese Butter Bread, Chocolate Banana Bread, Chocolate Peanut Bread, Strawberry Streusel Bread, Blueberry Streusel Bread, Shredded Bread, and Flower Bread. Based on the results of observations, it was found that the number of requests for bread production was uncertain every day and for the purchase of raw materials, it was still using the forecast method. Therefore potatora bakery requires planning the optimal amount of production to get maximum profit by determining the number of products that will be produced every day. So that it can meet the number of requests by considering the production costs incurred. In mathematics this problem is known as optimization.

Optimization is the achievement of the best state or condition, meaning the achievement of problem solutions aimed at the maximum and minimum limits. Optimization problems include minimizing production costs or maximizing profits so as to get optimal results [2] (Karo, 2018). In overcoming the problem of determining the amount of production, it is necessary to optimize using linear programming and cutting planes.

Linear programming is a mathematical method in the form of linear to determine an optimal solution by maximizing or minimizing the objective function against a constraint [3] (Siswanto, 2018). Cutting plane is a method used to solve linear programming cases in the form of non-integer numbers with the addition of new constraints (gomory). The addition of new constraints is done if the value of the decision variable is not unanimous [4](Nico, 2017).

Research using linear programming and cutting plane methods refers to previous studies. in optimizing the production of the furniture angga business [5]. The results of the research show that the maximum profit can be determined using the linear programming method [5]. Secondly,

by Fatimah et al (2021) in optimizing tofu production using the cutting plane method, it shows that the maximum profit can be determined by the cutting plane method [6].

Based on previous research, the variables used were at most 6 variables, so in this study the researchers developed by adding 2 variables to 8 variables and using different subjects and had never been studied before, namely Home Industry Potatora Bakery.

## II. RESEARCH METHOD

The data used in this optimization is bread production data in 2022 at Home Industry Potatora Bakery. The data in this optimization is primary data. Primary data is data that comes from the original or first source. This data is not available in compiled form or in file form. This data must be sought through sources, namely people who are used as objects of research or as a means of obtaining data (Wardiyanta, 2017) [8]. The data obtained was then validated by the owner of Home Industry Potatora Bakery. This optimization uses numbers (numbers), from the beginning of data collection, data analysis, to the optimization results obtained, so the research approach in optimization is called the quantitative research approach. The research method in completing this optimization is the Linear Programming and Cutting Plane method.

The following are the stages of linear programming and cutting plane methods in solving optimization problems:

1. Forming decision variables, namely variables related to decisions used in optimization problems.

2. Forming the objective function, namely the function on the decision variable that is maximized or minimized

3. Establish limiting function/constraint, which is a function of the barrier/constraint faced by the company, so that the value (coefficient) of the decision variable cannot be determined arbitrarily.

4. Forming a mathematical model of a linear program, namely the mathematical method used in allocating resources (needs) that have limits/constraints in achieving the goal, namely maximizing profits or minimizing costs.

5. Solve optimization problems using the linear programming method with the following steps:
   a. The objective and constraint functions    that have been converted into standard form are arranged in the initial simplex table.
   b. Specifying the entering variable or key column.
   c. Specifies the leaving variable or key row.

    d. Change the values of the leaving variable or row key.

    e. Performs elementary row operations.

    f. Perform steps b to step e so that the optimum value is obtained in the row.

6. Solve optimization problems using the cutting plane method with the following steps:

    a. Solve integer programming problems using the simplex method.

    b. Check the optimum solution. If all the base variables have integer values, the integer optimum solution has been obtained and the solution process has ended. If one or more of the base variables have a fractional value, then go to step

    c. If the completion of step 1 contains a decision variable that has a fractional value then do the following steps.

7. Taking conclusions obtained from the results of research problems.

## III. RESULT AND DISCUSSION

### A. Linear Program Mathematical Model

#### a) Shaping Decision Variables

    The decision variables in this optimization are 8 types of bread produced at Home Industry Potatora Bakery in 2022, namely Boi Chocolate Bread ($x_1$), Cheese Butter Bread ($x_2$), Chocolate Banana Bread ($x_3$), Chocolate Peanut Bread ($x_4$), Bread Strawberry Streusel ($x_5$), Blueberry Streusel Bread ($x_6$), Shredded Bread ($x_7$), and Flower Bread ($x_8$).

#### b) Establishing the Objective Function

    The objective function in this optimization is the profit of bread production in 45 gram packages, these advantages can be presented in table 1 below:

Table 1. Advantages of Bread Production in 45 Gram Packages

| Jenis Produk Roti | Rata-Rata Harga Jual Produk (Rp) | Rata-Rata Biaya Produksi (Rp) | Keuntungan Produksi Roti (Rp) |
|---|---|---|---|
| Boi Coklat | 3.000 | 1.775 | 1.225 |
| Butter Keju | 3.000 | 1.900 | 1.100 |
| Pisang Coklat | 3.000 | 2.000 | 1.000 |
| Coklat Kacang | 3.000 | 1.850 | 1.150 |
| Streusel Strawberry | 3.000 | 2.000 | 1.000 |
| Streusel Blueberry | 3.000 | 2.000 | 1.000 |
| Abon | 3.000 | 1.850 | 1.150 |
| Bunga | 3.000 | 1.800 | 1.200 |

So, based on table 1, there are advantages of bread production of 8 types of bread that can be formed by the objective function in equation (3) below:

$$f(x) = 1.225x_1 + 1.100x_2 + 1.000x_3 + 1.150x_4 + 1.000x_5 + 1.150x_6 + 1.000x_7 + 1.200x_8 \qquad (3)$$

c) **Establishing a Constraint Function**

The limiting function or constraint in this optimization is the raw material for each type of bread product in 45 gram packages and the production time of bread per package, these constraints can be presented in table 2 and table 3, as follows:

Table 2. Raw materials for each type of bakery product in 45 gram packages

| Bahan Baku | Jenis Produk Roti (Gram) | | | | | | | | Persediaan Bahan (Gram) |
| | Boi | Butter Keju | Pisang Coklat | Coklat Kacang | Streussel Strawberry | Streussel Blueberry | Abon | Bunga | |
|---|---|---|---|---|---|---|---|---|---|
| Tepung | 6 | 5 | 5 | 3 | 4 | 3 | 3 | 7 | 18000 |
| Gula | 1,8 | 1,7 | 1,7 | 1,7 | 1,6 | 1,6 | 1,8 | 1,9 | 14500 |
| Telur | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 6 | 12500 |
| Susu Bubuk | 2 | 3 | 2 | 2 | 4 | 4 | 2 | 4 | 1250 |
| Mentega | 4,5 | 6 | 5 | 5 | 4,5 | 4,5 | 5 | 6 | 5000 |
| Pengembang | 0,5 | 0,5 | 0,25 | 0,5 | 0,7 | 0,7 | 0,25 | 0,25 | 525 |
| Pelembut | 1,5 | 2 | 2 | 1,5 | 1 | 1 | 2,5 | 2 | 650 |
| Toping | 4 | 5 | 3 | 5 | 3 | 3 | 4 | 2 | 3700 |

Table 3. Bread Production Time

| Jenis Produk | Waktu (Menit) |
|---|---|
| Roti Boi | 1,23 |
| Butter Keju | 1,25 |
| Pisang Coklat | 1,25 |
| Coklat Kacang | 1,32 |
| Streussel Strawberry | 1,25 |
| Streussel Blueberry | 1,25 |
| Abon | 1,35 |
| Bunga | 1,23 |

Based on table 2 and table 3, there are 9 constraints in bread production, so that the constraint function can be formed in equation 4 below:

$$6x_1 + 5x_2 + 5x_3 + 3x_4 + 4x_5 + 3x_6 + 3x_7 + 7x_8 \leq 18000$$

$$1{,}8x_1 + 1{,}7x_2 + 1{,}7x_3 + 1{,}7x_4 + 1{,}6x_5 + 1{,}6x_6 + 1{,}8x_7 + 1{,}9x_8 \leq 14500$$

$$4x_1 + 5x_2 + 5x_3 + 5x_4 + 4x_5 + 4x_6 + 5x_7 + 6x_8 \leq 12500$$

$$2x_1 + 3x_2 + 2x_3 + 2x_4 + 4x_5 + 4x_6 + 2x_7 + 4x_8 \leq 1250$$

$$4{,}5x_1 + 6x_2 + 5x_3 + 5x_4 + 4{,}5x_5 + 4{,}5x_6 + 5x_7 + 6x_8 \leq 5000 \qquad (4)$$

$$0{,}5x_1 + 0{,}5x_2 + 0{,}25x_3 + 0{,}5x_4 + 0{,}7x_5 + 0{,}7x_6 + 0{,}25x_7 + 0{,}25x_8 \leq 525$$

$$1{,}5x_1 + 2x_2 + 2x_3 + 1{,}5x_4 + 1x_5 + 1x_6 + 2{,}5x_7 + 2x_8 \leq 650$$

$$4x_1 + 5x_2 + 3x_3 + 5x_4 + 3x_5 + 3x_6 + 4x_7 + 2x_8 \leq 3700$$

$$1{,}23x_1 + 1{,}25x_2 + 1{,}25x_3 + 1{,}32x_4 + 1{,}25x_5 + 1{,}25x_6 + 1{,}35x_7 + 1{,}23x_8 \leq 675$$

d) **Forming a Linear Program**

Based on equations (3) and (4), a linear program can be formed, so that the following equation (5) is obtained:

$$Maks\ z = f(x){=}1.225x_1 + 1.100x_2 + 1.000x_3 + 1.150x_4 + 1.000x_5 + 1.000x_6 + 1.150x_7 + 1.200x_8$$

$$kendala\ (g_i(x)) : g_1 = 6x_1 + 5x_2 + 5x_3 + 3x_4 + 4x_5 + 3x_6 + 3x_7 + 7x_8 \le 18000$$

$$g_2 = 1{,}8x_1 + 1{,}7x_2 + 1{,}7x_3 + 1{,}7x_4 + 1{,}6x_5 + 1{,}6x_6 + 1{,}8x_7 + 1{,}9x_8 \le 14500$$

$$g_3 = 4x_1 + 5x_2 + 5x_3 + 5x_4 + 4x_5 + 4x_6 + 5x_7 + 6x_8 \le 12500$$

$$g_4 = 2x_1 + 3x_2 + 2x_3 + 2x_4 + 4x_5 + 4x_6 + 2x_7 + 4x_8 \le 1250$$

$$g_5 = 4{,}5x_1 + 6x_2 + 5x_3 + 5x_4 + 4{,}5x_5 + 4{,}5x_6 + 5x_7 + 6x_8 \le 5000$$

$$g_6 = 0{,}5x_1 + 0{,}5x_2 + 0{,}25x_3 + 0{,}5x_4 + 0{,}7x_5 + 0{,}7x_6 + 0{,}25x_7 + 0{,}25x_8 \le 525$$

$$g_7 = 1{,}5x_1 + 2x_2 + 2x_3 + 1{,}5x_4 + 1x_5 + 1x_6 + 2{,}5x_7 + 2x_8 \le 650 \tag{5}$$

$$g_8 = 4x_1 + 5x_2 + 3x_3 + 5x_4 + 3x_5 + 3x_6 + 4x_7 + 2x_8 \le 3700$$

$$g_9 = 1{,}23x_1 + 1{,}25x_2 + 1{,}25x_3 + 1{,}32x_4 + 1{,}25x_5 + 1{,}25x_6 + 1{,}35x_7 + 1{,}23x_8 \le 675$$

$$x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9 \ge 0$$

## B. Completing the Optimization of Bread Production Profits Using the Linear Programming Method

### a) Converting Inequality Constraints in Linear Programs to Equation Constraints
Change the inequality in equation (5) into equation constraint by adding the slack variable so that it becomes equation (6) below:

$$Z = 1.250x_1 + 1.250x_2 + 1.000x_3 + 1.000x_4 + 1.100x_5 + 1.100x_6 + 1.200x_7 + 1.500x_8 + 0S_1$$
$$+ 0S_2 + 0S_3 + 0S_4 + 0S_5 + 0S_6 + 0S_7 + 0S_8 + 0S_9$$

$$6x_1 + 5x_2 + 5x_3 + 3x_4 + 4x_5 + 3x_6 + 3x_7 + 7x_8 + S_1 = 18000$$

$$1{,}8x_1 + 1{,}7x_2 + 1{,}7x_3 + 1{,}7x_4 + 1{,}6x_5 + 1{,}6x_6 + 1{,}8x_7 + 1{,}9x_8 + S_2 = 14500$$

$$4x_1 + 5x_2 + 5x_3 + 5x_4 + 4x_5 + 4x_6 + 5x_7 + 6x_8 + S_3 = 12500$$

$$2x_1 + 3x_2 + 2x_3 + 2x_4 + 4x_5 + 4x_6 + 2x_7 + 4x_8 + S_4 = 1250$$

$$4{,}5x_1 + 6x_2 + 5x_3 + 5x_4 + 4{,}5x_5 + 4{,}5x_6 + 5x_7 + 6x_8 + S_5 = 5000 \tag{6}$$

$$0{,}5x_1 + 0{,}5x_2 + 0{,}25x_3 + 0{,}5x_4 + 0{,}7x_5 + 0{,}7x_6 + 0{,}25x_7 + 0{,}25x_8 + S_6 = 525$$

$$1{,}5x_1 + 2x_2 + 2x_3 + 1{,}5x_4 + 1x_5 + 1x_6 + 2{,}5x_7 + 2x_8 + S_7 = 650$$

$$4x_1 + 5x_2 + 3x_3 + 5x_4 + 3x_5 + 3x_6 + 4x_7 + 2x_8 + S_8 = 3700$$

$$1{,}23x_1 + 1{,}25x_2 + 1{,}25x_3 + 1{,}32x_4 + 1{,}25x_5 + 1{,}25x_6 + 1{,}35x_7 + 1{,}23x_8 + S_9 = 675$$

$$x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, S_1, S_2, S_3, S_4, S_5, S_6, S_7, S_8, S_9 \ge 0$$

