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The Communication Skills Profile of Pre-Service Biology Teachers

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Abstract: The focus of learning design and learning innovations for the twenty-first century is preparing students with communication skills. Students must have communication skills to transfer scientific knowledge, scientific processes, knowledge, and insights, as well as other important data effectively. The objective of this study was to determine the profile of communication skills possessed by pre-service biology teachers at IAIN Ternate. This is a quantitative descriptive study involving 65 students from the Tadris Biology Department at IAIN Ternate. The research was conducted during the even semester of the 2021/2022 academic year. Observation sheets of verbal and nonverbal communication were used to collect data. The technique for collecting data is direct observation (experience) of the learning process and interactive class discussion in the target classroom. The results indicated that the verbal and nonverbal communication abilities of pre-service biology teachers were extremely deficient. These findings provide educators with an overview of effective learning approaches for training students to be independent and proficient in 21st century skills.

Keywords: *Pre-service Biology Teachers, Communication Skills, Non-Verbal, Profile, Verbal*

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Introduction

The importance of studying communication skills in the realm of education stems from the fact that communication between instructors and students has a significant impact on the efficacy of learning outcomes. Effective communication has a crucial function in education, affecting both productivity and the atmosphere of the classroom (Alawamleh et al., 2020; Hariyanto et al., 2019). Communication in the classroom can create a free-thinking environment for students to explore and reflect on their ideas in an argumentative forum (Makur, 2019). Communication is dynamic and interactive, so students can readily respond, conclude, assess, and make comments and thoughts as feedback on a concept or argument (Uyen et al., 2021). Communication skills include the ability to explain ideas effectively and persuasively orally and in writing, express viewpoints in clear words, convey clear instructions, and motivate others through effective public speaking (Hasanah & Malik, 2020; Shivni et al., 2021).

The constructivist learning paradigm is founded on the ability of students to actively interpret information in their own way; students construct their own knowledge with meaningful ideas that integrate newly acquired knowledge with previously acquired knowledge and experience (Adnan et al., 2021). This process of determining meaning will be more efficient if pupils possess adequate communication skills. Through proper identification and delivery of scientific ideas, constructivist learning conditioning can be trained. Facilitating constructivist and meaningful

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learning experiences in the scientific inquiry process helps foster scientific literacy, teamwork, and communication skills in students (Rahayu, 2017). Students must be able to utilize words, symbols, graphs, and tables to describe an object, an event, an activity, and the result of a discussion in order to promote their science process skills (Omeodu et al., 2021).

To overcome verbal communication difficulties with students, comprehend nonverbal communication from students, and constructively resolve conflicts in the classroom, educators require communication skills (Santrock, J, 2007). Students must be able to integrate acquired knowledge into a social context by employing communication principles to construct a thinking discourse (Mwakapina, 2020). The focus of learning and innovation in the 21st century is on preparing students to think critically, communicate, collaborate, and think creatively (Permana et al., 2020). Communication skills are essential in the workplace, especially in the twenty-first century; consequently, they must be polished in the classroom from a young age (Hariyanto et al., 2019). Students with strong communication skills can enjoy a higher quality of life because these skills can help the development of other crucial abilities (Haryanti & Suwarma, 2018).

Many biology courses in universities still follow conventional learning which leads to inactivity and lack of confidence in students to ask questions (Nurmala & Priantari, 2017). Poor communication skills are demonstrated by students' poor speaking abilities in presentations or laboratory work (Fajarianingtyas et al., 2021). Learners from diverse social, cognitive, and personality backgrounds should be able to enhance an environment of active learning in which they may speak extensively to comprehend topics. Teachers are frequently challenged by students' inability to ask questions while encountering obstacles during the learning process (Fitriah et al., 2020). The learning approach, which is dominated by lecturing and largely consists of passive listening, is incapable of training students' communication abilities (Nurmala & Priantari, 2017).

Higher education faces the difficulty of preparing graduates with great self-confidence while presenting ideas, speaking publicly, asking questions, and possessing adequate verbal and nonverbal communication skills. The ability to convey discoveries or studies is one of the key abilities involved in the scientific process (sciencing) (Oktaviani & Hidayat, 2010). Biology education is meant to cultivate in students attitudes that are truthful, objective, open, persistent, critical, and able to collaborate and communicate effectively (Nawawi & Azhari, 2020).

This study's objective was to determine the communication skills profile of pre-service biology teachers at IAIN Ternate. This study is anticipated to give a foundation for university professors to create the skills that students need to confront the challenges of the twenty-first century. In the 21st century, the learning process must stimulate active communication among participants, as well as their ability to comprehend, manage, and produce effective oral, written, and multimedia communication in diverse formats (Nurmala & Priantari, 2017). Educators can design models, learning techniques, and learning methods that will be implemented in the classroom by obtaining knowledge about communication skills. As a result, university graduates will be independent and possess 21st century skills.

Method

In this study, a quantitative descriptive design was adopted. The research sample consisted of sixty-five Biology Education students at IAIN Ternate. The research instrument comprised verbal and non-verbal communication observation sheets. Data were gathered through direct observation (experience) of the classroom learning process. Three observers were engaged in this assignment.

The participants' capacity to communicate verbally and nonverbally was used to assess their communication skills. In this study, verbal communication skills refer to students' abilities to ask and answer questions, interact in groups, convey ideas orally, and respond to ongoing oral presentations. Students' nonverbal communication skills were evaluated based on their ability to communicate the outcomes of observations, debate observation data, draw inferences, make suggestions, and use correct Indonesian spelling (EBI).

Microsoft Excel was used to process the data acquired from the observation sheets, which were then presented as a percentage. The formula used to analyze the data was adopted from (Purwanto, 2009).

$$NP = \frac{R}{SM} X\ 100\%$$

Remarks:
NP = Percentage sought or expected

R = Raw score obtained by the group
SM = The ideal maximum score of the test

The score categories used in this study were presented below.
86-100% = exceptionally good
76-85% = good
60-75% = poor
< 55% = extremely poor

Results and Discussion

Results

Table 1 provides a summary of the verbal communication skill scores collected from the observation sheets.

