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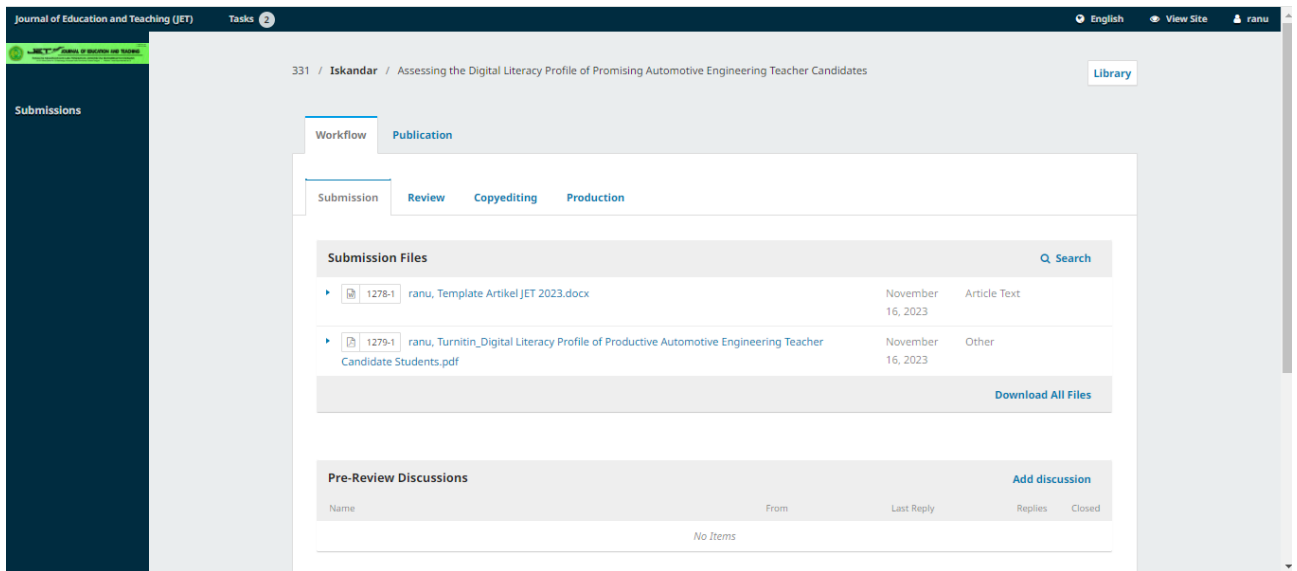# ARTIKEL JURNAL NASIONAL TERINDEKS SINTA 4

