



IMPLEMENTATION OF COOPERATIVE LEARNING METHODS TO MOTIVATE AND IMPROVE LEARNING ABILITIES OF STUDENTS IN THE INFORMATICS DEPARTMENT AT INSTITUTO SUPERIOR CRISTAL

Dídimo Agostinho Belo^{1*}, Augusto da Costa², Aderita Mariana Takele³, Agostinho Dos Santos Goncalves⁴
Instituto Superior Cristal^{1,2,4}, Dili Timor Leste³

ARTICLE INFO

Article history:

Received: 17-09-2025

Accepted: 20-11-2025

Published: 31-12-2025

Keyword:

implementation,
cooperative-
learning, motivate,
improve, learning-
abilities

ABSTRACT

The objectives of this research are to discover the benefits of implementing the cooperative learning method to motivate and increase students' learning ability in the informatics department at Instituto Superior Cristal. This study utilizes a qualitative research approach. The Participants are six informants. The instrument for this study is semi-structured and has been validated by supervisors. The technique for data collection is through observation, interviews, and documentation. The collected data are analyzed through the presented reduction and conclusion (verifying and describing the data). The results of this research show that the cooperative learning method motivates students to enhance their learning ability. Therefore, this approach to learning needs to be implemented at various levels of education, such as universities and Secondary Schools.

INTRODUCTION

Education is a fundamental pillar of a nation's development. Quality education is the key to creating qualified, innovative, and globally competitive human resources. In efforts to achieve these objectives, a major challenge for educators is developing effective learning methods that motivate and enhance students' learning abilities.

* Corresponding author.

E-mail addresses: agostinhacabral4@gmail.com (Agostinha Cabra)*, acostas3bk2015@gmail.com (Augusto da Costa), dossantosgoncalvesagostinho@gmail.com (Agostinho Dos Santos Gonçalves),

ISSN: 2523-613X (Online) - ISCE: Journal of Innovative Studies on Character and Education is licensed under Creative Commons Attribution-ShareAlike 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>).

One learning method that researchers aim to study is the Cooperative Learning Method (CLM)(Ekeke & Telu, 2017). CLM is an alternative approach that has attracted the attention of educators and researchers in education. The basic concept of cooperative learning is to foster cooperation and active participation among students in the learning process. Unlike traditional learning approaches that tend to be teacher-centered and individual-focused, the cooperative method encourages students to interact and collaborate to achieve common learning goals (Norman, 2017).

A key aspect of implementing the cooperative method is students' active participation in the learning process. Through various collaborative activities, such as group discussions, joint project work, or role-playing, students have opportunities to share ideas, exchange information, and support one another in understanding subjects. These activities help create an inclusive learning environment. Such an environment encourages students to confidently express their individual ideas in groups or to a wider audience. The objective is to develop students' fundamental competencies and prepare them for a globalized world.

The current global changes represent a global revolution that has introduced a new leadership style. The characteristics of this new leadership are rooted in comprehensive competence, requiring communities and organizations to improve their capacity to adapt to rapid change (Costa et al., 2019). This fact serves as a mirror to reflect on the education system in Timor-Leste. Observing the education system in Timor-Leste, challenges are apparent across various institutions and universities, particularly in the learning process. These challenges include limited basic infrastructure, a shortage of educators in specialized fields, insufficient learning resources, and a lack of student interest in learning. Furthermore, the use of official languages (Tetum and Portuguese) as the medium of instruction poses difficulties for students, especially those who are new to the university or just starting their studies, especially those from outside the Capital city. These indicators raised some questions: (1) What is the Cooperative Learning Method? (2) How can the Cooperative Learning Method be implemented in the learning process in the educational environment? (3) How can the Cooperative Learning Method increase students' learning abilities?

LITERATURE REVIEW

According to Pateşan et al. (2016), cooperative learning is a type of group work that uses small-group instruction to promote students working together to maximize their individual learning. Furthermore, implementing cooperative learning methods involves dividing students into small, well-organized groups, where each group member has a role and responsibility to support one another. These groups work collaboratively to complete learning tasks, discuss topics, and assist one another in achieving common goals.