### b) Inserting Objective Functions and Constraint Functions into the Simplex Table
Based on equation (6), it can be entered into the following table 4 simplex:

Table 4. Initial Simplex

| CJ | CJ | 1225 | 1100 | 1000 | 1150 | 1000 | 1000 | 1150 | 1200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VB | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | NK |
| 0 | S1 | 6 | 5 | 5 | 3 | 4 | 3 | 3 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18000 |
| 0 | S2 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.8 | 1.9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14500 |
| 0 | S3 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12500 |
| 0 | S4 | 2 | 3 | 2 | 2 | 4 | 4 | 2 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1250 |
| 0 | S5 | 4.5 | 6 | 5 | 5 | 4.5 | 4.5 | 5 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5000 |
| 0 | S6 | 0.5 | 0.5 | 0.25 | 0.5 | 0.7 | 0.7 | 0.25 | 0.25 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 |
| 0 | S7 | 1.5 | 2 | 2 | 1.5 | 1 | 1 | 2.5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 650 |
| 0 | S8 | 4 | 5 | 3 | 5 | 3 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3700 |
| 0 | S9 | 1.23 | 1.25 | 1.25 | 1.32 | 1.25 | 1.25 | 1.35 | 1.23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 675 |

### c) Performing Elementary Row Operations
Based on table 4, iteration calculations are carried out so as to get the optimal solution results in the third iteration, presented in table 5 below:

Table 5. Optimal Solution of Simplex Method

| CJ | CJ | 1225 | 1100 | 1000 | 1150 | 1000 | 1000 | 1150 | 1200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VB | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | NK |
| ITERASI 3 | | | | | | | | | | | | | | | | | | | |
| 0 | S1 | 0 | -3 | -3 | -3 | 0 | -1 | -7 | -1 | 1 | 0 | 0 | 0 | 0 | 0 | -4 | 0 | 0 | 15400 |
| 0 | S2 | 0 | -0.75 | -0.6 | -0.1 | 0 | 0 | -1 | -0.7 | 0 | 1 | 0 | -0.15 | 0 | 0 | -1 | 0 | 0 | 13662.5 |
| 0 | S3 | 0 | -0.5 | 0 | 1 | 0 | 0 | -1 | 0 | 0 | 0 | 1 | -0.5 | 0 | 0 | -2 | 0 | 0 | 10575 |
| 1000 | X5 | 0 | 0.125 | -0.25 | 0 | 1 | 1 | -0.5 | 0.5 | 0 | 0 | 0 | 0.375 | 0 | 0 | -0.5 | 0 | 0 | 143.75 |
| 0 | S5 | 0 | -0.1875 | -0.625 | 0.5 | 0 | 0 | -1.75 | -0.75 | 0 | 0 | 0 | -0.5625 | 1 | 0 | -2.25 | 0 | 0 | 2834.375 |
| 0 | S6 | 0 | -0.2125 | -0.325 | 0 | 0 | 0 | -0.4 | -0.6 | 0 | 0 | 0 | -0.1375 | 0 | 1 | -0.15 | 0 | 0 | 255.625 |
| 1225 | X1 | 1 | 1.25 | 1.5 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | -0.25 | 0 | 0 | 1 | 0 | 0 | 337 |
| 0 | S8 | 0 | -0.375 | -2.25 | 1 | 0 | 0 | -2.5 | -3.5 | 0 | 0 | 0 | -0.125 | 0 | 0 | -2.5 | 1 | 0 | 1918.75 |
| 0 | S9 | 0 | -0.44375 | -0.2825 | 0.09 | 0 | 0 | -0.485 | -0.625 | 0 | 0 | 0 | -0.16125 | 0 | 0 | -0.605 | 0 | 1 | 80.1875 |
| | ZJ | 1225 | 1656.25 | 1587.5 | 1225 | 1000 | 1000 | 1950 | 1725 | 0 | 0 | 0 | 68.75 | 0 | 0 | 725 | 0 | 0 | 557187.5 |
| | CJ-ZJ | 0 | -556.25 | -587.5 | -75 | 0 | 0 | -800 | -525 | 0 | 0 | 0 | -68.75 | 0 | 0 | -725 | 0 | 0 | |

In table 5, the value of = 557,188.5 is obtained and the table above shows the value of < 0 which means that the optimal solution has been obtained with the optimal solution value, namely $X_1 = 337$ and $X_5 = 143.75$. After three iterations, the optimal solution is obtained.

## C. Completing the Optimization of Bread Production Profits Using the Cutting Plane Method

### a) Solving integer problems using the simplex method

Based on table (5), the optimal solution of the simplex method is obtained with a value of = 557,188.5 with a value of 5 = 143.75. Because there are still non-integer decision variables, it is continued with the cutting plane method with the addition of new constraints to produce a solution in the form of an integer number.

### b) Adding the formed Gomory Piece to the last row in the table

After obtaining new constraints and adding Gomory constraints, then adding the Gomory pieces that have been formed to the last row in Table 6 below

Table 5. Table After Adding Gomory Pieces

| CJ | CJ | 1225 | 1100 | 1000 | 1150 | 1000 | 1000 | 1150 | 1200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VB | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | NK |
| 0 | S1 | 0 | -3 | -3 | -3 | 0 | -1 | -7 | -1 | 1 | 0 | 0 | 0 | 0 | 0 | -4 | 0 | 0 | 0 | 15400 |
| 0 | S2 | 0 | -0.75 | -0.6 | -0.1 | 0 | 0 | -1 | -0.7 | 0 | 1 | 0 | -0.15 | 0 | 0 | -1 | 0 | 0 | 0 | 13662.5 |
| 0 | S3 | 0 | -0.5 | 0 | 1 | 0 | 0 | -1 | 0 | 0 | 0 | 1 | -0.5 | 0 | 0 | -2 | 0 | 0 | 0 | 10575 |
| 1000 | X5 | 0 | 0.125 | -0.25 | 0 | 1 | 1 | -0.5 | 0.5 | 0 | 0 | 0 | 0.375 | 0 | 0 | -0.5 | 0 | 0 | 0 | 143.75 |
| 0 | S5 | 0 | -0.1875 | -0.625 | 0.5 | 0 | 0 | -1.75 | -0.75 | 0 | 0 | 0 | -0.5625 | 1 | 0 | -2.25 | 0 | 0 | 0 | 2834.375 |
| 0 | S6 | 0 | -0.2125 | -0.325 | 0 | 0 | 0 | -0.4 | -0.6 | 0 | 0 | 0 | -0.1375 | 0 | 1 | -0.15 | 0 | 0 | 0 | 255.625 |
| 1225 | X1 | 1 | 1.25 | 1.5 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | -0.25 | 0 | 0 | 1 | 0 | 0 | 0 | 337.5 |
| 0 | S8 | 0 | -0.375 | -2.25 | 1 | 0 | 0 | -2.5 | -3.5 | 0 | 0 | 0 | -0.125 | 0 | 0 | -2.5 | 1 | 0 | 0 | 1918.75 |
| 0 | S9 | 0 | -0.44375 | -0.2825 | 0.09 | 0 | 0 | -0.485 | -0.625 | 0 | 0 | 0 | -0.16125 | 0 | 0 | -0.605 | 0 | 1 | 0 | 80.1875 |
| 0 | Sg1 | 0 | -0.25 | 0.5 | 0.5 | 0 | 0 | 0.5 | 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | -0.75 |
| | ZJ | 1225 | 1656.25 | 1587.5 | 1225 | 1000 | 1000 | 1950 | 1725 | 0 | 0 | 0 | 68.75 | 0 | 0 | 725 | 0 | 0 | | 557187.5 |
| | CJ-ZJ | 0 | -556.25 | -587.5 | -75 | 0 | 0 | -800 | -525 | 0 | 0 | 0 | -68.75 | 0 | 0 | -725 | 0 | 0 | | |

The last equation in table 5 is the required Gomory constraint equation and represents the necessary conditions for 5 to be an integer. Each additional equation or Gomory constraint equation, the value of the right hand side is negative, it can be concluded that this cut is not feasible. So the dual simplex method is used for this inadequacy.

### c) Solving using the dual simplex method

In table 6, the optimal solution is obtained in the second iteration using the dual simplex method where the coefficients in row z are positive or zero and none of the values on the right hand side are negative. Then the decision variable has an integer value.

Table 6. Optimal Simplex Table

| CJ | | 1225 | 1100 | 1000 | 1150 | 1000 | 1000 | 1150 | 1200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CJ | VB | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | NK |
| 0 | S1 | 0 | -6.5 | 4 | 4 | 0 | -1 | 0 | 9.5 | 1 | 0 | 0 | 0 | 0 | 0 | -4 | 0 | 7 | 14 | 15397.55 |
| 0 | S2 | 0 | -1.25 | 0.4 | 0.9 | 0 | 0 | 0 | 0.8 | 0 | 1 | 0 | -0.15 | 0 | 0 | -1 | 0 | 1 | 2 | 13662.15 |
| 0 | S3 | 0 | -1 | 1 | 2 | 0 | 0 | 0 | 1.5 | 0 | 0 | 1 | -0.5 | 0 | 0 | -2 | 0 | 1 | 2 | 10574.65 |
| 1000 | X5 | 0 | -0.125 | 0.25 | 0.5 | 1 | 1 | 0 | 1.25 | 0 | 0 | 0 | 0.375 | 0 | 0 | -0.5 | 0 | 0.5 | 1 | 144 |
| 0 | S5 | 0 | -1.0625 | 1.125 | 2.25 | 0 | 0 | 0 | 1.875 | 0 | 0 | 0 | -0.5625 | 1 | 0 | -2.25 | 0 | 1.75 | 3.5 | 2833.763 |
| 0 | S6 | 0 | -0.4125 | 0.075 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.1375 | 0 | 1 | -0.15 | 0 | 0.4 | 0.8 | 255.485 |
| 1225 | X1 | 1 | 2.25 | -0.5 | -1 | 0 | 0 | 0 | -2 | 0 | 0 | 0 | -0.25 | 0 | 0 | 1 | 0 | -2 | -4 | 338 |
| 0 | S8 | 0 | -1.625 | 0.25 | 3.5 | 0 | 0 | 0 | 0.25 | 0 | 0 | 0 | -0.125 | 0 | 0 | -2.5 | 1 | 2.5 | 5 | 1917.875 |
| 0 | S9 | 0 | -0.68625 | 0.2025 | 0.575 | 0 | 0 | 0 | 0.1025 | 0 | 0 | 0 | -0.16125 | 0 | 0 | -0.685 | 0 | 1.485 | 0.97 | 80.01775 |
| 0 | Sg1 | 0 | -0.5 | 1 | 1 | 0 | 0 | 1 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0.35 |
| | Zj | 1225 | 2631.25 | 362.5 | 725 | 1000 | 1000 | 0 | 1200 | 0 | 0 | 0 | 68.75 | 0 | 0 | 725 | 0 | 1950 | 3900 | 557870 |

The optimum solution using the cutting plane method in table 6 has been obtained with values $x_5=144$ and $x_1=338$ with = 557870.

## IV. CONCLUSION

Based on the results of the study, it can be concluded. The optimum solution obtained from optimizing the profit of bread production at Home Industry Potatora Bakery using the linear programming method obtained a profit of . 557,188,5 by producing Bread boi chocolate $(X1)$ = 337 packs and Bread streussel strawberry$(X5)$ = 143.75 packs. While the completion of optimization of bread production profit at Home Industry Potatora Bakery using the cutting plane method, the profit is . 557,870 by producing Bread boi chocolate $(X1)$ = 338 packs and Bread streussel strawberry$(X5)$ = 144.