Judul Artikel : Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students

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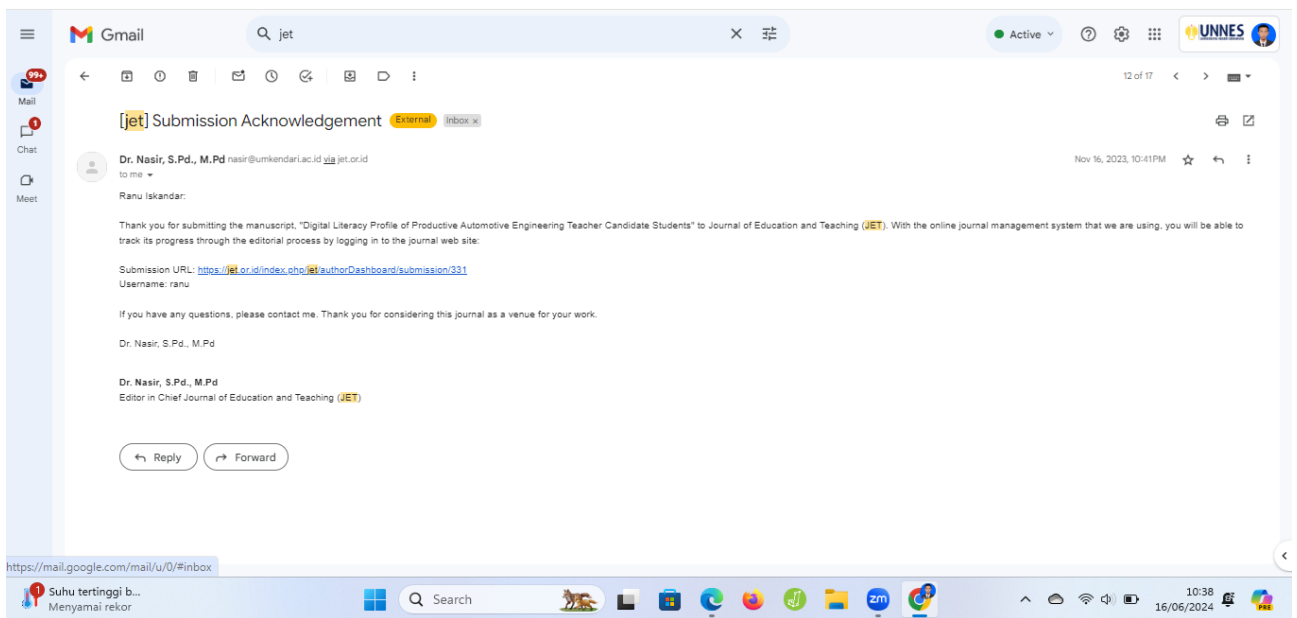
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Thank you for submitting the manuscript, "Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students" to Journal of Education and Teaching (JET). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

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If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Dr. Nasir, S.Pd., M.Pd

Dr. Nasir, S.Pd., M.Pd
Editor in Chief Journal of Education and Teaching (JET)

Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students

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ABSTRACT: As automotive Engineering teacher candidates, students of automotive engineering education need to master digital literacy. The productive material taught is complicated, invisible, and requires dismantling to study its components. This research aims to find out how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education. The tool used for data collection is a questionnaire. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form. The results of this research show that generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, in e-safety, critical thinking, creativity, and Functional Skills and Beyond aspects are low.

Keywords Automotive Engineering, Digital Literacy, Productive Teacher Candidate Students

INTRODUCTION

Technological developments are increasingly rapid. Like it or not, students must be able to adapt to these developments. If students do not master technology, they will be considered behind the times.

Technology, especially ICT, has long been used in the education sector. However, the education sector needs to adopt technology that can increase effectiveness and efficiency in achieving the learning objectives that have been set. This shows the need for competencies possessed by Automotive engineering teacher candidate students in the 21st century.

Currently, Automotive Engineering Teacher Candidate students born in the 2000s and above are native to ICT (Moran, 2016). Since birth, students have been exposed to cell phones and computers. However, the Industrial Revolution 4.0 and the era of massive digitalization mean that Automotive engineering teacher candidate students must adapt to all forms of progress (Purwanto, 2021). This is necessary so that later when you become a teacher, you can integrate technology into the learning process.

Automotive engineering teaching students as automotive engineering teacher candidates need to have mastery of digital literacy. This is because the productive material taught is a) complicated systems such as the common rail fuel system, b)

sometimes it is necessary to disassemble it to find out the components inside, such as the transmission system and cranking system, and c) new technology such as the EFI system (Adnyana & Suyanto, 2013; Iskandar, Arifin, & Sudira, 2020; Supraptono, Khumaedi, Soesanto, & Septiyanto, 2018; Utomo & Ratnawati, 2018). Students need to use technology that makes it easier to learn these difficulties.

Digital literacy is the mastery of various digital technologies in retrieving, assessing, storing, producing, presenting, exchanging information, communicating, and participating in collaborative networks via the Internet confidently and critically (UNESCO Institute of Statistics, 2021).

This control needs to be addressed wisely and ethically so that in the future, we can avoid cyberbullying, which makes social media a means to ridicule someone and give negative comments to someone not in accordance with their thoughts (Rajbhandari & Rana, 2023). Therefore, it is necessary to build media, information, and ICT literacy for both teachers and prospective teachers or teaching students as a form of anticipation of the negative impacts caused by low media, information, and ICT literacy as an essential component of digital literacy.