Table 1. Vocal Communication Skills Scores of Students

No	Vocal Communication Skills (Verbal)	Semester II		Semester IV		Semester VI	
		%	Category	%	Category	%	Category
1	Asking questions	65.00	poor	46.67	extremely poor	25.00	extremely poor
2	Answering questions	30.00	extremely poor	40.00	extremely poor	25.00	extremely poor
3	Group interactions	40.00	extremely poor	33.33	extremely poor	20.00	extremely poor
4	Expressing ideas	35.00	extremely poor	20.00	extremely poor	15.00	extremely poor
5	Oral presentations	65.00	poor	46.67	extremely poor	25.00	extremely poor
6	Responding to others' presentations	65.00	poor	40.00	extremely poor	35.00	extremely poor

Table 1 demonstrates that the vocal communication skills of second-semester biology teacher candidates at IAIN Ternate for asking questions, oral presentations, and giving presentations fall into the category of poor, while the ability of teachers to respond to questions, interact in groups, and express ideas is categorized as extremely poor. In contrast, students in semesters IV and VI demonstrated inadequate voice communication skills.

Table 2 summarizes the nonverbal communication ability scores collected from the observation sheets.

Table 2. Non-Vocal Communication Skills Score of Students

No	Non-Vocal Communication Skills (Non-Verbal)	Semester II		Semester IV		Semester VI	
		%	Category	%	Category	%	Category
1	Presenting observations	60.00	Poor	40.00	extremely poor	25.00	extremely poor
2	Discussing observational data	55.00	extremely poor	33.33	extremely poor	20.00	extremely poor
3	Drawing inferences	35.00	extremely poor	26.67	extremely poor	15.00	extremely poor
4	Making suggestions	30.00	extremely poor	13.33	Sangat Kurang	15.00	extremely poor

No	Non-Vocal Communication Skills (Non-Verbal)	Semester II		Semester IV		Semester VI	
		%	Category	%	Category	%	Category
5	Using correct Indonesian spelling (EBI).	50.00	extremely poor	40.00	extremely poor	25.00	extremely poor

According to Table 2, the non-vocal communication skills of second-semester pre-service biology teachers at IAIN Ternate for presenting observational data are classified as poor, while those for discussing observational data, drawing inferences, making suggestions, and utilizing EBI are categorized as extremely poor. Additionally, students in the fourth and sixth semesters performed poorly in all areas of the non-vocal communication skills evaluation.

Discussion

Observational data revealed that the pre-service biology teachers lacked both verbal and non-vocal communication skills. The poor level of their communication skills may be a result of the limited variety of learning models and techniques employed in the classroom, which are incapable of training their ability to ask and answer questions. When students with high academic ability dominate the completion of group assignments and the presentation of discussion results, group interaction is not conducive.

Participants' capacity to articulate thoughts and arguments is deemed undeveloped. The capacity to relate assignment concepts is still confined to the key elements of the assignment material. Observations revealed that the students had trouble providing further explanations, articulating the information's connection to everyday problems, expressing thoughts and points of view, challenging current solutions, and grasping the presented material. They also struggled with delivering the discussion's conclusions and topic in a structured manner. This is because the students lack conceptual knowledge and critical thinking skills. They were infrequently engaged in the independent building of knowledge and comprehension because the repetitive lecturing technique had dominated the learning process thus far.

One aspect that can explain the students' poor communication skills is their misunderstanding of biological ideas (Sari et al., 2019). In this study, the students appeared afraid to answer the lecturer's questions since did not master the content (Hamidah & Luzyawati, 2022). Anisah & Wisanti (2022) found that errors in picking the correct sentences, lack of knowledge of subjects, lack of confidence, anxiety, and lack of fluency when expressing opinions in class also contributed to the challenges the participants experienced. The students tended to communicate less interactively, use less technology, and deliver messages or information less assertively and effectively (Dipalaya et al., 2016). This lack of communication capacity might hinder the ability to comprehend information, integrate ideas and speech, and adjust to the environment (Wood & Hasrtshorne, 2017).

Communication skills are a fundamental requirement for conducting the scientific process (Oktaviani & Hidayat, 2017). Reading skills, discussion presentations, and writing activity reports all contribute to the development of communication skills in biology education (Mursidah et al., 2019). With communication skills, students can gain experience presenting the results of a completed scientific procedure. Students can learn to convey the results of their studies through graphs, tables, images, and other forms of presentation (Wahyuningsih & Fatonah, 2021).

Verbal communication is essential for students to communicate their results and thoughts orally through oral presentations, conversations, and debates, and helps them predict writing test performance (Haworth & Garrill, 2003). Effective communication is characterized by the capacity to articulate thoughts and ideas clearly in vocal, written, and nonverbal forms. Communication skills are also evidenced by the capacity to listen effectively in order to interpret meaning, to use communication for a variety of reasons, to employ a variety of media and technology, and to communicate effectively in a variety of settings

(including multi-language) (Khoerunisa & Habibah, 2020)

Effective oral communication skills can assist pupils in achieving greater academic success and proficiency (Crebert et al., 2011). Oral communication is seen effective since students provide feedback in the form of questions and responses during the learning process (Wisman, 2017). This feedback enables pupils to enhance their previous communication methods. Communication skills are essential for engaging in productive social interactions, fostering mutual understanding, and maximizing learning results (Kurniati, 2016). For aspiring biology teachers, oral communication skills are the most crucial factor in effectively conveying science, understanding, and other pertinent information (Sari et al., 2 C.E.).

To attain appropriate learning objectives and outcomes, the communication process in learning is conducted from multiple directions. Confidence and the capacity to adapt students' grasp of the content being studied are two factors that can affect students' communication skills. The capacity to communicate can assist and aid students in expressing their thoughts and exchanging information with teachers or other students (Marfuah, 2017). The level of mastery of a subject or idea and a person's reasoning ability will impact the quality of the argument, including the individual's communication ability (Amin et al., 2021).

The benefits of communication skills for students in the learning process is that they enable pupils to comprehend the information and messages offered by educators as materials or concepts. In addition, through communication skills, students are able to provide comments, communicate their ideas and opinions, and ask pertinent questions when they struggle to comprehend the topic (Milawati, 2014). Verbal and nonverbal communication skills are essential to improve university graduates' competency and their professional success (Kompella et al., 2020; Wrighting et al., 2021). Through the construction of a network structure to offer and improve good interpersonal and coordination abilities, the communication process plays a significant role in altering people's behavior (Tekad & Febriana, 2021).