The results of the comparison of the optimization of bread production profits using the linear programming and cutting plane methods are obtained that the benefits obtained by using the cutting plane method are more leverage than the linear programming method.

Based on the research that has been done, it is expected that Potatora Bakery can implement a raw material inventory control system so that all resources can be used as optimally as possible to get a more optimal amount of production. In addition, it can also be done by expanding product marketing targets, so that the amount of production and the amount of raw material inventory can increase and increase profits will be obtained. and for further development, researchers also suggest using other, simpler methods in solving optimization problems with a large number of decision variables and constraint functions.

## REFERENCES

Rina, R, (2021) "Peranan Bauran Pemasaran (Marketing Mix) Terhadap Peningkatan Penjualan (Sebuah Kajian Terhadap Bisnis Restoran)," Jurnal Kompetensi Teknik Vol.2 Nomor 2.

Siswanto. (2018). Operations Research. Jakarta : Erlangga.

Nico dkk. (2017). Aplikasi Metode Cutting Plane Dalam Optimasi JumlahProduksi Tahunan Pada

PT.XYZ. Jurnal Saintia Matematika. Vol 2 (2) : 127-136.

Dumairy. (2019). Matematika Terapan Untuk Bisnis Dan Ekonomi Edisi Kedua. Yogyakarta : BPFE

Lusia, O. dan Sutopo (2021), "Analisis Pengaruh Brand Image (Citra Merek), Kualitas Produk dan Harga Terhadap Minat Beli Produk Mie Instan Supermi (Studi kasus pada konsumen Mie Instan Supermie di Kota Semarang)," Diponergoro of Journal Management Volume 3 Nomor 4.

Dimyati T.T dan Dimyati A. (2020). Operation Research : Model-model. Pengambilan Keputusan, CV. Sinar Baru Bandung : Bandung.

Fitria, Nela. (2016). Eksperimen Pembuatan Roti Manis Menggunakan Bahan Dasar Komposit Pati. Semarang: Universitas Negeri Semarang.

Meflinda, A., dan Mahyarni. (2019). Operations Research. Pekanbaru : UR PRESS Pekanbaru.

Pianda, D. (2018). Menentukan Kombinasi Produk Yang Optimal Dengan Metode Linear Programming. Jawa Barat : CV Jejak.

Prawirosentono, Suyadi. Riset Operasi dan Ekonofisika. Jakarta : Bumi Aksara.

Safitri, Elfira., dkk. (2020). Penerapan Metode Cutting Plane untuk Optimasi Biaya Pemupukan Pada Tanaman Cabai (Studi Kasus: Kelompok Wanita Tani Sentosa Santul). Jurnal Sains Matematika dan Statistika. Vol 6 (1).

Basriati, Sri.,dkk. (2018). Pengunaan Metode Cutting Plane dalam Menentukan Solusi Integer Linear Programming (Studi Kasus: Dinas Perikanan Pemerintah Kabupaten Kampar). Jurnal Seminar Nasional Teknologi Informasi, Komunikasi dan Industri (SNTIKI-10).

Pianda, D. (2018). Menentukan Kombinasi Produk Yang Optimal Dengan Metode Linear Programming. Jawa Barat : CV Jejak.

Raudhatul, J. A.M, Arnellis, and Riry Sriningsih, (2018). "Optimasi Hasil Produksi Tahu dan Tempe dengan Metode Branch and Bound dan Metode Cutting Plane," Journal of Mathematics UNP, vol. III, no. 1, pp. 42 – 47.

# Hamiltonian in 5-Connected Graph

**[1*]Leni Prastiwi,[2] Risang Narendra, [3] Rachmadania Akbarita [4] M. Nur Haqqul Qomarudin**

[1,2,3,4] *Universitas Nahdlatul Ulama, Blitar*
*E-mail: [1]leniprastiwi001@gmail.com, [2]risang@gmail.com, [3]akbarita@gmail.com,
[4]qomarudin@gmail.com*

*\*Corresponding Author*

**Abstract**— One of the branches of mathematics that studies the properties of graphs is graph theory. The purpose of this study is to find out how to prove the Hamiltonian on a 5-connected graph. Through the stages, including modeling a complete graph, as well as modeling a 5-connected graph using vertices and cut edges, it was found that $K_6$ is a graph that satisfies the characteristics of a 5-connected graph. Analysis of Hamiltonian on 5-connected graph that 5-connected graph is Hamilton's invention, but it is not uniquely Hamiltonian because it has more than one Hamiltonian circuit.

**Keywords**— k-connected graph; Hamiltonian; vertex cutset; edge cutset.

*Corresponding Author:*

Leni Prastiwi,
Universitas Nahdlatul Ulama Blitar,
Email: leniprastiwi001@gmail.com

## I. INTRODUCTION

Graphs can be used to represent objects in Discrete Mathematics with some conditions. Along with the development of time, research on graph theory is growing rapidly [1]. In the application of graphs, applied modeling can be used to facilitate problem analysis. In everyday life, you can also find the application of graphs, such as the research conducted regarding the application of graphs to find the shortest route for transporting waste using the Hamilton approach[2]. A graph can contain Hamilton paths and Hamilton circuits, it can also not contain both, and or contain one of them. If a graph has a Hamiltonian circuit, it is called a Hamiltonian. The existence of Hamilton paths, and Hamilton circuits that focus on 4-connected graphs are concluded that 4-connected graphs are not Uniquely Hamiltonian [3]. Based on the background description above, as a form of development from previous research on Hamiltonian trajectories in 4-connected graphs, the researcher intends to analyze the Hamiltonian in 5-Connected graphs with the title "Hamiltonian in 5-Connected Graphs". This study aims to prove the existence of Hamiltonian circuits, as well as Hamiltonian in 5-Connected

## II. RESEARCH METHOD

The type of research used in this thesis is a literature review. In conducting research, researchers collect data or sources related to the research topic. This method is called a literature study [4]. Researchers study articles, and other sources related to the research title. The literature study will then produce a theoretical basis for determining whether
Here are the research steps:

a. Conducting literature study on k-connected graph and Hamiltonian.
b. Represented a graph G is a complete graph according to the theorem and definition.
c. An example of a synchronous graph G is defined with the definition of a k-connected graph, where k=5.
d. Prove the 5-connected graph according to the definition of Hamiltonian.

## III. RESULT AND DISCUSSION

**A. Forming 5-connected graph**

The initial stage in this study is to select a graph G that meets the definition of a complete graph, starting from a graph with three vertices. This limitation is intended to facilitate the determination of the desired graph G model. The next step is that the selected graph G must be able to form a 5-connected graph.

A one-vertex graph forms an isolated vertex where the graph has no edges. The isolated vertex graph can be seen in Figure 1.



Figure 1. An isolated vertex graph

A graph with two vertices can form a connected graph but does not form a k-connected graph. The graph of two vertices can be seen in Figure 2.



Figure 2. Graph of 2 vertices

When $n = 3$ where $n$ is the number of vertices, and according to the **definition 1** complete graph $(K_n)$ is a simple graph with n vertices where each pair of vertices is connected by an edge [5] and
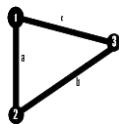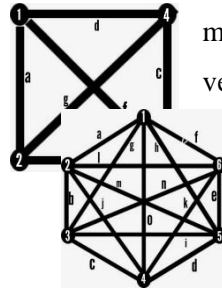


**theorem 1** the number of sides in *complete graph* dengan $n \geq 3$ can be determined by $n \times \frac{1}{2}(n - 1)$. The graph that is formed is as shown in Figure 3.

Figure 3. $K_3$ graph

Because Figure 3 fulfills the initial stage, the graph in Figure 3 can be called $K_3$ graph The next step is to form the graph $K_3$ into a k-connected graph.

**Definition 2**

k-connected graph is the minimum number of omissions from the combination of two cutset vertices and cutset edges as vertices and intersections of a connected graph to become an unconnected graph where $k(G) = k'G = k$.



**Theorem 2**

*Complete graph $K_n$, $k(K_n) = n - 1$*

**Theorem 3**

A graph G is called a k-connected graph if $k(G) = k$

*k-connected graph* which formed from graph $K_3$ according to definition 2 is in figure 4.

Figure 4. The results of the vertex and side cutset

Through the vertex cutset and side cutset with $k(G) = k'G = k = 2$ the obtained graph is not connected with two components, namely a graph connected to two vertices and an isolated vertex graph. Therefore graph $K_3$ is2-connected graph. Figure 4 is not the desired graph.

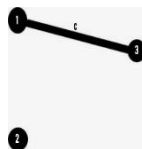When $n = 4$, according to the definition 1 graph formed is like figure 5.



Figure 5. $K_4$ graph

Since Figure 5 satisfies Theorem 1, Figure 5 fulfills the initial stage and forms graph $K_4$. After that, the next step is carried out. According to definition 2, we get a k-connected graph from $K_4$ graph as shown in Figure 6.

The 1ˢᵗ International Seminar August 2022
**The Changing Role of Knowledge and Living Sustainability in ASEAN Community**
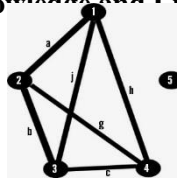tps://proceeding.unpkediri.ac.id/index.php/ip

Figure 6. The results of the vertex and side cutset

According to Figure 6, the results of the vertex and side cutsets are $k(G) = k'G = k = 3$. Because it satisfies theorem 2 and theorem 3, then graph $K_4$ is a 3-connected graph and is not the desired graph.

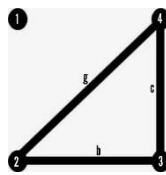When $n = 5$, the graph representation according to definition 1 is like Figure 7.

Figure 7. $K_5$ graph

Since Figure 7 satisfies Theorem 1,

figure 7 is a graph $K_5$ and fulfills the initial stage. Next is to form grapg $K_5$ into a k-connected graph. According to definition 2, the image formed is in figure 8.

Figure 8. The results of the vertex and side cutset

According to figure 8, the result of the vertex and edge cutset is $k(G) = k'G = k = 4$. Because it fulfills theorem 2 and theorem 3, then graph $K_5$ is a 4-connected graph and is not desired graph.

When $n = 6$, the graph representation according to definition 1 is like figure 9.

Figure 9. Graph $K_6$
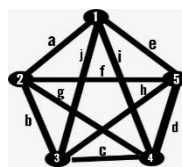
Because the figure 9 satisfies theorem 1, then figure 9 fulfills the initial stage and forms graph $K_6$. Next form a k-connected graph from graph $K_6$ according to definition 2. We get a k-connected shown in figure 10.
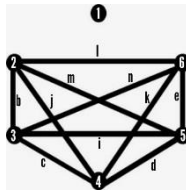


Figure 10. The results of the vertex and side cutset

According to figure 10, the result of the vertex and edge cutset is $k(G) = k'G = k = 5$. Because it satisfies theorem 2 and theorem 3, then graf $K_6$ is a 5-connected graph and is the desired graph.

**B. *Hamiltonian* in *5-connected graph***

After finding the 5-connected graph is the desired graph, it will be proven wether *5*-connected graph is Hamiltonian.

**Definition 3**

A connected graph is called Hamiltonian if it contains Hamiltonian circuits. The circuit in the Hamiltonian visits every vertex of the graph exactly once except for the initial vertex because $v_0 = v_n$.

**Definition 4**

Uniquely Hamiltonian is a graph with a single Hamiltonian circuit.

**Theorem 4**

In the complete graph where $n \geq 3$, contains as many Hamilton circuits as $\frac{1}{2}(n-1) \geq 1$.