Sudirman et al. (2023) emphasize that the core principles of cooperative learning align with enhancing students' abilities to contribute to academic success through strong collaboration, thereby developing advanced writing competencies. The term "writing competence" refers to a comprehensive understanding of topics, texts, contexts, grammar, and writing conventions. Cooperative learning plays a vital role in encouraging classroom writing as a means of inspiration and motivation, helping students achieve their full potential.

Pahrudin et al. (2020) further highlight that cooperative learning leads to improved academic performance, enhanced critical thinking skills, the formation of friendly relationships, access to diverse information, and the development of politeness, thereby increasing student motivation. It also helps improve students' attitudes towards school, reduces negative behaviors, and encourages students to appreciate different ideas or perspectives.

According to Pujianto et al. (2020), structured team learning is a teaching method where students work in teams to achieve shared learning objectives, supporting one another with a focus on cooperation, shared responsibility, and mutual encouragement. Important components of cooperative learning include forming heterogeneous groups, ensuring individual accountability, and fostering a supportive classroom climate.

Cooperative learning can be implemented in various forms, such as Think-Pair-Share, Jigsaw, Student Teams-Achievement Division, Teams-Games-Tournament, Cooperative Integrated Reading and Composition, Group Investigation, or Numbered Heads Together. Each form emphasizes active collaboration and interaction among students as a central focus for achieving learning objectives effectively. The following are key elements of cooperative learning and their definitions: (a) Think-Pair-Share: An active learning technique or strategy used in a cooperative learning context to encourage

student participation, reflection, and sharing of ideas (Singh, 2020). (b) Jigsaw: A cooperative learning method or strategy designed to promote collaboration, active student engagement, and a deeper understanding of the material. Jigsaw requires students to work in small groups, called "expert groups," to master specific sections of the material and then share their knowledge with other members in "mixed groups" (Sciences & Muda, 2016).

Student Teams-Achievement Division is a cooperative learning method or strategy designed to increase students' motivation, engagement, and learning outcomes. This method focuses on heterogeneous groups of students with varying levels of ability who work together to support one another in achieving shared learning goals (Dewantara et al., 2020). Teams-Games-Tournament is a cooperative learning model designed to motivate students, enhance their engagement in learning, and facilitate healthy competition in a cooperative context. This model organizes students into small groups that compete for points in academic tournaments, stimulating both motivation and collaboration (Hidayah & Sari, 2020).

Cooperative Integrated Reading and Composition (CIRC) is a cooperative learning model designed to improve students' reading and writing skills. CIRC integrates reading and writing skills into a group collaboration context. This model allows students to work together in small groups to read a text and then use their comprehension to write collaboratively (Maruf & Anjely, 2020).

Group Investigation is a cooperative learning model that provides students with opportunities to collaborate in groups and conduct investigations on a topic or project. In GI, students take active roles in identifying problems, planning, and conducting their investigations. This model encourages engagement, research, problem-solving, and knowledge sharing in a teamwork context (Artawan, 2023). Numbered Heads Together is a cooperative learning technique designed to encourage active participation from all students in classroom learning. This technique requires students to work in small groups and collaborate to solve problems or answer questions posed by the teacher (Maman & Rajab, 2016).

Referring to the above concepts, researchers summarize that cooperative learning is a teaching and learning approach where students work together in groups to achieve shared learning objectives. This approach has several key functions and benefits in the

educational context, including increased student engagement, development of social skills, fostering collaboration, improved understanding, enhanced information retention, development of life skills, reduced social isolation, and teaching responsibility. The students recognize their strengths to achieve group objectives, develop problem-solving skills, engage actively with the teacher, provide feedback, and increase motivation. Learning motivation refers to an internal drive that influences students' behaviors and activities in their effort to achieve learning objectives (da Costa et al., 2019). It reflects students' level of enthusiasm, interest, and determination to engage in the learning process. The motivation to learn involves various intrinsic and extrinsic factors that influence students' intentions and efforts to achieve desired academic outcomes (Carvalho Do Carmo et al., 2020).

According to Novitasari (2023), learning motivation refers to internal or external conditions that drive individuals to learn and improve their understanding and abilities. These conditions may include personal interest, academic goals, social acceptance, and self-drive for growth and development. According to (2022), Learning motivation is an intrinsic factor that influences students' learning outcomes. Motivation in learning is a significant factor for students, besides their responsibility to learn independently (Islamiyah et al., 2025). It is essential to instill motivation in students to foster their determination to learn. Students with strong learning motivation will allocate time and resources effectively to understand the lessons or learning materials they encounter (Utami et al., 2022).