However, several studies show teachers' and prospective teachers' low levels of digital literacy. Research by

Anori, Faiza, Agustiarmi, & Dewi (2022) show that during the Covid-19 pandemic, there were vocational school teachers in Payakumbuh City who did not understand at all how to operate tools such as Zoom, Microsoft, LMS, and others in the learning process so they always needed help. Other people when using it. Research by Laksono (2021) shows that prospective teachers' theoretical understanding of digital literacy is 80%, social media use is 30%, use at home is 72%, and use for communication is 30%.

Based on field observations, prospective automotive teacher students have smartphones and computers. However, not all existing applications help the learning process—many applications, such as games, fintech, and social media.

Based on the problems above, this research aims to determine how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. The gap in this research is the respondent gap. Whereas in other studies, the students who were respondents were chemistry education students, while in this study, the students who were respondents were automotive engineering education students. It is hoped that this research will provide a unique contribution to prospective students who are productive automotive engineering teachers regarding the issue of digital literacy on campus and become a reference for other universities in Indonesia.

Futurelab (2010) explains that there are 8 components of digital literacy, namely: a Functional Skill and Beyond relating to a person's ICT skills, b) Creativity relating to how we think, build and share knowledge by utilizing digital technology which includes (1) creation products or outputs in various formats and models by utilizing digital technology, and (2) creative and imaginative thinking skills including planning, knitting content, exploring ideas and controlling the creative process, c) Collaboration related to individual participation in the process of dialogue, discussion and building ideas other ideas to create understanding, d) Communication is related to the ability to communicate through digital technology media and the ability to comprehend and comprehend the audience, e) The Ability to find and select Information is related to the ability to search for and select Information, f) Critical Thinking and Evaluation is related to the ability contribute, analyze and sharpen critical thinking when dealing with Information, g) Cultural and Social Understanding relating to digital literacy practices that are in line with the context of social and

cultural understanding, and h) E-Safety Components related to ensuring security when users explore, create, collaborate with digital technology.

RESEARCH METHOD

This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education Semarang State University. Ideally, the sample is a minimum of 30 respondents. The tool used for data collection is a questionnaire. This questionnaire instrument is prepared starting with a conceptual definition, operational definition, indicators, and statement items. This questionnaire was adapted from an instrument developed by Nugroho & Nasionalita (2020), which is valid and reliable for each question. The questionnaire was distributed using Google Forms. Ordinal data was collected using a Likert scale, namely strongly disagree (SD), disagree (D), neutral (N), agree (A), and strongly agree (SA). The dependent variable of digital literacy is the ordinal data above. The independent variables in this research are gender, age, and class. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form.

RESULT AND DISCUSSION

From the instrument distribution, 80 automotive teacher candidate students completed the questionnaire. The respondents were categorized based on entry class, gender, and age. These categories are shown in Table 1.

Table 1. Characteristics of Respondents

Variables	Measurement Scale	Frequency (n=80)	Percentage (%)
Year Intake	2023	14	17.5
	2021	23	28.75
	2020	43	53.75
Gender	Man	74	92.5
	Woman	6	7.5
Age	<18 years old	5	6.25
	18-19 years old	20	25
	20-21 years old	48	60
	>21 years old	7	8.75

The results of data tabulation on the digital literacy level of Automotive engineering teacher candidate students from each statement can be explained in table 2.