Conclusion

Data analysis revealed that the vocal communication skills of second-semester biology teacher candidates at IAIN Ternate for asking questions, oral presentations, and giving presentations fall into the category of poor, while the ability of teachers to respond to questions, interact in groups, and express ideas is categorized as extremely poor. In addition, students in semesters IV and VI demonstrated extremely poor vocal communication skills.

Meanwhile, the non-vocal communication skills of second-semester pre-service biology teachers at IAIN Ternate for presenting observational data are classified as poor, while those for discussing observational data, drawing inferences, making suggestions, and utilizing EBI are categorized as extremely poor. Additionally, students in the fourth and sixth semesters performed very poorly in all areas of the non-vocal communication skills evaluation.

This study on communication skills demonstrates that pre-service biology teachers' communication skills, particularly at IAIN Ternate, still require improvement. Educators must strive for the empowerment of creative learning models that are more diverse in teaching autonomous learning and the persistent and ongoing active engagement of students in learning. This effort can be made so that the output of future biology instructors meets the skill requirements of the twenty-first century.

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Introduction

The importance of studying communication skills in the realm of education stems from the fact that communication between instructors and students has a significant impact on the efficacy of learning outcomes. Effective communication has a crucial function in education, affecting both productivity and the atmosphere of the classroom (Alawamleh et al., 2020; Hariyanto et al., 2019). Communication in the classroom can create a free-thinking environment for students to explore and reflect on their ideas in an argumentative forum (Makur, 2019). Communication is dynamic and interactive, so students can readily respond, conclude, assess, and make comments and thoughts as feedback on a concept or argument (Uyen et al., 2021). Communication skills include the ability to explain ideas effectively and persuasively orally and in writing, express viewpoints in clear words, convey clear instructions, and motivate others through effective public speaking (Hasanah & Malik, 2020; Shivni et al., 2021).

The constructivist learning paradigm is founded on the ability of students to actively interpret information in their own way; students construct their own knowledge with meaningful ideas that integrate newly acquired knowledge with previously acquired knowledge and experience (Adnan et al., 2021). This process of determining meaning will be more efficient if pupils possess adequate communication skills. Through proper identification and delivery of scientific ideas, constructivist learning conditioning can be trained. Facilitating constructivist and meaningful learning experiences in the scientific inquiry process helps foster scientific literacy, teamwork, and communication skills in students (Rahayu, 2017). Students must be able to utilize words, symbols, graphs, and tables to describe an object, an event, an

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activity, and the result of a discussion in order to promote their science process skills (Omeodu et al., 2021).

To overcome verbal communication difficulties with students, comprehend nonverbal communication from students, and constructively resolve conflicts in the classroom, educators require communication skills (Santrock, J, 2007). Students must be able to integrate acquired knowledge into a social context by employing communication principles to construct a thinking discourse (Mwakapina, 2020). The focus of learning and innovation in the 21st century is on preparing students to think critically, communicate, collaborate, and think creatively (Permana et al., 2020). Communication skills are essential in the workplace, especially in the twenty-first century; consequently, they must be polished in the classroom from a young age (Hariyanto et al., 2019). Students with strong communication skills can enjoy a higher quality of life because these skills can help the development of other crucial abilities (Haryanti & Suwarma, 2018).

Many biology courses in universities still follow conventional learning which leads to inactivity and lack of confidence in students to ask questions (Nurmala & Priantari, 2017). Poor communication skills are demonstrated by students' poor speaking abilities in presentations or laboratory work (Fajarianingtyas et al., 2021). Learners from diverse social, cognitive, and personality backgrounds should be able to enhance an environment of active learning in which they may speak extensively to comprehend topics. Teachers are frequently challenged by students' inability to ask questions while encountering obstacles during the learning process (Fitriah et al., 2020). The learning approach, which is dominated by lecturing and largely consists of passive listening, is incapable of training students' communication abilities (Nurmala & Priantari, 2017).

Higher education faces the difficulty of preparing graduates with great self-confidence while presenting ideas, speaking publicly, asking questions, and possessing adequate verbal and nonverbal communication skills. The ability to convey discoveries or studies is one of the key abilities involved in the scientific process (sciencing) (Oktaviani & Hidayat, 2010). Biology education is meant to cultivate in students attitudes that are truthful, objective, open, persistent, critical, and able to collaborate and communicate effectively (Nawawi & Azhari, 2020).

This study's objective was to determine the communication skills profile of pre-service biology teachers at IAIN Ternate. This study is anticipated to give a foundation for university professors to create the skills that students need to confront the challenges of the twenty-first century. In the 21st century, the learning process must stimulate active communication among participants, as well as their ability to comprehend, manage, and produce effective oral, written, and multimedia communication in diverse formats (Nurmala & Priantari, 2017). Educators can design models, learning techniques, and learning methods that will be implemented in the classroom by obtaining knowledge about communication skills. As a result, university graduates will be independent and possess 21st century skills.

Method

In this study, a quantitative descriptive design was adopted. The research sample consisted of sixty-five Biology Education students at IAIN Ternate. The research instrument comprised verbal and non-verbal communication observation sheets. Data were gathered through direct observation (experience) of the classroom learning process. Three observers were engaged in this assignment.

The participants' capacity to communicate verbally and nonverbally was used to assess their communication skills. In this study, verbal communication skills refer to students' abilities to ask and answer questions, interact in groups, convey ideas orally, and respond to ongoing oral presentations. Students' nonverbal communication skills were evaluated based on their ability to communicate the outcomes of observations, debate observation data, draw inferences, make suggestions, and use correct Indonesian spelling (EBI).

Microsoft Excel was used to process the data acquired from the observation sheets, which were then presented as a percentage. The formula used to analyze the data was adopted from (Purwanto, 2009).

$$NP = \frac{R}{SM} X\ 100\% \quad (1)$$

Remarks:
NP = Percentage sought or expected
R = Raw score obtained by the group
SM = The ideal maximum score of the test

The score categories used in this study were presented below.
86-100% = exceptionally good
76-85% = good

60-75% = poor
< 55% = extremely poor

Table 1 provides a summary of the verbal communication skill scores collected from the observation sheets.