Based on theorem 4, it will be proved the number of Hamiltonian circuits in a 5-connected graph. The Hamilton 5-connected graph circuit can be seen in Figure 11.
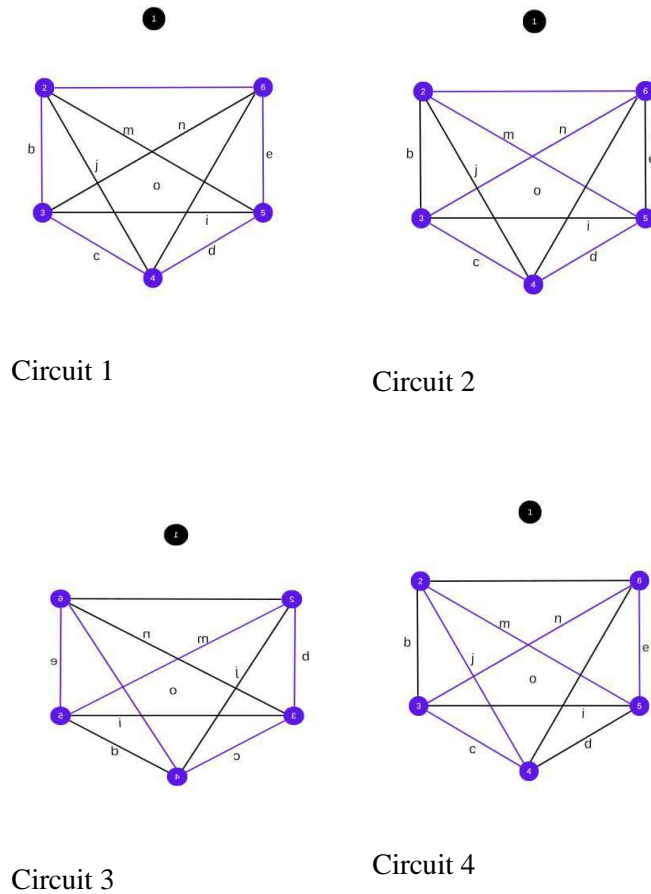
Circuit 1

Circuit 2



Circuit 3

Circuit 4

Figure 11. Circuit Hamilton 5-connected graph

According to theorem 4, Hamilton circuits in a 5-connected graph are four. This proves that the 5-connected graph meets the definition of 3 in other words the 5-connected graph is a Hamiltonian. According to the definition of 4, the 5-connected graph is not a Hamiltonian because it has four Hamilton circuits, which means that the Hamilton circuit is not single.

Based on the above results, the k-connected graph can be applied to real life, one example is communication networks. If the graph G is connected, then any two or more computers in the network can be connected or communicate with each other. However, it is still possible for the network to be connected if there is a disconnected connection. This can be analyzed through the connectedness of a graph. The smaller the vertex and edge cutset results, the weaker the connection. Vice versa, the greater the vertex and edge cutset, the stronger the connectedness of a graph.

## IV. CONCLUSION

Based on the results and discussion in the previous chapter, the evidence obtained from the 5-connected graph is as follows:

a. The 5-connected graph is a form of k-connected graph of a complete six-vertex graph or graph $K_6$.
b. The 5-connected graph is Hamiltonian because it has a Hamiltonian circuit.
c. The 5-connected graph is not uniquely Hamiltonian because it has four Hamiltonian circuits.

In this article, the author focuses on the discussion of Hamiltonian and 5-connected graph. Based on the results obtained, the authors hope that further research will focus on discussing the uniquely Hamiltonian and its application.

## REFERENCES

[1]  Prastio, J., & Ekayanti, A. (2020). Faktorisasi pada Graf Reguler. Jurnal Ilmiah Mahasiwa, 75-92

[2]  Rozi, S., & Multahadah, C. (2021). Rute Terpendek untuk Pengangkutan Sampah dengan Pendekatan Lintasan Hamilton. E-Jurnal Matematika, 115-121.

[3]  Makalew, R. A., Montolalu, C. E., & Mananohas, M. L. (2020). Lintasan Hamiltonian pada Graf 4-Connected. d'CartesiaN Jurnal Matematika dan Aplikasi, 181-188.

[4] Habsy, B. A. (2017). Seni Memahami Penelitian Kualitatis dalam Bimbingan dan Konseling : Studi Literatur. JURKAM:Jurnal Konseling Andi Matappa, 90-100.

[5]  Nahari, F. S. (2019). Planaritas-1 Graf Komplit dan Graf Multipartisi Komplit. Jurnal Ilmiah Matematika, 268-272.

[6]  Cranston, D. W., & O., S. (2012). Hamiltonicity in Connected Regular Graphs. Journal of Graph Theory, 22-24.

[7] Huda, N., & Amri, Z. (2012). Pelabelan Graceful, Skolem Graceful dan Pelabelan $\rho$ pada Graf H-Bintang dan A-Bintang. Jurnal Matematika Murni dan Terapan, 30-37.

[8]  Aspur, M. (2014). KeHamiltonan Pada Graf Komplit. Malang: Fakultas Sains dan Teknologi, Universitas Maulana Malik Ibrahim.

[9]  Alhamis. (2012). Aplikasi Algoritma Seqential Color untuk Pewarnaan Peta Wilayah Kabupaten Kuantan Singingi Provinsi Riau. Pekanbaru.

[10]  Aliana, D. F., Wamiliana, & Fitriani. (2013). Pembentukan Hamiltonian Cycle pada Double Loop Networks. Prosiding Seminar dan Rapat Tahunan BKS PTN Barat 2013 (pp. 1-8). Bandar Lmapung: FMIPA Universitas Lampung.

[11]      Azis, T. A. (2021). Eksplorasi Justifikasi dan Rasionalisasi Mahasiswa dalam Konsep Teori Graf. Jurnal Pendidikan Matematika Raflesia, 40-54.

[12]      Siang, J. J. (2014). Riset Operasi dalam Pendekatan Algoritmis. Yogyakarta: ANDI.

[13]      Sukriadi. (2019). Implementasi Algoritma Sequential Coloring dalam Pewarnaan Graph Pemetaan Daerah Kabupaten Jeneponto. Makassar.

[14]      Wirdasari, D. (2011). Teori Graf dan Implementasinya dalam Ilmu Komputer. Jurnal SAINTIKOM, 23-34.

[15]      Zai, D., Budiati, H., & Berutu, S. S. (2016). Simulasi Rute Terpendek Lokasi Pariwisata di Nias dengan Metode Breadth First dan Tabu Search. Jurnal InFact, 30-41.

# Framing Behaviorist Theory toward Situational Language Teaching (SLT)

**Widiarini**
*English Education Department, Universitas Nahdlatul Ulama Blitar*
*E-mail: widiarini@unublitar.ac.id*

**Abstract**— The changing of foreign language teaching methodology happens over the years due to the shift of the changes of language teaching's goals in different periods and in different places regarding the nature of language and the nature of learning. The aims of the paper are contextualizing behaviorist theory for Situational language teaching (SLT) and its relevance in current language teaching from practical experiences. The paper follows a narrative approach to review the previous works of literature on behaviorist theory, SLT, and its implementation. The findings are behaviorist theory becomes the fundamental learning theory of SLT that flourishes in SLT's teaching and learning activities in the classroom. Influenced by behaviorist theory, SLT becomes a teaching method that provides more guided repetition and substantive activities. In addition, along with the existence of the trend of communicative language teaching and scientific approach, SLT is still implemented by teachers for various education levels to achieve teaching objectives. In conclusion, unfashionable methods do not mean that they are not able to apply in current teaching practice. Some modification activities can be created to attain meaningful learning. Therefore, it is suggested that in applying certain methods in teaching practice, practitioners or teachers should consider the following question: who the learners are, what their current level of language proficiency is, what their goals want to be achieved through learning activities, what sort of communicative need they have, and so forth.
**Keywords**— behaviorist theory; situational language teaching; teaching methods

*Corresponding Author:*

Widiarini,
English Education,
Universitas Nahdlatul Ulama Blitar,
Email: widiarini@unublitar.ac.id

## I. INTRODUCTION

There are some changes in language teaching from time to time that is engineered by various factors. The first is the changes in language teaching's goals in different periods and in different places. These changes are assumed as the main prompt for the implementation of language teaching change. In certain areas, language teaching was focused on enabling language learners to understand a text. Meanwhile, the others, language was taught in order to facilitate oral communication. Second, the theory of language teaching was shifted about the nature of language. By the shift in the nature of language learning, it emerged the change in language teaching. Third, the rapid growth of education internalization also created a demand for new types of language programs. The last but not least, in the recent era, globalization and technological growth allow one to access the internet, and the global use of English also contributes to the need to evaluate language teaching policies and practices [1].

Practically, the changes in language teaching were triggered by a search for more effective language teaching. Hence, Richards and Rodgers [2] stated that the foundations of approaches to language teaching were developed as the expertise sought to develop principles and procedures for teaching methods and materials design, drawing on the developing fields of linguistics and psychology. Therefore, the method concept in teaching becomes a prominent one and the foundation for better methods was a preoccupation of many teachers and applied linguists for many centuries and other centuries. In this case, a method is assumed as a systematic set of teaching practices based on a particular theory of language and language learning.

Driven by chronicle changes in language teaching practices, this paper discusses teaching methods that are underlined by the existence of the behavioristics strand that is Situational Language Teaching (SLT). Behaviorist psychology states that people's language is conditioned behavior, they learn language through the process of training and conditioning [1]. Furthermore, this paper will discuss about the relation of behaviorist theory to SLT.

## II. RESEARCH METHOD

This paper aims are contextualizing behaviorist theory for Situational language teaching (SLT) and its relevance in current language teaching from practical experiences. Material this paper includes books, book chapter, and journal articles that are relevant to behaviorist theory and SLT.

Furthermore, it adopted a narrative approach [3,4,5] in reviewing the context of behaviorist theory for Situational language teaching (SLT) and its relevance in current language teaching from practical experiences. The sample for the literature review was developed into steps. First, the authors conducted a keyword search for "learning theory", "behaviorist theory", "the implementation of SLT" in the web of science as well as in Google Scholar, covering a period

between 1940 and 2022. As the database search method has been found to be insufficient for identifying a universal set of relevant publications, we applied snowball sampling to identify additional articles, e.g. by pursuing references of references This step resulted in a basic sample of publications, which were collected using the citation management software Zotero. Second, from this basic sample, conference papers were excluded to ensure the publications' quality through peer review, whereas empirical studies, conceptual papers, and literature reviews from peer-reviewed journals, as well as books, were included.

## III. RESULT AND DISCUSSION

Behaviorist Theory in Foreign Language Teaching

Behaviorism was simply defined in the dictionary as theory and method of psychological investigation based on the objective study of behavior [6,9]. This definition is supported by behaviorism practitioners, Torndike and Skinner (1976). Torndike contended the major principle of the behaviorist theory rested on the analysis of human behavior in observable stimulus-respond interaction and the association between them. In sum, behaviorism believed that only observable behavior, measurable through stimulus respond interaction and the association with them is worthy of scientific inquiry.

Along with its development, behaviorist practitioners have conducted some research to observe stimulus-respond phenomena. From those researches, Torndike and Skinner have led important contribution in education field. Torndike (1874-1949) worked with his law effect that was an act that is followed by a favorable effect is more likely to be repeated in similar situation; an act that is followed by an unfavorable effect is less likely to be repeated. Furthermore, Skinner made a large contribution to research into instructing the learning process. His work commonly called operants. They serve to manipulate the environment in order to effect a change which will result in a reward. The impulse to perform operants will become stronger or weaker depending on their consequences [10]

To the behaviorist, human being is viewed as an organism that capable of a wide repertoire of behaviors furthermore, the existence of these behaviors is dependent on three crucial elements, they are a stimulus, which serves to elicit behavior; a response which is triggered by a stimulus; and reinforcement, which serves to mark the response as being appropriate (or inappropriate) and encourages the repetition (or suppression) of the response in the future[1,6,11,12], Reinforcement becomes a vital element in this process because it increases the likelihood that behavior will be repeated and finally change into a habit. In contrast, no reinforcement or negative reinforcement

elicited so that it is not likely to occur again. The representation of this explanation can be seen in the following figure.
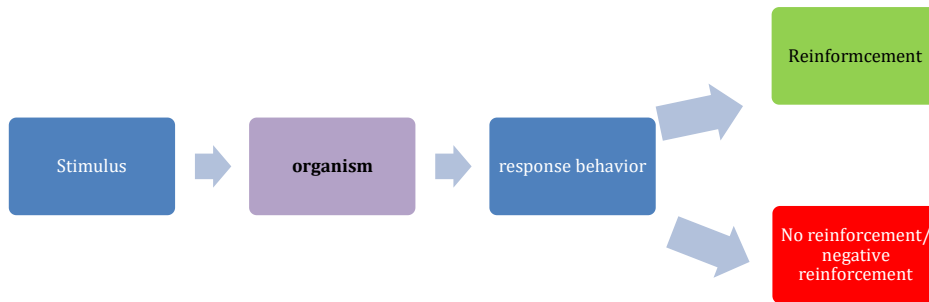


Figure 3.1 The behaviorist learning process (Richards, 2014)

As mention above that behaviorism only concerns in describing, explaining, and influencing behavior, so it has particular features(Ertmer & Newby, 2013). First, the most important causes or motivations for behavior depend on the outside rather that within the individual. Second, the dualistic portrayal of human being which distinguishes between mental processes and observable behavior is scientifically unproductive. It is proved by fact that in human being daily life it is often known that explanations for human behavior are sought in inner believe and disposition, not from mental processes. Third, the scientific study of human being should be restricted as much as possible to directly observable quantity. Fourth, human behavior is quite complex that it is influenced by the outside (stimulus and environment). Fifth, human being is generally a shallow and imprecise observer of both own and others' behavior. The last, attempts to influence behavior must be preceded by a thorough behavioral analysis.