Table 2. Frequency Distribution of Perceptions of Digital Literacy of Automotive Engineering Teacher Candidate Students

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
Functional Skill and Beyond	I have ICT skills to operate a computer	0	0	2	18	60	0	0	2.5	22.5	75
	I have ICT skills in the internet field	0	0	4	22	54	0	0	5	27.5	67.5
Creativity	I am able to create products in various formats and models by utilizing digital technology	0	10	26	32	12	0	12.5	32.5	40	15
	I have the ability to think creatively	0	2	4	30	44	0	2.5	5	37.5	55

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
	I have the ability to think imaginatively	0	0	0	26	54	0	0	0	32.5	67.5
Collaboration	I have the ability to participate in the digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to explain ideas with others in groups in digital spaces	0	0	8	18	54	0	0	10	22.5	67.5
	I am able to negotiate ideas with others in the group in the digital space	0	0	10	26	44	0	0	12.5	32.5	55
Communication	I am able to communicate via digital technology media	0	0	0	4	76	0	0	0	5	95
	I understand the audience in the digital space	0	0	4	36	40	0	0	5	45	50
	I understand the audience in the digital space	0	0	6	24	50	0	0	7.5	30	62.5
The Ability to find and select Infomation	I am able to search for information in digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to select information in the digital space	0	0	6	12	62	0	0	7.5	15	77.5
Critical Thinking and Evaluation	I am able to contribute when dealing with information in the digital space	0	0	14	26	40	0	0	17.5	32.5	50
	I am able to analyze when dealing with information in the digital space	0	8	14	34	24	0	10	17.5	42.5	30
	I am able to think critically when dealing with information in the digital space	0	8	12	18	42	0	10	15	22.5	52.5
Cultural and Social Understanding	I have thoughts that are in line with social and cultural understanding	0	0	4	26	50	0	0	5	32.5	62.5
E-safety	I can guarantee safety when exploring with digital technology	2	16	40	4	18	2.5	20	50	5	22.5
	I can guarantee safety when creating with digital technology	4	20	24	14	18	5	25	30	17.5	22.5
	I can guarantee security when collaborating with digital technology	0	0	2	18	60	0	0	2.5	22.5	75

Functional Skills and Beyond are the technical abilities and competencies needed to skillfully operate computers and various digital tools connected to the internet (Davis & Newstrom, 2009; Watulak & Kinzer, 2013). Functional Skills and Beyond development is that students can operate new technology. From the two statements on the Functional Skill and Beyond aspect, it is known that the percentage of students who answered strongly disagree was 0%, disagree 4.17%, neutral 12.33%, agree 30%, and strongly agree 52.5%. Many students who are productive automotive engineering teacher candidates have low functional skills and beyond aspects; even the students are digital natives. Especially during the Covid-19 pandemic, students are required to study online, so they must be able to operate ICT connected to the internet

(Wakijah, Sukardi, Sudira, Pramu, Iskandar, & Haq, 2023). This is because students must learn how to operate by self-teaching or trial and error.

Creativity is a digital literacy ability that is actively involved in exploring digital media and creating and understanding what the media was created for (Syahfira, Siregar, & Purwaningtyas, 2023). Creative students can create products in various formats and models by utilizing digital technology. From the 3 Creativity statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0.83%, Neutral 1.67%, Agree 27.5%, and Strongly Agree 70%. Some students still feel that their creative aspect is not proficient in digital tools such as CAD, which visualizes 3D images.

Collaboration is a process where people talk, discuss, and reach a shared understanding based on each other's views. Collaborative capacity is working together well to develop knowledge and other things. From the 3 Collaboration statements, it is known that the percentage of students who answered strongly disagree was 0%, disagree 0%, Neutral 11.25%, Agree 27.5%, and Strongly agree 61.25%. Prospective teacher students are used to collaborating in writing using Google Docs, Google Spreadsheet, Google Workspace, and Google Colab.

Communication is the ability and willingness to share thoughts, ideas, and understanding that is never separated from human daily life. With today's technological advances, communication not only takes place through conversations, but communication is also developing with the emergence of digital communication, which allows individuals to interact and send messages via computers, cell phones, the internet, and many other devices. From the 3 Communication statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 4.16%, Agree 26.67%, and Strongly agree 69.17%. Prospective teacher students are already skilled at communicating because they are used to communicating using WhatsApp, Gmail, and Zoom meetings.