According to Damis & Muhajis (2019), motivation is understood as internal desires that encourage students to engage actively in the learning process. Motivation is a psychological factor that influences students' level of effort, persistence, and determination in studying and achieving academic goals (Rahmawati & Wulan, 2020). Motivation is an internal state that drives and directs an individual's behavior toward achieving specific goals in the learning context. Da Costa et al. (2019) state that motivation plays a crucial role in helping students achieve better learning outcomes and maintain their engagement in the learning process. According to Andriani & Rasto (2019), student motivation is a critical factor influencing the level of participation, attention, and effort students invest in learning.

Referring to the description above, the writer summarizes that learning motivation is essential for students to understand the function of intrinsic motivation and for

educators to understand the sources of students' motivation and to strive to encourage extrinsic motivation. These two types of motivation are associated with satisfaction and a sense of fulfillment in learning. Students with strong motivation tend to be more enthusiastic and resilient in facing learning challenges, and lecturers foster students' extrinsic learning motivation, which comes from outside the student.

METHOD

The characteristics used in this research are descriptive qualitative analysis, conducted directly in the field, to analyze data collected from the field or the school where the research is being carried out. The research design used in this study is phenomenological. This qualitative research is descriptive in nature and focuses on analyzing significant processes and understanding the type of research, with the basic theory used as a guideline, concentrating on the facts found in the field.

The qualitative method, according to Fiantika et al. (2022), serves as a means for the researcher to seek, collect, and analyze all data from informative sources gathered in the field, in order to develop and present credible descriptions based on these sources. The development of the research results will adhere to scientific principles, using credible sources such as observations, interviews, and documentation /recording from reliable sources (Walidin et al., 2020).

The research duration is set at one week, from the submission of the research proposal letter to the Dean of the Faculty of Education Science on 19 - 26, 2023. During this period, the researcher will collect all necessary data, including the mini-proposal examination, which will be reviewed and approved by the evaluators during the proposal seminar. This qualitative research does not aim to generalize its results. The topics studied, which are already reflected in the study's focus, are not predetermined. The study's subjects are the information provided by the informants, who will supply the necessary information throughout the research process, including interviews with two leading professors (including the department head) and three students.

Observation is a technique used to take notes or systematically analyze the symptoms that appear during the research process (Guterres et al., 2023). Interviews are a technique for collecting data in which the researcher directly interacts with respondents to gather information related to the research problem (Bastian et al., 2018). In this study, the interview was conducted directly with the department head,

lecturers, and students to gather information on aspects that could not be observed during classroom teaching and learning activities. The interviews were conducted according to prepared guidelines. Documentation involves gathering documents related to the research problem and data collection process (Gendro, 2022). The documents used in this study include lesson plans, practical questions, final assessment questions, and photos from activities during the learning process.

Data analysis is the process of seeking and organizing data collected through techniques such as interviews, observations, and documentation, using tools like audio/video recordings to highlight important points and draw conclusions. This makes it easier to understand, especially in light of ideas from the field (Rijali, 2019). Qualitative data is an effort to organize and categorize collected data into units that can guide data management and help identify relevant learning models. The data analysis process follows these steps: Data Collection, Data Presentation, Data Reduction, and Conclusion (Verification and Description) (Ilyas et al., 2022).

RESULT AND DISCUSSIONS

Result

Referring to the motivation to increase the ability of students, no Hasa'e Abilidade Estudante, the results of the research showed that the implementation of the cooperative learning Method. The following table lists categories to motivate and enhance students' abilities.

Kategoria	SUB-KATEGORIA
To motivate and increase students' ability	What is the student comprehending about the cooperative learning method?
	How is students' experience with utilizing the cooperative learning method?
	Based on students' experience, what are the benefits of implementing the cooperative learning method?

Table1: Kategoria no Sub Kategoria ba Estudante

Kategori	Sub-Kategori
To motivate and increase students' ability	What do the lecturers and the Head of Department understand about the cooperative learning method?
	What is the experience of lecturers and the head of the Department in utilizing the cooperative learning method?
	Based on the lecturers' and the Head of Department's experience, what are the benefits of implementing the cooperative learning method?