Behaviorism influence education system. It is become the basic learning theory besides cognitivism and constructivism. Behaviorism equates learning with changes in either the form or frequency of observable performance(Anne Weegar Dina Pacis, 2012; Clark, 2018; Tolman, 1926). Learning is accomplished when a proper response is demonstrated following the presentation of a specific environmental stimulus. The key elements are the stimulus, the response, and the association between the two. Of primary concern is how the association between the stimulus and response is made, strengthened, and maintained. Behaviorism focuses on the importance of the consequences of those performances and contends that responses that are followed by reinforcement are more likely to recur in the future. No attempt is made to determine the structure of a student's knowledge nor to assess which mental processes it is necessary for

them to use (Herschel J, 1967; Richards, 2014). The learner is characterized as being reactive to conditions in the environment as opposed to taking an active role in discovering the environment.

In order to provide more effective language teaching, linguist have adopted behaviorism as the theory of learning. It was underlined by the argument that behaviorist theory, which is basically a psychological theory in its essence, founded by J.B. Watson is actually a theory of native language learning. Adopting behaviorist theory into language learning enable language learner acquire target language closely similar with native (Ajdini, n.d.; Mehuıet DEMİREZEN, n.d.) It is proved by the fact that the babies obtain native language habits via varied babblings which resemble the appropriate words repeated by a person or object near him. Since for his babblings and mutterings he is rewarded, this very reward reinforces further articulations of the same sort into grouping of syllables and words in a similar situation. In this way, he goes on emitting sounds, groups of sounds, and as he grows up he combines the sentences via generalizations and analogy (as in *goed for went, *doed, for did, so on), which in some complicated cases, condition him to commit errors by articulating in permissible structures in speech. By the age of five or six, or babblings and mutterings grow into socialized speech but little by little they are internalized as implicit speech, and thus many of their utterances become instinguishable from the adults. This, then, obviously, means that behaviorist theory is a theory of stimulus-response psychology(Ertmer & Newby, 2013).

As consequences of the adoption of behaviorist into language learning, basic tenets of behaviorist theory have been formulated as follows (Mehuıet DEMİREZEN, n.d.):

1. Behaviorist theory dwells on spoken language
2. Behaviorist theory is the habits formation theory of language teaching and learning
3. Stimulus-respond chain is a pure case of conditioning
4. All leaning is the establishment of habits as the result of reinforcement and reward for each individual.

For instance, the application of behaviorist theory in foreign language learning are (1) the organism (mention in figure 4.1) as the learners, (2) the behavior is assumed as verbal behavior, (3) the stimulus as what is presented of foreign language, (4) the response as the learner's reaction to the stimulus, and (5) the reinforcement as the extrinsic approval and praise of the teacher, peer, and self-satisfaction of the target language use. Furthermore. Language acquisition is represented as acquiring a set of appropriate language stimulus-response chain.

**Situational Language Teaching**

Situational language teaching or commonly known as SLT draws from the reform movement and the Direct Method that adds some features some prominent figures from applied linguists such as (Hornby, 2014). Palmer, Hornby, and other British applied linguists from the 1930s to the

1960s develop a more scientific foundation for the oral approach in language teaching more that the direct method. The result of their development was systematic principles and procedures that could be applied to the selection and organization of the content of language courses (Fauziati, 2014). This systematic principle involved selection, gradation, and presentation. Selection refers to the procedures by which lexical and grammatical content is selected. Gradation deals with the principles by which the organizational and sequencing of the contents is determined. Presentation is defined as techniques used for presenting and practicing of the items in a language course (or in language teaching procedure). Furthermore, this systematic principle is called the Oral Approach to language teaching.

In its development, SLT became an influential set of teaching materials and it was widely used in Australia, New Guinea, and the pacific territories (Richards, 2014). The main characteristic of SLT are as follows:

1. Language teaching begins with the spoken language. Material is taught orally before it is presented in written form.
2. The target language is the language of the classroom.
3. New language points are introduced and practiced situationally.
4. Vocabulary selection procedures are followed to ensure that an essential general service vocabulary is covered.
5. Items of grammar are graded following the principle that simple forms should be taught before complex ones.
6. Reading and writing are introduced once a sufficient lexical and grammatical basis is established.

In addition, the third principle of SLT becomes the key feature of the language teaching approach. As the study applied linguists in exploring more systematically the relationship between theory and practice in language teaching methods.

**SLT as Language Teaching Method**

The practitioner is still confronted with a set of options at the levels of theory and practice, especially the terms of approach, method, and technique. the American applied linguist clarified that terminology as the chart below (Anthony, 1963).

Approach ——————— Method ——————— Technique

| • Theories of language<br>• Theories of language learning | • Procedure/ overall plan of presentation | • Classroom practice, technique |
|---|---|---|
| Axiomatic | Procedural | implementation |

Chart 3.1 Anthony's diagram of Approach, Method, and Technique (Fauziati, 2014)

Following Anthony(Anthony, 1963), the approach refers to theories about the nature of language and language learning that serve as the source of practices and principles in language teaching. Mostly language teaching methods are explicitly from a theory of language and theories about how language is learned. The theory of language is a very complex part that is studied from the perspective of different disciplines, such as linguistics, literature, psychology, anthropology, and sociology. There are six models of language that influence language teaching methods and approaches i.e cognitive model, the structural model, the functional model, the interactional model, the sociocultural model, the genre model, and the lexical model. Meanwhile theory of learning covers the cognitive, personal, interpersonal, and social processes learners make use of in second language learning. Research on second language acquisition has led the rich finding theories to explain how language are learned, they are behaviorism, cognitive-code learning, the creative-construction hypothesis, skill learning, interactional theory, constructivism, sociocultural learning theory, and individual factors.

A method is defined as an overall plan for the orderly presentation of language material. Furthermore, a method is associated at the level of design in which the roles of teachers, learners, and instructional materials are specified. Other applied linguists Richard and Rodgers identified the method as design because it is theoretically related to an approach (Richards, 2014). Then, the technique is the implementation which actually takes place in the classroom. It covers techniques that encompass the real step-by-step teaching practice and behaviors that operate in language teaching in the classroom. Furthermore, it is also known as procedure.

Framing SLT as a language teaching method, the following description detail mentions SLT in its approach, design (consisting of objectives, the syllabus, types of learning activities, learner roles, teacher roles, and the role of instructional materials), and procedure.

**SLT Approach**

SLT approach is constructed by the theory of language and learning theory. The theory of language delineates that SLT was developed based on the British structural model or structuralism. Underlying this model, language is assumed as a system of grammatical patterns and structures that had to be mastered in learning a language. Following its development, the British theoreticians had a different focus on their version of structuralism, especially the notion of the situation. They view the theory about knowledge of structures must be linked to situations. J.R Firth followed by M. A.K Halliday developed powerful views of language in which meaning, context, and situation were assumed given a prominent place in language. As a result, language activity is defined as part of the whole complex events which together with the participants and relevant objects create an actual situation (Richards, 2014).

Behaviorist learning theory was adopted in SLT. Palmer in Richards and Rodgers (Richards, 2014) pointed out the process of language learning i.e. receiving the knowledge or materials,

fixing it in the memory by repetition, and using it in actual practice until it becomes a personal skill. Furthermore, the meaning of words or structures is not given through explanation in either the native language or the target language but induced by the way the form is used in a situation. By doing so, the learners are expected to deduce the meaning of a particular structure or vocabulary item from the situation in which it is presented.

**SLT Design**

1. Objectives

   The objectives of SLT methods in language teaching are [2,21]:

   - to teach a practical command of the four language skills (listening, speaking, reading, and writing);

   - to achieve language skills through structure;

   - to control basic structures and sentence patterns both oral and written skills;

   - to introduce language skills form speech work then followed by written work (reading and writing).

2. The syllabus

   The syllabus of SLT is a structural syllabus and word list. It means that the syllabus consists of structure, sentence pattern, and vocabulary that is arranged according to their presentation. It is presented from the simple to the complex one. In SLT, vocabulary never stands alone. It is taught inbound within sentences, and vocabulary is selected based on the sentence pattern. The example of the structural syllabus of SLT is provided by Frisby(Frisby, 1957).

Table 3.1 Frisby Syllabus of SLT

| Lesson | Sentence pattern | Vocabulary |
|--------|------------------|------------|
| Fist lesson | This is … <br> That is … | Book, pencil, ruler, desk |
| Second lesson | These are … <br> Those are … | Chair, pictures, door, window |
| Third lesson | Is this…? Yes, it is <br> Is that…? Yes, it is | Watch, box, pen, blackboard |

3. Types of learning activities

   Learning activities in the classroom employ a situational approach to presenting new sentence patterns and a drill-based manner of practicing them. In order to provide situational learning, teachers make use of concrete objects, pictures, and realia that are accompanied by actions and gestures to demonstrate the meaning of the new language item. The practice technique generally consists of a guided repetition, and substitution activities including

chorus repetition dictation, drills, and controlled oral-based reading and writing tasks. Pair practice is sometimes used in practicing oral activities.

4. Learner roles

   In SLT, learners have a passive role. The learner has to listen and repeat what the teacher is saying;

   • He has to respond to the questions asked by the teacher;

   • The learner has to situationalize the structure and meaning;

   • The class is teacher-controlled hence, the pupil has to do chorus repetitions, dictations, drills, oral-based reading and writing exercises, pair practices and group works.

5. Teacher roles

   The teacher has a dominant function in SLT method (Hussain et al., n.d.), such as:

   • The method leads to threefold activity for a teacher-setting the stage for a new structure, presenting the model structure, and finally drilling and correction.

   • The teacher strictly checks the pronunciation, grammar and structural errors during drilling.

   • The instructor is highly demonstrative through different teaching aids like wall charts, flashcards, posters, pictures, stick figures, and so on.

   • The teacher is supposed to have mastery over prescribed textbook.

   • The instructor is a classroom controller like a director of orchestra music.

   • He sets the pace of the lesson; skillfully manipulate the situation to elicit correct sentences from the learners.

   In addition, Pittman summarized the teacher's responsibility in teaching English using the SLT method as dealing with: (1) timing; (2) oral practice to support the textbook structures; revision and review; adjustment to special needs of individuals; (5) testing; and developing language activities other than those arising at the available book.

6. The role of instructional materials

   In line with the syllabus in SLT that is structural and consists of a word list, thus instructional materials play a significant role in the process of teaching and learning in the classroom. The process of teaching and learning relies on both textbooks and visual aids. The textbook contains organized lessons that were planned in various grammatical structures. Many kinds of visual aids are make used by English teachers, such as wall cards, flashcards, pictures, stick figures, and so on. They may produce the visual aids or use the commercial produced one. The combination of structural grammar and visual aids becomes a crucial

aspect of SLT. Pittman(Pittman, 1963) suggested that textbooks should be used to guide the learning process, and the teacher is expected mastering of the available book.

**Classroom procedure**

The teaching procedure of English in SLT is different from one grade of the class to another. The purpose of teaching at any grade is to move from controlled practices to freer ones and from the use of oral in structural sentences to the automatic use in speech, reading, and writing. The most popular teaching procedure of SLT is PPP format lesson and it is still used today. PPP stands for Presentation- practice- production (Richards, 2014). The following is the explanation of those terms.

- **Presentation**. Text, audio, or visual is used by the teacher to present the grammar in a controlled situation.

- **Practice**. A controlled practice phase follows where the learner says the structure correctly, using such activities as drills and transformations, gap-fill or close activities, and multi-choice questions.

- **Production**. In the production phase, the learner transfers the structure to freer communication through dialogues and other activities, where there is more than one correct answer.

**Empirical Studies of Situational Language Teaching**

Even though more than a century of SLT has existed, it is still used in English Language Teaching (ELT) today. English teachers' perception of using situational language teaching method for teaching vocabulary has been investigated (Masna et al., 2020). This research was conducted at the elementary school level. The result of this research found that the advantages of using SLT were enhancing students' motivation, and creating an effective teaching-learning process. Whereas, the challenge of using SLT in teaching vocabulary was preparing instructional material and related to students' boredom.

Another researcher conducted a study on improving elementary students' vocabulary using SLT. This research tried to analyze some implications of SLT on oral learning in primary schools. From this research, it is suggested that first, English teachers should avoid situations where the form is far from the teaching content. Secondly, teachers should design a balance implementation of creation and presentation in the classroom. Thirdly, teachers should concern about the teaching steps which are started with preparation to reflection. The last, the teacher should implement mutual exchange between students and teacher, teacher-center class is out of date. In order to stimulate interaction, the teacher can utilize any kind of teaching both conventional and using technology. That research explicitly informs that SLT is still implemented by an English teacher at the elementary school level, where the students are categorized as young learners. Teaching

English to young learners must be fun so that it can serve joyful learning to the young learner. Due to the unique characteristics of young learners, English is delivered using more repetition and started with oral to written activities (1990 Teaching English to Children (Longman Keys to Language Teaching) by Wendy A. Scott and Lisbeth H. Ytreberg (z-Lib.Org), n.d.; 1992 Teaching English in the Primary Classroom (Longman Handbooks for Language Teachers) by Susan Halliwell (z-Lib.Org), n.d.; 2004 Teaching English A Handbook for Primary and Secondary School Teachers by Andrew Goodwyn, Jane Branson (z-Lib.Org), n.d.; The Routledge Handbook of Teaching English to Young Learners, n.d.).