Results and Discussion

Results

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Table 1. Vocal Communication Skills Scores of Students

No	Vocal Communication Skills (Verbal)	Semester II		Semester IV		Semester VI	
		%	Category	%	Category	%	Category
1	Asking questions	65.00	poor	46.67	extremely poor	25.00	extremely poor
2	Answering questions	30.00	extremely poor	40.00	extremely poor	25.00	extremely poor
3	Group interactions	40.00	extremely poor	33.33	extremely poor	20.00	extremely poor
4	Expressing ideas	35.00	extremely poor	20.00	extremely poor	15.00	extremely poor
5	Oral presentations	65.00	poor	46.67	extremely poor	25.00	extremely poor
6	Responding to others' presentations	65.00	poor	40.00	extremely poor	35.00	extremely poor

Table 1 demonstrates that the vocal communication skills of second-semester biology teacher candidates at IAIN Ternate for asking questions, oral presentations, and giving presentations fall into the category of poor, while the ability of teachers to respond to questions, interact in groups, and express ideas is categorized as extremely poor. In contrast, students in semesters IV and VI demonstrated inadequate voice communication skills.

Table 2 summarizes the nonverbal communication ability scores collected from the observation sheets.

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Table 2. Non-Vocal Communication Skills Score of Students

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No	Non-Vocal Communication Skills (Non-Verbal)	Semester II		Semester IV		Semester VI	
		%	Category	%	Category	%	Category
1	Presenting observations	60.00	Poor	40.00	extremely poor	25.00	extremely poor
2	Discussing observational data	55.00	extremely poor	33.33	extremely poor	20.00	extremely poor
3	Drawing inferences	35.00	extremely poor	26.67	extremely poor	15.00	extremely poor
4	Making suggestions	30.00	extremely poor	13.33	Sangat Kurang	15.00	extremely poor
5	Using correct Indonesian spelling (EBI).	50.00	extremely poor	40.00	extremely poor	25.00	extremely poor

According to Table 2, the non-vocal communication skills of second-semester pre-service biology teachers at IAIN Ternate for presenting observational data are classified as poor, while those for discussing observational data, drawing inferences, making suggestions, and utilizing EBI are categorized as extremely poor. Additionally,

students in the fourth and sixth semesters performed poorly in all areas of the non-vocal communication skills evaluation.

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Discussion

Observational data revealed that the pre-service biology teachers lacked both verbal and non-vocal communication skills. The poor level of their communication skills may be a result of the limited variety of learning models and techniques employed in the classroom, which are incapable of training their ability to ask and answer questions. When students with high academic ability dominate the completion of group assignments and the presentation of discussion results, group interaction is not conducive.

Participants' capacity to articulate thoughts and arguments is deemed undeveloped. The capacity to relate assignment concepts is still confined to the key elements of the assignment material. Observations revealed that the students had trouble providing further explanations, articulating the information's connection to everyday problems, expressing thoughts and points of view, challenging current solutions, and grasping the presented material. They also struggled with delivering the discussion's conclusions and topic in a structured manner. This is because the students lack conceptual knowledge and critical thinking skills. They were infrequently engaged in the independent building of knowledge and comprehension because the repetitive lecturing technique had dominated the learning process thus far.

One aspect that can explain the students' poor communication skills is their misunderstanding of biological ideas (Sari et al., 2019). In this study, the students appeared afraid to answer the lecturer's questions since did not master the content (Hamidah & Luzyawati, 2022). Anisah & Wisanti (2022) found that errors in picking the correct sentences, lack of knowledge of subjects, lack of confidence, anxiety, and lack of fluency when expressing opinions in class also contributed to the challenges the participants experienced. The students tended to communicate less interactively, use less technology, and deliver messages or information less assertively and effectively (Dipalaya et al., 2016). This lack of communication capacity might hinder the ability to comprehend information, integrate ideas and speech, and adjust to the environment (Wood & Hasrtshorne, 2017).

Communication skills are a fundamental requirement for conducting the scientific process (Oktaviani & Hidayat, 2017). Reading skills, discussion presentations, and writing activity reports all contribute to the development of communication skills in biology education (Mursidah et al., 2019). With communication skills, students can gain experience presenting the results of a completed scientific procedure. Students can learn to convey the results of their studies through graphs, tables, images, and other forms of presentation (Wahyuningsih & Fatonah, 2021).

Verbal communication is essential for students to communicate their results and thoughts orally through oral presentations, conversations, and debates, and helps them predict writing test performance (Haworth & Garrill, 2003). Effective communication is characterized by the capacity to articulate thoughts and ideas clearly in vocal, written, and nonverbal forms. Communication skills are also evidenced by the capacity to listen effectively in order to interpret meaning, to use communication for a variety of reasons, to employ a variety of media and technology, and to communicate effectively in a variety of settings (including multi-language) (Khoerunisa & Habibah, 2020)

Effective oral communication skills can assist pupils in achieving greater academic success and proficiency (Crebert et al., 2011). Oral communication is seen effective since students provide feedback in the form of questions and responses during the learning process (Wisman, 2017). This feedback enables pupils to enhance their previous communication methods. Communication skills are essential for engaging in productive social interactions, fostering mutual understanding, and maximizing learning results (Kurniati, 2016). For aspiring biology teachers, oral communication skills are the most crucial factor in effectively conveying science, understanding, and other pertinent information (Sari et al., 2 C.E.).

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To attain appropriate learning objectives and outcomes, the communication process in learning is conducted from multiple directions. Confidence and the capacity to adapt students' grasp of the content being studied are two factors that can affect students'

communication skills. The capacity to communicate can assist and aid students in expressing their thoughts and exchanging information with teachers or other students (Marfuah, 2017). The level of mastery of a subject or idea and a person's reasoning ability will impact the quality of the argument, including the individual's communication ability (Amin et al., 2021).

The benefit of communication skills for students in the learning process is that they enable pupils to comprehend the information and messages offered by educators as materials or concepts. In addition, through communication skills, students are able to provide comments, communicate their ideas and opinions, and ask pertinent questions when they struggle to comprehend the topic (Milawati, 2014). Verbal and nonverbal communication skills are essential to improve university graduates' competency and their professional success (Kompella et al., 2020; Wrighting et al., 2021). Through the construction of a network structure to offer and improve good interpersonal and coordination abilities, the communication process plays a significant role in altering people's behavior (Tekad & Febriana, 2021).