Table 2: Category and Sub-category for lecturers and heads of Department

Cooperative Learning Method

Based on the results of interviews with students, teachers, and the department head regarding their understanding and thoughts on the Cooperative Learning Method (CLM), the following was shared:

According to the students:

1. *The Cooperative Learning Method (CLM) is a study model in which students work together to gain knowledge and share tasks within small groups. It is a method that helps students learn better by interacting in groups, exchanging ideas, and discussing various topics. The Cooperative Learning Method helps students learn what they cannot learn on their own in their environment. It is a way to guide students and assign tasks so they can collaborate in groups and present their results to another group in the classroom (E1.M.19.II. Student, E.3, F.22.II. Student, E2. M. 21. IV. Student).*

According to the teachers and the head of the Department:

The Cooperative Learning Method is an approach that allows students to learn knowledge in their everyday lives. It is a group-based learning method that fosters discussions between students within their groups, and it also encourages discussion between different groups (D.M.26. Teacher), (Xd.M.35. Department Head).

Based on interviews with students, teachers, and the department head, the researcher concludes that the Cooperative Learning Method is an approach that emphasizes student cooperation to achieve learning objectives. This method

emphasizes creating a collaborative learning environment in which students work together, share ideas, and support one another throughout the learning process. Because of this, teachers need to implement this method, as it helps shape students' mindset in the school environment and their learning process.

As students become more involved in the school environment or the learning process, they are naturally motivated to learn. This process helps improve students' abilities in teaching and learning, making the Cooperative Learning Method more effective than conventional learning methods. Cooperative learning is a method where students collaborate in small groups to achieve shared learning objectives. It emphasizes respecting individual differences and how collaboration can improve students' understanding and motivation (David W. Johnson and Roger T. Johnson, 2018).

Implementation of the Cooperative Learning Method

Based on the results of interviews with students, teachers, and the department head, their views, based on their experiences with the Cooperative Learning Method, suggest that this method can be implemented in the educational environment as follows: According to the students:

Based on my experience with the Cooperative Learning Method, it is a learning approach in which we, as students, work together in small groups to achieve learning objectives. This method allows us to collaborate within a team to solve problems, create projects, and understand various concepts. From my experience, the Cooperative Learning Method was very effective in the classroom because it helped shape my mindset and improve my ability. I believe the method helped me in class by developing skills that will be useful in the future when implementing it. Also gained skills through this method that others have already implemented (E1.M.19.II, 2024 student; E3.F.22.II, student; E2.M.21.IV, student).

Based on the results of interviews with students, teachers, and the department head, the researcher concludes that the Cooperative Learning Method can be implemented at all levels of education, from elementary school to university, using various techniques and strategies that educators can employ. This method emphasizes cooperation, active participation, and the development of social skills, which are essential for preparing students to become competent and contribute to society. Based on field interviews, many students expressed satisfaction with the

implementation of the Cooperative Learning Method, and it has provided significant benefits, particularly for learning outcomes. Moreover, students are eager to learn more about the method so that they can apply it in the future. The importance of integrating cooperative learning into the curriculum was highlighted, including identifying and selecting topics that foster student collaboration and paying attention to group composition. It is also important to create balanced groups based on students' abilities and backgrounds. Adequate support and training should be provided to teachers to ensure they understand and apply the Cooperative Learning Method effectively (Slavin, 1980).

Influence of the Cooperative Learning Method on Motivating and Enhancing Student Learning Abilities. According to the students:

Based on my experience in classes where the Cooperative Learning Method was implemented, I can say it significantly increased our engagement. From what I understand, the benefit for me was that when the teacher used this method in class and assigned us to groups, I had the opportunity to present our work and explain it to others. This method allowed me to learn from my peers. Based on my experience, whenever the teachers used the Cooperative Learning Method in class, I benefited a lot because if I were to implement this method in the future, I would already have prior experience with it (E1.M.19.II. Student, E3.F.22.II. Student, E2.M.21.IV. Student).

According to the teacher and department head, 2. Based on my experience with the Cooperative Learning Method, I can say it has a significant influence on students' learning abilities, as they learn to collaborate in their daily lives as students. Yes, the Cooperative Learning Method greatly influences students' abilities because it encourages them to engage in discussions about a particular subject, during which they begin to express their thoughts and challenge other groups. This is the influence it has on students (Dc.M.26.Teacher, Xd.M.35.Head of Department).