The empirical practices of SLT in English language teaching at middle school have been by some researchers (Husniati, n.d.; Jusriandi, 2020; Li, n.d.; Si, 2022). The studies found that SLT can be used to teach both grammar and vocabulary. In general, grammar is viewed as difficult and uninterested material. By using SLT teaching grammar can be modified to be easy to understand and interesting material (Si, 2022). In addition, SLT is also used to teach vocabulary. Action research on vocabulary found that teaching vocabulary by using SLT can improve students' vocabulary mastery(Husniati, n.d.; Jusriandi, 2020). Furthermore, in senior high school found that SLT was implemented to teach grammar (Wenrong, n.d.). From a critical view of some investigation in teaching grammar, it can be suggested that to improve the students' learning results in grammar class the use of SLT in teaching grammar can be improved and optimized. The contrast finding gotten from the implementation of SLT at the university level. The investigation of the application of SLT for teaching Mongolian English major students revealed that the obstacles existing in the implementation of this method, students are passive participants, weakening the role of teachers, and ineffective transfer of language, image, and meaning (Du, 2017).

Along with the growth of educational technology, SLT can be embodied in ubiquitous learning (u-learning). Situational mashups were proposed to identify learners' situations and learning requirements by merging situation awareness with service mashups in order to enable its innovation and give situational learning services on demand. Learning with situational mashups and learning without situation awareness support were compared and contrasted as two types of u-learning. According to experimental findings, the students who received support from situational mashups performed better in their learning and exhibited better behavior. In order to support U-SLT and the core problem of a ubiquitous learning school, situational mashups were therefore seen as a valuable and desirable solution(Anne Weegar Dina Pacis, 2012; Huang et al., n.d.) .

## IV. CONCLUSION

Behaviorist theory considered that people's language is conditioned behavior; they learn language through the process of training and conditioning. Even though they have been changed into other teaching methods but they have contributed to teaching procedures to attain certain teaching goals. Unfashionable methods do not mean that they are not able to apply in current teaching practice. Some modification activities can be created to attain meaningful learning. Therefore, in applying a certain method in teaching practice, practitioners or teachers should consider the following question: who the learners are, what their current level of language proficiency is, what their goals want to be achieved through learning activities, what sort of communicative need they have, and so forth. Unfashionable methods do not mean that they are not able to apply in current teaching practice. Some modification activities can be created to attain meaningful learning. Therefore, in applying certain methods in teaching practice, practitioners or teachers should consider the following question: who the learners are, what their current level of language proficiency is, what their goals want to be achieved through learning activities, what sort of communicative need they have, and so forth.

## REFERENCES

1990 Teaching English to Children (Longman Keys to Language Teaching) by Wendy A. Scott and Lisbeth H. Ytreberg (z-lib.org). (n.d.).

1992 Teaching English in the Primary Classroom (Longman Handbooks for Language Teachers) by Susan Halliwell (z-lib.org). (n.d.).

2004 Teaching English A Handbook for Primary and Secondary School Teachers by Andrew Goodwyn, Jane Branson (z-lib.org). (n.d.).

Ajdini, F. (n.d.). BEHAVIORIST THEORY ON LANGUAGE LEARNING AND ACQUISITION.

Anne Weegar Dina Pacis, M. (2012). A Comparison of Two Theories of Learning-Behaviorism and Constructivism as applied to Face-to-Face and Online Learning.

Anthony, E. M. (1963). Approach, Method, Technique. English Language Teaching, 17, 63–67.

Clark, K. R. (2018). Learning theories: behaviorism. In Radiologic technology (Vol. 90, Issue 2, pp. 172–175). Am Soc Radiol Tech.

Du, J. (2017). On the Application of Situational Language Teaching Method to Mongolian English Majors. English Language and Literature Studies, 7(4), 98. https://doi.org/10.5539/ells.v7n4p98

Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. Performance Improvement

Quarterly, 26(2), 43–71. https://doi.org/10.1002/piq.21143

Fauziati, E. (2014). Methods of Teaching English as a Foreign Language (TEFL): Traditional Method Designer Method Communicative Approach Scientific Approach. Era pustaka utama.

Frisby, A. W. (1957). Teaching English: Notes and Comments on Teaching English Overseas. Longman.

Herschel J. (1967). Pub Date 6 Oct 68 Note-7p.; Paper presented at a meeting of the American Association of Teachers of Spanish and Portuguese. In Journal Cit-The Modern Language Journal (Vol. 52).

Hornby, A. S. (2014). The Situational Approach in Language Teaching (I) Downloaded from. http://eltj.oxfordjournals.org/

Huang, A. F., H Yang, S. J., Hwang, G.-J., & Yang, S. J. (n.d.). 312 Knowledge Management & E-Learning. In An International Journal (Vol. 2, Issue 3). https://www.researchgate.net/publication/50346438

Husniati, B. (n.d.). IMPROVING THE SECOND YEAR STUDENTS' VOCABULARY THROUGH SITUATIONAL LANGUAGE TEACHING METHOD AT MTs.S UJUNG JAMPEA PASI'MASUNGGU TIMUR KAB. KEPULAUAN SELAYAR A THESIS Submitted in Pertial Fulfillment of the Requirement for Sarjana of Education in English Department of Tarbiyah and Teaching Faculty State Islamic University.

Hussain, S., Shafaat Hussain, E., & Sajid, S. (n.d.). Oral Approach and Situational Language Teaching: A Short Review. https://www.researchgate.net/publication/314895766

Jusriandi. (2020). The use of Situational Language Teaching Method to Improve Students' Vocabulary at The Second Year SMPN 27 Bulukumba (A Pre-Experimental Research at the Seventh Grade of SMP 27 Bulukumba).

Li, J.-E. (n.d.). The Revelation of Situational Language Teaching in English Teaching at Middle Schools. 2, 1–17. https://doi.org/10.25236/FER.033001

Masna, Y., Dahliana, S., Martaputri, N. A., Ar-Raniry, U., & Aceh, B. (2020). EXPLORING ENGLISH TEACHERS' PERCEPTIONS ON USING SITUATIONAL LANGUAGE TEACHING METHOD IN TEACHING VOCABULARY. Getsempena English Education Journal (GEEJ, 7(2), 283.

Mehuıet DEMİREZEN, D. (n.d.). Hacettepe Vniversitesi Eğitim Fakültesi Dergisi BEHAVIORIST THEORY AND LANGUAGE LEARNING.

Pittman, G. (1963). Teaching Structural English. Jacaranda.

Richards, Jack. C. and R. T. S. (2014). Approach and Methods in Language Teaching (third). Cambridge University Press.

Si, S. (2022). The Application of Situational Language Teaching in English Grammar Teaching in Junior Middle School-A Case Study of "used to. In International Journal of Liberal Arts and Social Science (Vol. 10, Issue 2). www.ijlass.org

The Routledge Handbook of Teaching English to Young Learners. (n.d.).

Tolman, E. C. (1926). A behavioristic theory of ideas. Psychological Review, 33(5), 352.

Wenrong, L. (n.d.). The Application of Situational Teaching Method to English Grammar Teaching in Senior High School. https://doi.org/10.25236/iwass.2018.238

# An Analysis Of Speech Act On Civil War Movie

**[1*]Tyas Alhim Mubarok, [2]Winda Khoirun Nisak, [3]Yuliana Firmand**
[123]*Universitas Nahdlatul Ulama Blitar*
*E-mail: [1]Tyas Alhim Mubarok, [2]winda.side@gmail.com,[3]yulianafirmanda10@gmail.com*
*\*Corresponding Author*

**Abstract**—This research aims to analyze speech act found in Civil War movie. This research focuses on the conversation between Captain America and Iron Man. The method used in this research is qualitative using conversation analysis. The data were collected from conversation script between Captain America and Iron Man. The result of this research shows that in the conversation between Captain America and Iron Man. It was found that there are three kind of speech acts used between Captain America and Iron Man. They are locutionary, illocutionary, and perlocutionary acts. The most speech act frequently used is locutionary act with total number is 33 (46%). While the second speech act frequently used is illocutionary act that are 23 (33%). For perlocutionary act is only found 15 (21%). In locutionary act, the conversations consisted of rhetic and phatic act. Illocutionary act dominated by asking and answering and perlocutionary act involved sarcasm, joke and caution.

**Keywords**: speech act; conversation analysis; movie

---

*Corresponding Author:*
Tyas Alhim Mubarok,
Universitas Nahdlatul Ulama Blitar,
Email: Tyas Alhim Mubarok

---

## I. INTRODUCTION

This paper aims to analyze what kind of speech act discovered in a communication. Communication is language function which is carried out by speech. Speech itself represented by shorter or longer strings of linguistic items used to give expression about particular purpose and involves both written and spoken text. However, speech depends on the will of the speaker.

Speech act is part of critical discourse analysis which study about communication process. In this paper, researcher conducted Civil War movie as a research object. Due to the popular aspect or the main figure in this movie,Captain America and Iron Man were mostly popular in all of age. This movie was premiered in 2016, produced by Marvel Studios and distributed by (Troxel, 2016). It had a story about disagreement over international oversight of Avenger or American super hero group fight their opposite factions. One led by Steve Rogers and the other by Tony Stark. Steve Rogers or Captain America was the leader of a faction against the regulation. He was described as a wise person, came really first hold his duty so much then willing propagandist. Tony Stark or Iron Man was on the other side. He led the supported-team, a person described as a genius, billionaire-playboy and philanthropist. Captain America and Iron Man were two kind of different character, which in the end brought an enjoyable analysis in their both communication (Adopted from Walt Disney Studios Motion Pictures).

Either way, movie also has a crucial position in education learning, proved by many previous studies talked about the importance of movie in learning. Scene on movie offers visual portrayal of a theoryor concept taught in learning process. Inexperienced students will totally take many benefits from the use of the movie, because movie can increase a greater feeling of reality. So, students will enjoy the learning (Champoux, 2007). By taking conversation between Captain America and Iron Man in Civil War movie to be analyzed, this study definitely gives idea to understand better about speech act in order to easier people-understanding in their communication and increase their linguistic knowledge and competence in doing conversation.

This study was using theory about speech act and what was developed on it. Speech act, as we know, is a theory from (Austin, 1962). In his book, he wrote the definition of speech act as part of critical discourse analysis in pragmatic study which involves the understanding of communication process through linguistic aspects. J.L Austin divided speech acts into three aspects, locutionary aspect, illocutionary aspect and perlocutionary aspect (Austin, 1962).

According to (Austin, 1962), "the locutionary act involves the actual speech production of sounds (the actual words which speaker is saying)". This first aspect states that act comes as a result from actual sounds of the speaker to the listener or it can be concluded that locutionary act is the act of saying something. Also,

we can preliminary describe this aspect as the utterance of certain words in a certain construction with a certain meaning in order to get a certain sense. Locutionary act is the basic of utterance itself. It is a production of meaningful linguistic expression. For example, because words are foreign and you get tongue-tied in uttering, then you may fail to produce a locucionary act. Saying or producing 'Aba mokofa' in English will not normally count as a locutionary act, but 'I've just made a coffee' will be counted (Yule, n.d.)(Yule,1996:48).

Locutionary also divided into three aspects. There are phonetic act, phatic act and rhetic act. A phonetic act is always used to perform the act of uttering certain sound in only a single word. Phatic act refers to an aspect which the utterance consist of combination some certain sounds or words arranged into a grammatical rules to give a certain meaning. Last is rhetic act, which is the utterance is contextualizing a sentence in the case of assertions. In conclusion, locutionary utterances are addressed to real condition which needs sense and reference to be understandable. Reference depends on the knowledge of the speaker at the time when utterance given. It is simply saying something, people convey information, talk innately, give question, etc. Locutionary performed in purpose to communicate and express affairs statements (Jarasch, Jamai, & Gümüs, 2014).

The second aspect of speech act is illocutionary acts. (Austin, 1962) described illocutionary as the act that is performed by the force in the locutionary. This aspect focuses on how the speakers say, the way they delivered the message. Most of us, commonly are not only producing well-formed utterances without a purpose. We make an utterance always followed by kind of function. Illocutionary acts include certain expression like arguing, ordering, promising, suggesting, and asking to, from offering, asking whether you will and asking 'Yes or No'. Illocutionary utterances are utterances performed by the speaker as an virtual act of having said something. It is what is accomplished by communicate the intention to accomplish something in conversation.