Conclusion

Data analysis revealed that the vocal communication skills of second-semester biology teacher candidates at IAIN Ternate for asking questions, oral presentations, and giving presentations fall into the category of poor, while the ability of teachers to respond to questions, interact in groups, and express ideas is categorized as extremely poor. In addition, students in semesters IV and VI demonstrated extremely poor vocal communication skills.

Meanwhile, the non-vocal communication skills of second-semester pre-service biology teachers at IAIN Ternate for presenting observational data are classified as poor, while those for discussing observational data, drawing inferences, making suggestions, and utilizing EBI are categorized as extremely poor. Additionally, students in the fourth and sixth semesters performed very poorly in all areas of the non-vocal communication skills evaluation.

This study on communication skills demonstrates that pre-service biology teachers' communication skills, particularly at IAIN Ternate, still require improvement. Educators must strive for the empowerment of creative learning models that are more diverse in teaching autonomous learning and the persistent and ongoing active engagement of students in learning. This effort can be made so that the output of future biology instructors meets the skill requirements of the twenty-first century.

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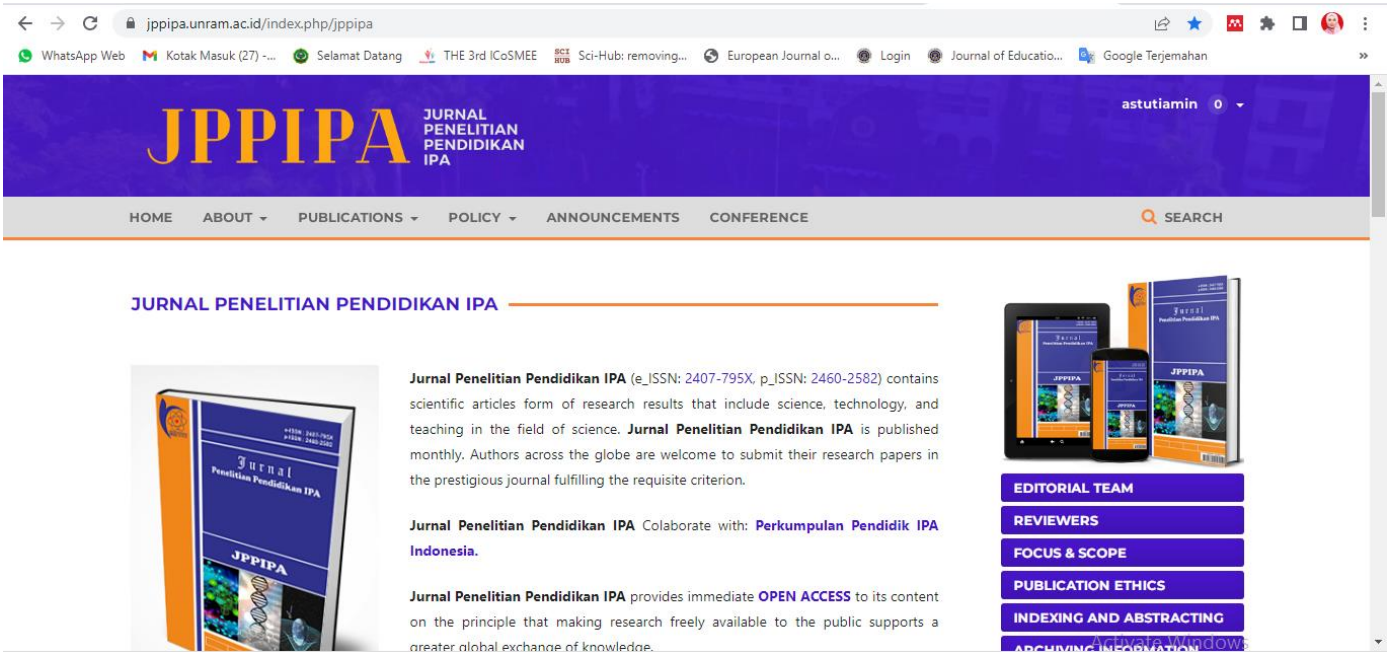