Discussions

Based on interviews with students, teachers, and department heads, the researcher concludes that the Cooperative Learning Method has a significant positive influence on students' learning, particularly in motivation and skill development. According to the researcher's analysis, the findings are as follows:

1. Student Motivation:

(a) Increased Intrinsic Motivation: Cooperative methods make learning more interesting and meaningful for students (da Costa et al., 2019). They feel more involved in the learning process because they have opportunities to participate actively, collaborate with peers, and take on essential roles within the group. This helps to increase their motivation to learn, as they feel more in control of their own learning.

(b) Social Support: Collaboration within groups allows students to feel supported by their peers. They can exchange ideas, help each other understand information, and feel that they are not alone in overcoming challenges. This social support increases students' motivation to continue working and not give up when facing difficulties.

(c) Social Rewards: The cooperative method also provides social rewards, such as recognition and appreciation from peers. When students feel valued as part of the group due to their contributions, it enhances their motivation to continue participating and performing well.

Student Skills: (a) Communication Skills: Collaboration in the cooperative method strengthens students' communication skills, including the ability to speak clearly, listen carefully, and present ideas effectively. These skills are essential in both academic and everyday life.

(b) Teamwork Skills: Cooperative methods develop students' teamwork skills, including the ability to collaborate, share tasks, and achieve common goals within a group. This prepares students to work in teams in future professional environments.

(c) Critical Thinking Skills: Discussions and group problem-solving promote critical thinking. Students must consider different viewpoints, build arguments, and formulate solutions based on evidence.

(d) Conflict Management Competence: Involvement in group collaboration also trains students to resolve conflicts and differences of opinion. They learn to find solutions that are fair and acceptable to all, leading to consensus.

(e) Metacognitive Skills: The cooperative method helps students understand how they learn and how they can improve their comprehension. This promotes essential metacognitive skills in planning and managing their learning. Cooperative learning enables students to collaborate, exchange ideas, and communicate effectively with their peers. This interaction further enhances their motivation to participate in the learning process actively. Cooperative learning activities involving discussion and group work also foster motivation and language skills over time (Abdi, 2004).

CONCLUSIONS

The conclusion, based on the research results and the implementation of the Cooperative Learning Method to motivate and improve students' abilities in the Department of Informatics at Instituto Superior Cristal Dili, is as follows:

1. The Cooperative Learning Method is very important for students because it creates a learning environment that supports collaboration, social interaction, and the development of essential skills. It helps to prepare students for continuous studies. Cooperative learning is an educational method where students work together in small groups, typically of 3 to 6 people, to achieve a common learning objective. They share responsibilities, discuss, and collaborate to solve problems, explore concepts, or complete academic tasks.
2. Based on the conclusion of the research, which also includes a reason for implementing the Cooperative Learning Method, the researcher concludes that the method is highly important for students because, through its implementation, students can become more active in class by engaging in group discussions, presenting work, exchanging ideas within a group or between different groups, and generally becoming more engaged in the learning process. The research results show that implementing the Cooperative Learning Method helps students understand and realize they can become the main contributors to their own learning process.
3. The Cooperative Learning Method significantly influences students' motivation and abilities, as they learn to work together to complete tasks, thereby increasing their motivation to learn. This method ensures that students do not work in isolation but instead become active participants in the learning process.

Therefore, cooperative learning not only helps students understand concepts but also develops their social skills, motivation, and abilities that are relevant to their lives. It creates a dynamic and meaningful learning environment that allows students to develop holistically.