"I pronounce the defendant guilty", when it is uttered by a judge it will be the act of sentencing, while "I pronounce…" can neither be said to be true or false if uttered in the right condition as if the utterance made for sincerely and had a meaning in appropriate circumstances of communication. However, illocutionary is not descriptive. Another example is, by using the test word "hereby", people can normally find the point, or force, of a given utterance by "I hereby X that P", where X make explicit whether the utterance is a request, command, promise, or etc. for it is worth noting that regardless of a hearer's response for instance, to act such an order. The fact is that the act uttered with proper intention (Jarasch et al., 2014).

In the end, people do not simply creating utterance with a function without intending it to have an effect. So, perlocutionary act is speech act aspect which is performing or achieving of certain effects by saying something. This aspect has main intention about how the utterance from the speaker gives effect to the

listener. Perlocutionary utterances are utterances that supposed to be having an effect to the hearer. Jokes, warnings, persuading, sarcasm, that's all are perlocutionary. They are generally meant to explicit response from the hearer. Perlocutionary effects are often the unsaid-products of linguistic communication and their effects may be intentional or unintentional, as it on the hearer who act upon an effect produced by the utterance. Example, depending on that explanation, people will utter 'I've just made a coffee' on the assumption that the listener will recognize the effect intended, may be to account for a good smell or even get them to drink the coffee. This is called the effect aspect of speech act (Yule, 1996: 48).

## II. RESEARCH METHOD

Method used in this research was qualitative in the term of conversation analysis. Qualitative research additionally involves such a method as observation activity through experimental natural setting. This method is kind of research procedure, produces a data in descriptive-narrative, or words comes from observing the research object in holistic (Education & Konstant, 2019). The data analysis in this method conducted in the time when the collecting data activity was held, in limited period as an interactive continually activity until the data was full. Collecting data activity in this research involved all of observing the communication scene between Captain America and Iron Man. This is a research design called content analysis. In a broader sense, content analysis refers to the process of summarizing and interpreting written data (Sándorová, 2019). Data in this research was taken from Civil War Movie, either the conversation scene or the movie subtitle text. The whole transcript movie was observed to determine the all conversations of Captain America and Iron Man. This process called *data reduction,* as part of qualitative method, beside *display data* and *verification* or *conclusion* (Alhamdani, 2017). The data then analyzed by content analysis design, based critical discourse analysis of speech act theory of J.L Austin. The analysis displayed in a descriptive-narrative, then concluded in descriptive-analysis result.

## III. RESULT AND DISCUSSION

Speech act in the communication between Captain America and Iron Man was conducted from the observing activity in the Civil War movie. Here, the data displayed with the discussion. The first data was taken from the very first conversation in the minute 28:50 to 29:10. This conversation was taken in a meeting room, where all of the *Avengers* gather to discuss command from the secretary Ross.

Natasha : *"Tony, you are being in-characteristically non-hyper-verbal."*
Steve Rogers: *"It's because he's made up his mind."*
Tony Stark: *"Boy, you know me so well"* (he gets up and winces, rubbing the back of his head)

The utterance came from Steve Rogers or Captain America, *"It's because he's made up his mind.",* can be analyzed as follows: First, the word *he* refers to the Iron Man or Tony Stark. Second, the utterance was

asserted from the condition of the Iron Man which was being un-normally non-hyper-verbal, just like what was said by Natasha. So, here the utterance from the Captain America to the Iron Man is the example of *locutionary act* due to the real condition of the utterance. For more clear discussion, this utterance was not a word, but sentence which is contextualizing what's really happening in that time, means it is *rhetic act.* One more supported statements was showed in what Iron Man said after that, *"Boy, you know me so well"*, this utterance confirming what Captain America trying to describe Iron Man's condition. At least, it is *rhetic act* too.

The next conversation held in minute 30:20. This scene shows how Captain America denies the instruction from the secretary Ross to sign the document. As what was stated in the movie review before, Captain America was in a faction against the regulation, while Iron Man was the opposite.

> Tony Stark  : *"...we're no better than the bad guys."*
> Steve Rogers: *"Tony, someone dies on your watch, you don't give up"*
> Tony Stark  : *"Who said we're giving up?"*
> Steve Rogers: *"We are, if we're not taking responsibility for our actions. This document just shifts the blames."*

To start the conversation, Captain America uttered *"Tony, someone dies on your watch, you don't give up"* in order to argue the statement from Iron Man who said they were all are no better than bad guys. Captain America was trying to make Iron Man change his thought about the bad condition *Avengers* faced before. So, here it can be conclude that the utterance from the Captain America was delivered on purpose, means it is *illocutionary act.* However, that arguing statement make Iron Man stated a question. That is also *illocutionary act.* The questioning he done created an answer, just like what actually happen if there is questioning, there is answering. *"We are,"* said by Captain America as answering, was proved the questioning *illocutionary act* from the Iron Man. In case of the answering, Captain America continued with *"if we're not taking responsibility for our actions. This document just shifts the blames".* If we are check the context of the conversation, here Captain America was warning all of the people in the meeting room, including Iron Man to not giving a sign to the document. The warning directly gave quick effect to them, showed by the change of their mindset about the signing. Warning is *perlocutionary act.*

In the minute 30:00, in the same place, there are still lots of conversation between Captain America and Iron Man. Both of them were continuing to defend their own idea about signing the document from the secretary Ross.

> Tony Stark       : *"...when I realized what my weapons were capable of in the wrong hands, I shut it down and stop manufacturing"*
> Steve            : *"Tony, you choose to do that, if we sign this, we surrender our right to choose. What if this panel sends us somewhere we don't think we should go? What if there is somewhere we need to go, and they don't let us?"*

Tony           : *"If we don't do this now, it's gonna be done to us later…"*

The first utterance from Tony, Iron Man was stating his thought in real and truly coming from his mind without any idea to create effect or give in purpose. He was trying to describe his idea what he will do in the future if his weapons are capable in the wrong hands. So, what was he said is *rhetic act* due to the utterance that is contextualizing a sentence in the case of assertions of the real thought. However, Captain America was giving a respond of Iron Man's utterance. He said "*Tony, you choose to do that, if we sign this, we surrender our right to choose".* This first utterance is a warning, just like the last utterance in the previous scene, where he tried to warn everybody in the meeting room, especially Iron Man, about the effect of signing the document as the disagreement side. So, it is *illocutionary act.* After that, he continued to give another respond in giving questions. "*What if this panel sends us somewhere we don't think we should go? What if there is somewhere we need to go, and they don't let us?"* is utterance which is asking in purpose to change the *Avenger's* mind, with Iron Man as the priority. This questioning is done because Captain America wants to keep his idea. If we observe the scene well, we can see that this all was proved by the change of Natasha's expression, means this is *illocutionary act*. Beside, this act also makes Iron Man respond it hard. He stood up in front of Captain America and said *"If we don't do this now, it's gonna be done to us later…"*in high intonation, as a warning. He asserted his opinion about signing the document also. Here, we can conclude the warning into *perlocutionary act.*

Obvious scene of Captain America and Iron Man's conversation found in 57:10**.** Here, the scene tells about the rescued process of Captain America from his escape and his fault in obeying the order from Iron Man's side. The conversation begins with Iron Man that is talking with someone in his phone. He keeps saying about consequences for what was done by Steve Rogers.

Steve Rogers  : *'Consequences'?*
Tony Stark      : *"Secretary Ross wants you both prosecuted, had to give him something."*
Steve Rogers   : *"I'm not getting that shield back, am I?"*

The first one utterance from Captain America, *'Consequences?'* is not a question. Although he uttered the word in kind of questioning intonation, what he was said is kind of sarcasm if we clearly observing the context of the conversation. By his expression with a tiny smile and eyes staring at Tony, he was getting mad with him. As the theory before, sarcasm is *perlocutionary act.* Perlocutionary act always brings effect to the listener, so then Iron Man said *"Secretary Ross wants you both prosecuted, had to give him somethin.",* in order to get the sarcasm from the Captain America. He uttered that with no other purposes but telling Captain America what will he gets, or the consequences. So, considering to the assertion of the real condition, it is *locutionary rhetic act.* Next utterance from Captain America *"I'm not getting that shield back, am I?"*, still in the same position and same expression is similar with the first utterance which is sounded as questioning, but actually is asserting sarcasm, *perlocutionary act*. Here, Captain America was trying to express his unpleasant feeling about the consequences. He was talking about his shield which will

be kept by the government because the agreement from Tony Stark, in case he should've done it because they were friends.

The conversation about consequences before, in the end brings Captain America to the room where he is pushed to do what Iron Man wants. This is the longest conversation between them. It is took five minutes and starts from 57:00.

| | |
|---|---|
| Tony Stark | : *"Hey, you wanna see something cool?*(1)*I pulled something from Dad's archives.* (2)*Felt timely.*(3)(Tony shows him two pens in a black presentation box). *FDR signed the Lend-Lease bill with these in 1941, provided support to the Allies when they needed it most"* (4) |
| | Steve Rogers: *"Some would say it brought our country closer to war.*" (5) |
| Tony Stark | : *"See? If not for these, you wouldn't be here. (6) I'm trying to…what do you call it? That's an olive branch, is that what you call it?"* (7) |
| | Steve Rogers: *"Is Pepper here?I didn't see her."* (8) |
| | Tony Stark   : *"We're kinda… well, not kinda…"*(9) |
| | Steve Rogers           : *"pregnant?"* (10) |
| Tony Stark | : *"No. definitely not. (11) We're taking a break, it's nobody's fault".* (12) |
| | Steve Rogers           : *"I'm so sorry. Tony. I didn't know."* (13) |
| Tony Stark | : *"a few years ago, I almost lost her, so I trashed all my suits. Then, we had to mop up HYDRA… and then Ultron. My fault. And then, and then, I never stopped. Because the truth is I don't wanna stop. I don't wanna lose her. I thought maybe the Accords could split the difference.* (Tony stands up and paces). *In her defense, I'm a handful. Yet, Dad was a pain in the ass, but he and Mom always made it work."* (14) |
| Steve Rogers | : *"You know, I'm glad Howard got married. I only knew him when he was young and single."*(15) |
| Tony Stark | : *"Really? You two know each other? He never mentioned that. Maybe only a thousand times. God, I hated you".* (16) |
| | Steve Rogers: *"I don't mean to make things difficult"* (17) |
| | Tony Stark   : *"I know you're very polite person"* (18) |
| Steve Rogers | : *"If I see a situation pointed south… I can't ignore it, sometimes I wish I could".* (19) |
| | Tony Stark   : *"No, you don't."* (20) |
| | Steve Rogers : (Steve smiles thinly). *"No, I don't. sometimes…"* (21) |
| Tony Stark | : *"Sometimes I wanna punch you in your perfect teeth, but I don't wanna see you gone. We need you cap. So far, nothing's happened that can't be undone, if you sign. We can make the last 24 hours legit. Barnes gets transferred to an American psych-center…instead of a wakandan prison"* (22) |
| Steve Rogers | : (Steve frowns thoughtfully and picks up one of the fountain pens. He stands up and paces, then turns to Tony. In the control room beyond there are multiple screens on the walls). *"I'm not saying it's impossible, but there would have to be safeguards."* (23) |
| Tony Stark | : *"Sure. Once we put out the PR fire, those documents can be amended. I'd file a motion to have you and Wanda reinstated…* (24) |
| Steve Rogers | : *"Wanda? What about Wanda?*" (25) |
| Tony Stark | : *"She's fine. She's confined to the compound, currently. Vision's keeping her company.*" (26) |
| Steve Rogers | : *"Oh God, Tony!! Every time. Every time I think you see things the right way…*" (27) |
| Tony Stark | : *"What? It's a 100 acres with a lap pool. It's got screening room. There's worse ways |

*to protect people".* (28)

Steve Rogers : *"Protection? Is that how you see this? This is protection? It's internment, Tony."* (29)
Tony Stark : *"She's not a US citizen",* (30)
Steve Rogers : *"Oh, come on, Tony."* (31)
Tony Stark : *"they don't grant visas to weapons of mass destruction".* (32)
Steve Rogers : *"She's a kid!"* (33)
Tony Stark : *"GIVE ME A BREAK! I'm doing what has to be done… to stave off something worse."* (34)
Steve Rogers : (Steve nods faintly) *"you keep telling yourself that".* (he puts the pen down). *Hate to break up the set"* (35) (he leaves the office and rueful Tony watches Bucky on one of the control room's service.