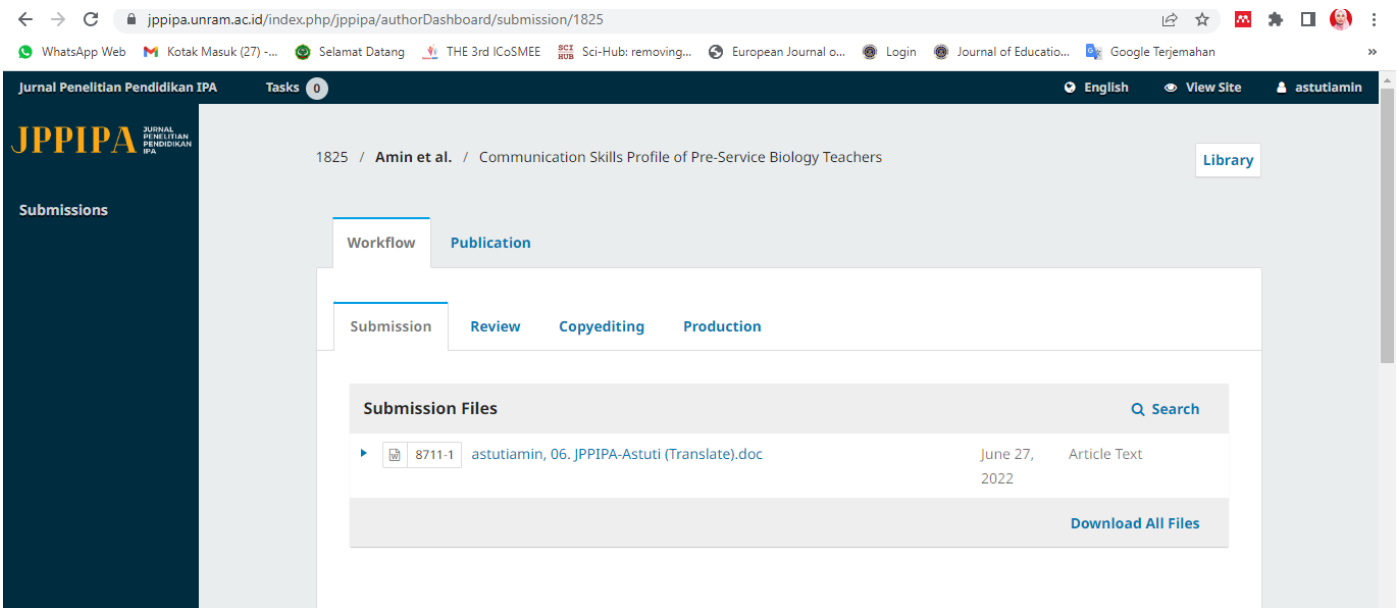

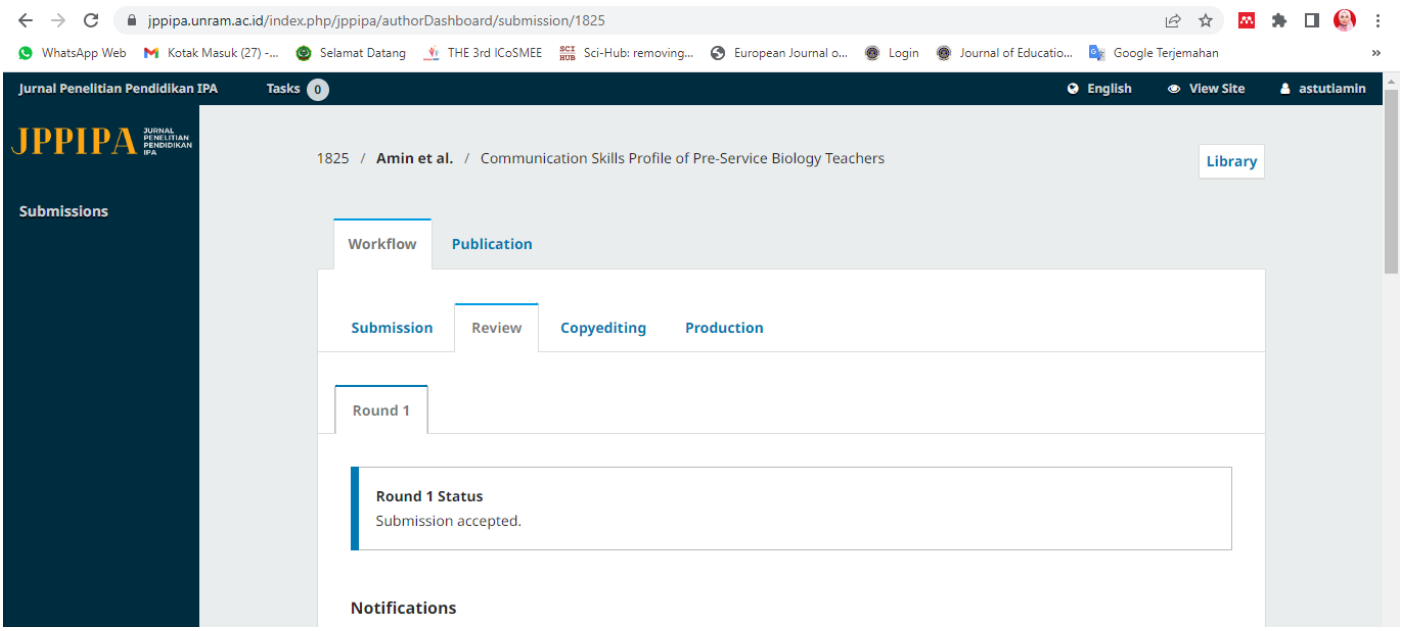
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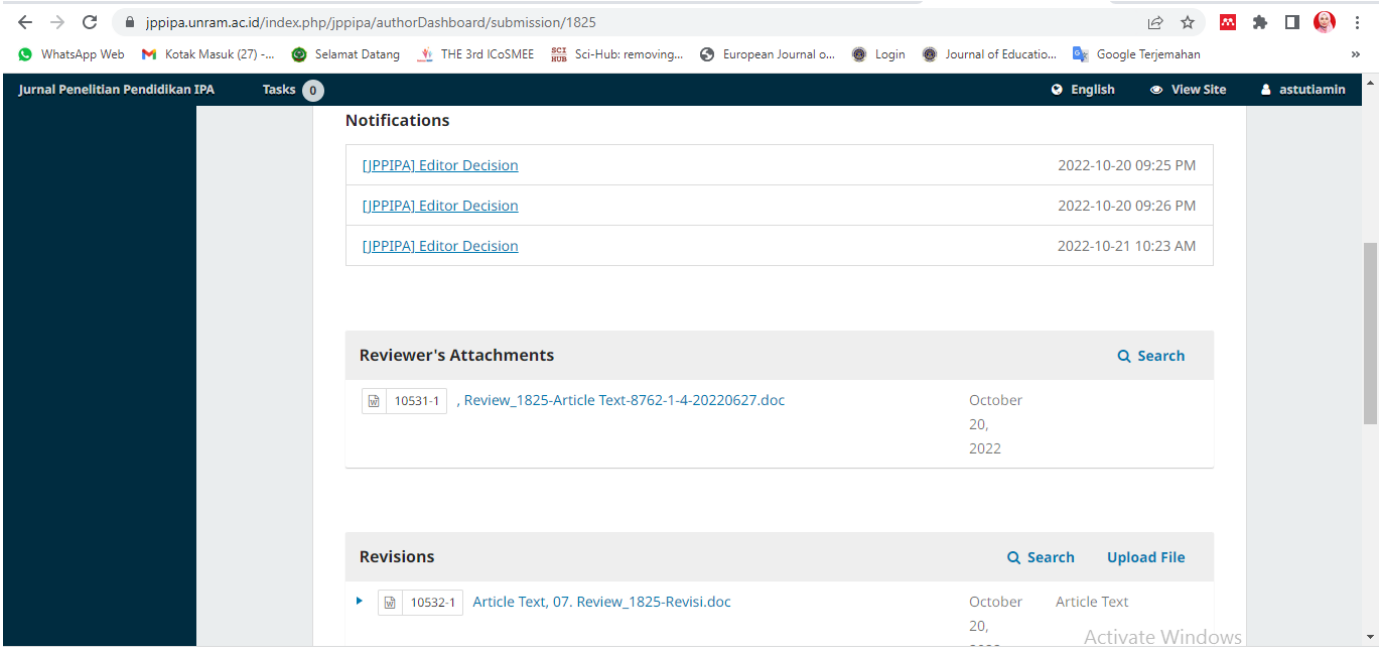