REFERÊNCIAS

- Artawan, P. (2023). *The Effectiveness of Group Investigation Cooperative Learning Model on Students' Science Learning Achievement*. 9(6),4544–4550.
- Atmoko, A., Machfudz, M., Mansur, R., & Da Costa, A. (2022). Motivation contribution to religious learning behavior during the covid pandemic. *Cakrawala Pendidikan*, 41(1), 271–283. <https://doi.org/10.21831/cp.v41i1.43255>
- Carvalho Do Carmo, A., Pereira, S., Moreira, X., & Da Costa, A. (2020). Impact of Parent'S Motivation on Students Academic Achievement in Catholic Secondary School of São José Operário De Remexio. *Journal of Innovative Studies on Character and Education ISCE : Journal of Innovative Studies on Character*, 4(2), 2020. <http://iscjournal.com/index.php/isce>
- Costa, A. da, Goncalves, A. D. S., Pereira, S., & Hitipeuw, I. (2019, March 25). *The Impact of Smartphone on Universitarian Psychological Wellbeing*. <https://doi.org/10.4108/eai.21-11-2018.2282266>
- da Costa, A., Hanurawan, F., Atmoko, A., & Hitipeuw, I. (2019). The model of grade point average academic of timor-leste S in Indonesia. *International Journal of Scientific and Technology Research*, 8(6), 213–216.
- Ekeke, H., & Telu, J. (2017). *Cooperative and Self-regulated Learning Styles on Students' Achievement in Biology*. 3(1).
- Ilyas, M., Herwin, H., Ma'rufi, M., Lidiasari, A. T., & da Costa, A. (2022). Technology integration in learning management: A post-pandemic phenomenological study in elementary schools. *World Journal on Educational Technology: Current Issues*, 14(4), 1205–1216. <https://doi.org/10.18844/wjet.v14i4.7729>
- Islamiyah, N. I., Atmoko, A., Simon, I. M., & Da Costa, A. (2025). Contribution of Religious Motivation and Learning Behavior to Academic Achievement of Eleventh Grade Students. *Jurnal Pembelajaran, Bimbingan, Dan Pengelolaan Pendidikan*, 5(4), 10. <https://doi.org/10.17977/um065.v5.i4.2025.10>
- Norman, Z. (2017). The Integration of Intercultural Competence and Servant Leadership Style of Faculty: An Emergent Teaching Style in Higher Education. *SSRN Electronic Journal, January*. <https://doi.org/10.2139/ssrn.2937464>

- Olinda Guterres, Augusto da Costa, A. D. S. G. (2023). Strategy Of The Training Management And Leadership For Youth Of Partidu Kmanek Haburas Unidade Nasional Timor Oan. *Journal of Innovative Studies on Character and Education*, 7(2), 370–374.
- Pateşan, M., Balagiu, A., & Zechia, D. (2016). *The Benefits of Cooperative Learning. International Conference KNOWLEDGE-BASED ORGANIZATION*, 22(2), 478–483. <https://doi.org/10.1515/kbo-2016-0082>
- Pahrudin, A., Munifah, Wardhani, S., Purnama, S., & Joemsittiprasert, W. (2020). The implementation of cooperative learning to developed management of language learning system. *Journal for the Education of Gifted Young Scientists*, 8(1), 379–392. <https://doi.org/10.17478/jegys.675251>
- Pujianto, D., Insanisty, B., & Sutisyana, A. (2020). *Using Cooperative Learning to Teach Team Game Tournament Structure in Learning Physical Education and Sports. 464(Psshers 2019)*, 309–314.
- Rahmawati, A. S., & Wulan, D. (2020). Motivasi Belajar Peserta Didik Ditinjau Dari Model Pembelajaran DiSTAD. *Jurnal Pendidikan Fisika Dan Teknologi*, 6(2), 314–319. <https://doi.org/10.29303/jpft.v6i2.2137>
- Sciences, P., & Muda, U. I. (2016). *The Application of Jigsaw Cooperative Learning Model towards the Improvement of Students' Critical Thinking Ability in Public Senior High School 15 Banda Aceh , Indonesia*. 1113–1122.
- Singh, C. K. S. (2020). *The Use of Think Pair Share of Cooperative Learning to Improve Weak Students' Speaking Ability. International Journal of Psychosocial Rehabilitation*, 24(5), 4008–4023. <https://doi.org/10.37200/ijpr/v24i5/pr2011>
- Sudirman, A., Fifardin, F., & Berkanis, M. I. (2023). *The Transformative Roles of Cooperative Learning in Promoting EFL Students' Writing Competence The Transformative Roles of Cooperative Learning in Promoting EFL Students' Writing Competence Department of English Education , Graduate Program , Universita. July*.
- Walidin, W., Saifullah, & ZA, T. (2020). *Metodologi Penelitian Kualitatif Dan Grounded Theory. Pengaruh Penggunaan Pasta Labu Kuning (Cucurbita Moschata) Untuk Substitusi Tepung Terigu Dengan Penambahan Tepung Angkak Dalam Pembuatan Mie Kering*, 8(January), 274–282.