In this scene, Tony starts the conversation as the point (1), *hey, you wanna see something cool?*, here he gives question to the Captain America. So, we can get it as *illocutionary act.* He continues his question by giving a sentence that is contextualizing it. We can check in the point (2) and conclude it as *locutionary rhetic act.* Point (3), *felt timely,* it is also contextualizing the previous statements, but it is not a sentence. That utterance is words arranged into grammatical from, means it is a *locutionary phatic act.* Point (4) uttered when Tony is showing the two pens in a black presentation box to Captain America. It refers to the real situation in that time when Iron Man is trying to describe the two pens. Means it is no more than *locutionary rhetic act.* However, the description of the pens is argued by Captain America. In point (5), Captain America states that the pens are brought country closer to the war. It totally different with the statements from Iron Man who said the pen is used tosupport the Allies. So, we can take it as *illocutionary act* based on the arguing utterance. Point (6) is *locutionary rhetic act,* because Tony utters a sentence with the true meaning. He is trying to explain that Captain America is caught up and placed in the room to sign the paper. Indeed, Captain America seems uninterested, so Iron Man gives *I'm trying to…what do you call it? That's an olive branch, is that what you call it?,* in point (7) as a sarcasm trough the Captain America's opinion about the pens. We can conclude it as *perlocutionary act.*

The sarcasm only brings the change of expression in Captain America face. He is trying to ignore it and starting change the topic by asking about Pepper. Look at point (8), it is *illocutionary act.* Point (9) proved it due to the answering from Tony Stark, but the answer isn't clear enough, so in the point (10) Captain America gives him question again. It brings an answer in point (11). Here, we can assert the three points into *illocutionary act* which involved questioning and answering. The next point, (12), still staying in the same topic, Tony Stark is stating the truth about what actually happened between him and Pepper, which is means it is *locutionary rhetic act.* The explanation makes Captain America feels sorry, so he states point (13) as *locutionary rhetic act* too. Besides, the conversation in this time is about the real condition that faced by Tony Stark. Check point (14) and (15). There all are statements that is telling the truth and giving the true meaning or we can say it as *locutionary rhetic act.*

Point (16) is rather different. Here, Tony is showing his bad feeling trough the statement from Captain America about his father through sarcasm. It is *perlocutionary act.* The sarcasm affects Captain America, so he argues it by saying point (17). It is absolutely *illocutionary act.* The next point, Iron Man smiles thinly and deliveres *I know you're very polite person* as a joke of the arguing statement. Point (18) is *perlocutionary act.* The joke makes Captain America keeps silent for a while, then, he takes a deep breath and utters a true explanation about what he actually feels. Point (19) is *locutionary rhetic act.* Point (20) and (21) are both an arguing statement trough the context they talked about, it is *illocutionary act.* In case of the arguing which is seems hard to stop, Tony Stark in the point (22) trying to explain again about his willing trough the signing of the paper. He explains the plan clearly, so it is *locutionary act.* Here, Captain America starting understand and seems little bit agree with Tony. However, he feels doubt, so, to make sure his mind, he gives an order to Tony Stark to prepare a safeguards. Point (23), ordering, is *illocutionary act,* also proved by Tony Stark who said *sure.* Tony stark in point (24) tells to Captain America about the documents, it is *locutionary rhetic act* since it gives the true meaning. In point (25), instead of keep an eye on the explanation about the document, Captain America worries about Wanda, so he asks Iron Man about her. Giving question is *illocutionary act.* Tony Stark answers the question by saying *she's fine* in point (26). In addition, he is also telling the real condition of Wanda in order to giving assertion. It is *illocutionary act.* Unfortunately, the utterance from Iron Man makes Captain America gets mad, so that he is starting to mock Iron Man. The uncompleted statement in point (27) shows *perlocutionary act* which is finally makes Iron Man pissed off and mocks him back, check point (28). However, even if Iron Man states it in a high voice, he tells the truth in a clear meaning, so it is *locutionary rhetic act.*

In that time, Captain America in a condition that worries about Wanda, he doesn't agree with the way Iron Man protects Wanda. It causes him to state sarcasm. Look at point (29), it is *perlocutionary act.* Both of them then stay in short debate by saying the truth from their own perspective about protection. Point (30) and (32) is *locutionary rhetic act* while point (31) is *locutionary phatic act* due to the grammatical form. All of their own arguments without the winning side, Captain America finally utters a caution with higher voice than Iron Man. See point (33), caution is *perlocutionary act.* In other side, Iron Man also makes his voice higher to give a feedback in kind of caution too. Point (34) is also *perlocutionary act.* In the end, the last utterance from Iron Man who doesn't want to listen to Captain America makes Captain America puts the pen down and ends the conversation by stating his disappointed feeling. Point (35) is *locutionary rhetic act.*

The next conversation found in 01:28:30. The place is taken in an airport where Iron Man finally found Captain America who used to escape before. Here are the short conversations in this scene:

    Tony Stark        : *"Wow, it's so weird how you run into people at the airport."*

| | | |
|---|---|---|
| Steve Rogers | : | *"Hear me out, Tony. That doctor, the psychiatrist, he's behind all of this."* |
| Tony Stark | : | *"Anyway, Ross gave me 36 hours to bring you in. that was 24 hours ago. Can you help a brother out?"* |
| Steve Rogers | : | *"You're after the wrong guy"* |
| Tony Stark | : | *"Your judgment is askew. Your old war buddy killed innocent people yesterday"* |
| Steve Rogers | : | *"And there are five more super soldiers just like him. I can't let the doctor find them first, Tony. I can't."* |

It starts with Iron Man who stares at Captain America. He can't hide his un-well face when he said *"Wow, it's so weird how you run into people at the airport"*. From here, we can conclude the utterance as sarcasm to shows how he was almost done to find where Captain America was, means it is *perlocutionary act*. The utterance is respond by Captain America obviously by saying *"Hear me out, Tony. That doctor, the psychiatrist, he's behind all of this"*. He is trying to suggest Tony to believe him through *hear me out, Tony*. It is illocutionary act. However, Iron Man doesn't want to understand it, he keeps saying sarcasm. *"Anyway, Ross gave me 36 hours to bring you in. that was 24 hours ago. Can you help a brother out?"*, this utterance is perlocutionary act, showed by the question that actually is not a true question, but sarcasm due to the rejection of Iron Man order to Captain America. To give a respond of the sarcasm, Captain America tells Iron Man the truth. He said *"You're after the wrong guy"* as *locutionary rhetic act,* but Iron Man still standing in his mind by uttering *"Your judgment is askew. Your old war buddy killed innocent people yesterday"*. That statement is also *locutionary rhetic act*, due to the statement that is true and contextualizing the previous statement. Again, Captain America states the same *locutionary rhetic act* in *"And there are five more super soldiers just like him. I can't let the doctor find them first, Tony. I can't."*

Still in the same place, here are one more short conversation between Captain America and Iron Man. The conversation begins when one of Iron Man's crew, Spider-Man is talking too much during the time.

| | | |
|---|---|---|
| Steve Rogers | : | *"You've been busy"* |
| Tony Stark | : | *"And you've been complete idiot. Dragging in Clint. 'rescuing' Wanda from a place she doesn't even want to leave, a safe place. I'm trying to keep… I'm trying to keep you from tearing the Avengers apart."* |
| Steve Rogers | : | *"You did that when you signed."* |
| Tony Stark | : | *"Alright, we're done. You're gonna turn Barnes over, you're gonna come with us. NOW! Because it's us!"* |

The first utterance from Captain America *"You've been busy"* is a joke, proved by the expression of Captain America that smiles to Iron Man. Joke is *perlocutionary act*. The joke makes Iron Man feel angry, so he scream the utterance "*And you've been complete idiot"*, but the utterance is showing the real condition in a clear meaning to express his anger. It is *locutionary rhetic act.* *"Dragging in Clint. 'rescuing' Wanda from a place she* doesn't *even want to leave, a safe place. I'm trying to keep… I'm trying to keep you from tearing the Avengers apart"*, this next utterance is still about telling the truth. We can take it as *locutionary rhetic act.*Also the statements from Captain America, in order to respond Iron Man, he said*"You did that when you signed"*, here, Captain America also gives a *locutionary rhetic act.*The last in this scene, no matter

what, the utterance from Captain America can't make Iron Man feel good. He keeps getting angry. *"Alright, we're done. You're gonna turn Barnes over, you're gonna come with us. NOW! Because it's us!"* is *locutionary rhetic act.*

After the scene in the airport, the conversation between Captain America and Iron Man is found in 01:57:45**.** Here, Iron Man follows Captain America to somewhere. His suddenly coming makes Captain America and his friend, Bucky a little bit confused because he used to run after both of them.

Steve Rogers : *"Then why are you here?"*
Tony Stark : *"could be your story's not so crazy. Maybe, ross has no idea I'm here. I'd like to keep it that way. Otherwise, I gotta arrest myself"*
Steve Rogers : *"Well, that sounds like a lot of paperwork* (He lowers his shield). *It's good to see you, Tony."*
Tony Stark : *"You too, Cap."*

The conversation begins with Captain America who asked Iron Man by *"Then why are you here?"*, giving question is *illocutionary act.* So that, Iron Man answers his question by *"could be your story's not so crazy. Maybe, ross has no idea I'm here. I'd like to keep it that way. Otherwise, I gotta arrest myself"*. Consider to the context and the way he said, it is has true meaning, so we can conclude it as *locutionary rhetic act.* Captain America responds it by saying his gratitude *"Well, that sounds like a lot of paperwork . It's good to see you, Tony."* that is *locutionary rhetic act.* In the other side, Iron Man also expresses his gratitude in seeing back Captain America by stating a grammatical form *"You too, Cap."* as *locutionary phatic act.*

Starting from the previous conversation, here are the last conversations between Captain America and Iron Man in Civil War Movie. This scene shows the anger of Iron Man who finally found the truth about the death of his family. In the fact, his family was killed by Bucky, Captain America's friend. So, Iron Man tried to revenge his lost, but Captain America wouldn't let him to do that due to the reality that Bucky is his friend.

Tony Stark : (Consumed with grief and tears glistening in his eyes he turns and looks at Steve) *"Did you know?"*
Steve Rogers : *"I didn't know it was him"*
Tony Stark : *"Don't bullshit me, Rogers! Did you know?"*
Steve Rogers : *"Yes."*

Begins with the question from Iron Man, *"Did you know?",* it is *illocutionary act* which is answered by Captain America in a *illocutionary rhetic act.* Indeed, Iron Man still asking the same question, but in this time he is getting angry because he knew the answer from Captain America was not true. Proved by the the answer *"yes"* from Captain America, that questioning is *illocutionary act.*

Steve Rogers : *"It wasn't him, Tony, Hydra had control of his mind!"*
Tony Stark : *"Move!"*
Steve Rogers : *"This isn't gonna change what happened."*

Tony Stark       : *"I don't care. He killed my mom."*
Steve Rogers    : *"He's my friend."*
Tony Stark       : *"So was I."*

That next short conversation happened when Iron Man is trying to kill Bucky. Captain America uttered *"It wasn't him, Tony, Hydra had control of his mind!"* to change Iron Man's mind, so it is *illocutionary act*. Iron Man was still getting mad. He said *"Move!"*in a high voice as an order to Captain America. Ordering is one of *illocutionary act.* The next utterances from Captain America and Iron Man are both *locutionary rhetic act* due to the real condition they tried to show.

Tony Stark : *"That shield doesn't belong to you.*"

The very last conversation was stated by Iron Man. He said *"That shield doesn't belong to you.*" It is kind of *caution*, *perlocutionary act,* proved by Captain America who directly affected by it and drop the shield then leave it with Iron Man.

# IV. CONCLUSION

In this research found the three kind of speech act between the conversation of Captain America and Iron Man. The number of locutionary act is 33, the number illocutionary act is 23 and the number of perlocutuonary act is 15. In this movie, the conversation took most of locutionary act and less of perlocutionary act. In locutionary act, the conversations consisted of rhetic and phatic act. Illocutionary act dominated by asking and answering and perlocutionary act involved sarcasm, joke and caution.

# REFERENCES

Alhamdani, F. Y. (2017). AN INTRODUCTION TO QUALITATIVE RESEARCH DATA ANALYSIS ARTISTIC. (January).

Austin. (1962). How to do things with words. Great Britain: Oxford University Press.

Champoux, J. E. (2007). FILM AS A TEACHING RESOURCE. 7108(2), 240–251.

Education, C., & Konstant, U. (2019). Berg, L. (February).

Jarasch, J., Jamai, I., & Gümüs, K. (2014). Speech Act Theory.

Sándorová, Z. (2019). Content Analysis as a Research Method in Investigating the Cultural Components in Foreign Language Textbooks Content Analysis as a Research Method in Investigating the Cultural Components in Foreign Language Textbooks. (February).

Troxel, W. (2016). Captain America: Civil War. 37(5).

Yule, G. (n.d.). Pragmatics.