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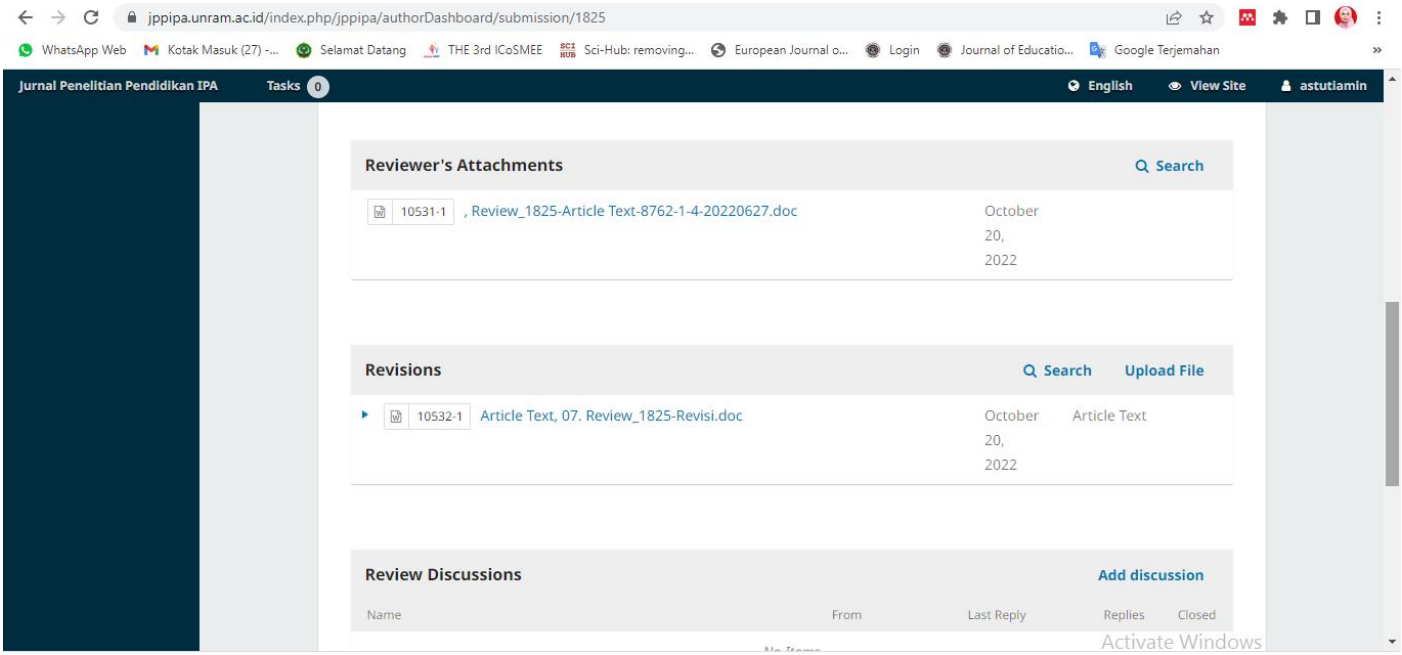
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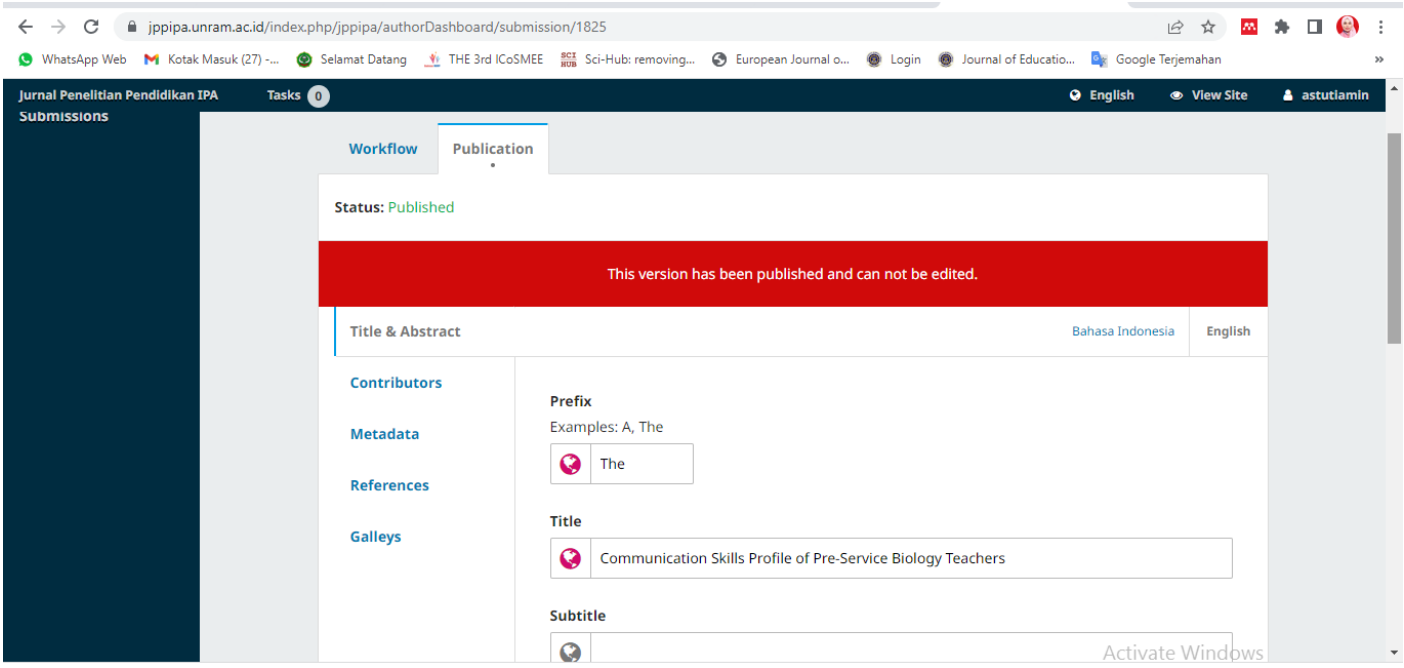
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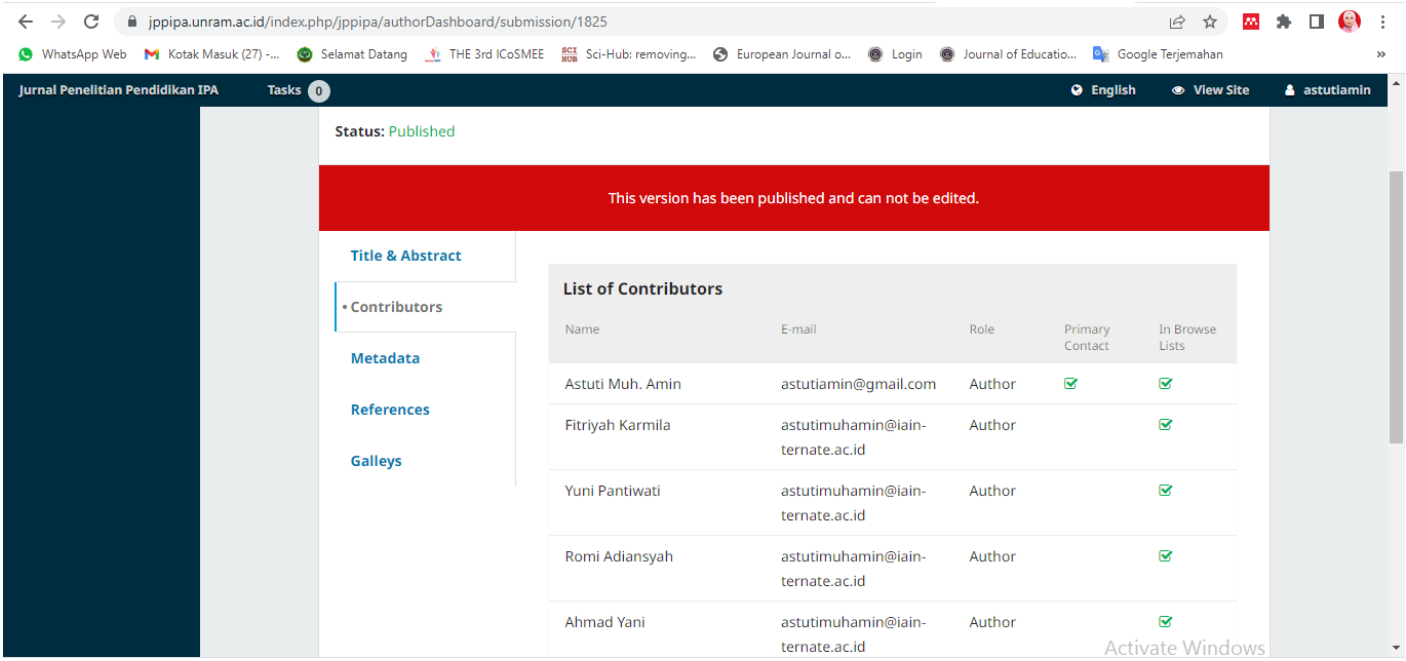
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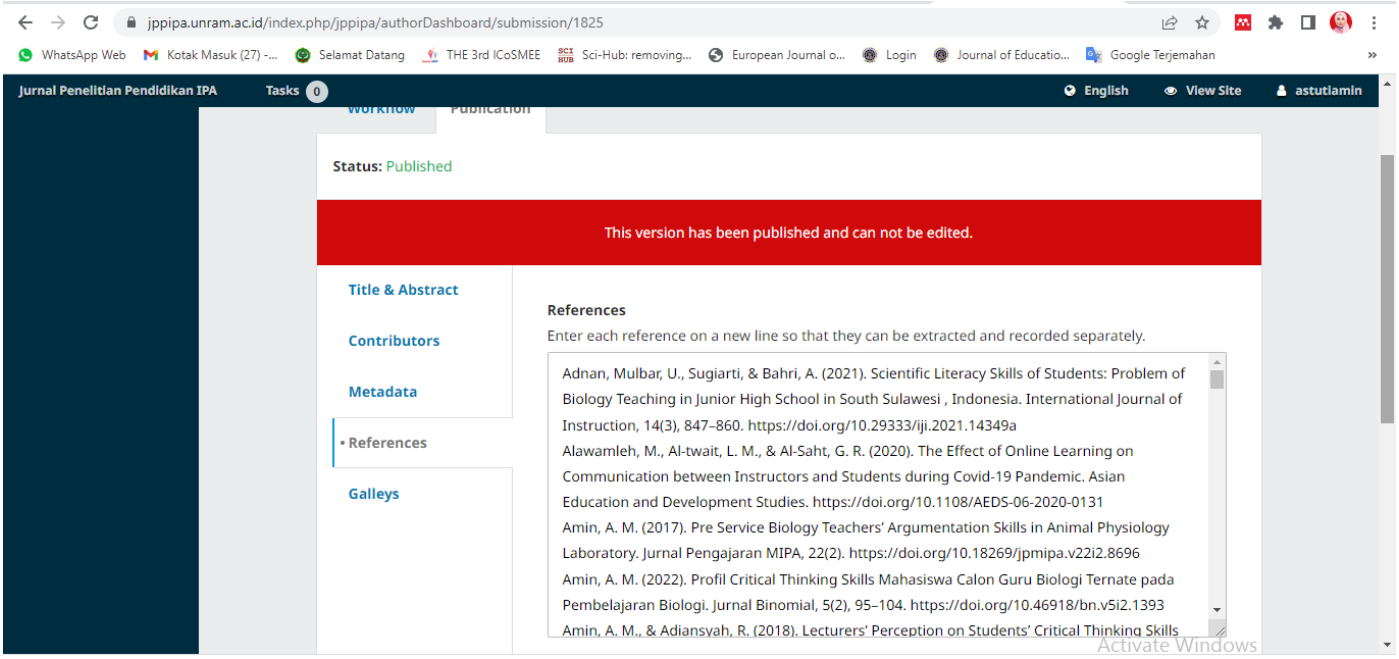
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