Understanding how to identify the information type is useful for those who support digital literacy activities. This ensures that people receive up-to-date and reliable information. When selecting information, people should be able to analyze it in detail, including where the information was obtained, who it is displayed to, how the content claims to be accurate, and any copyright issues. From the three statements on The Ability to find and select information, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 3.75%, Agree 13.75%, and Strongly agree 82.5%.

Critical thinking involves changing, analyzing, or processing information given data or ideas to interpret meaning and develop insight. Students must be able to contribute, analyze, and think critically when dealing with information in the digital space. From the 3 Critical Thinking and Evaluation statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 6.67%, Neutral 16.67%, Agree 32.5%, and Strongly Agree 44.16%.

Digital culture and technology have formed new ways of seeing social class theoretically, including immaterial labor, digital labor, informational and cultural work, "concept of free labor under conditions of the New Economy, as well as the now-famous notions of social factory" (Qiu, 2018). From 1 Cultural and Social Understanding statement, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 5%, Agree 32.5%, and Strongly agree 62.5%. Student automotive engineering teacher candidates can become active participants in the construction of their knowledge rather than being passive vessels. In this constructivist environment, student automotive engineering teachers can work on complex global projects through new media.

E-safety is an important component of digital literacy. Ofsted (2013) explains that e-safety is about empowering schools and professionals with knowledge and resources and requires a whole-school approach to educate and protect the well-being of students from online risks and provide appropriate intervention and support mechanisms. Developing security practices that utilize digital technology, such as the internet and smartphones, is part of the digital literacy component. This involves learning how to properly utilize digital technology and deciding what things to post. From the 3 E-Safety statements, it is known that the percentage of students who answered strongly disagree was 3.75%, disagreed 22.5%, Neutral 40%, Agree 11.25%, and Strongly Agree 22.5%. To improve skills in the e-safety aspect, Automotive engineering teacher candidate students must learn to start discussing the benefits and dangers of the internet and learn to create an open environment with other students to ask questions and express concerns (National Society for the Prevention of Cruelty to Children, 2023). Dangers of the internet include cyberbullying, grooming, identity theft, online pornography, hate sites, and sexting.

CONCLUSION

Generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, e-safety, critical thinking, creativity, and aspects of Functional Skills and Beyond are low. Functional Skills and Beyond aspects can be improved by Automotive engineering teacher candidate students by learning new tools on the internet efficiently by reading books, watching videos on YouTube, and asking classmates who are already proficient. Automotive engineering teacher candidate students can improve the e-safety aspect by discussing the dangers of the internet with classmates. Automotive engineering teacher candidate students can improve critical thinking by learning to look for trusted sources of information. Automotive engineering teacher candidate students can increase aspects of creativity by increasing curiosity.

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	I have the ability to think creatively	0	2	4	30	44	0	2.5	5	37.5	55

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
	I have the ability to think imaginatively	0	0	0	26	54	0	0	0	32.5	67.5
Collaboration	I have the ability to participate in the digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to explain ideas with others in groups in digital spaces	0	0	8	18	54	0	0	10	22.5	67.5
	I am able to negotiate ideas with others in the group in the digital space	0	0	10	26	44	0	0	12.5	32.5	55
Communication	I am able to communicate via digital technology media	0	0	0	4	76	0	0	0	5	95
	I understand the audience in the digital space	0	0	4	36	40	0	0	5	45	50
	I understand the audience in the digital space	0	0	6	24	50	0	0	7.5	30	62.5
The Ability to find and select Infomation	I am able to search for information in digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to select information in the digital space	0	0	6	12	62	0	0	7.5	15	77.5
Critical Thinking and Evaluation	I am able to contribute when dealing with information in the digital space	0	0	14	26	40	0	0	17.5	32.5	50
	I am able to analyze when dealing with information in the digital space	0	8	14	34	24	0	10	17.5	42.5	30
	I am able to think critically when dealing with information in the digital space	0	8	12	18	42	0	10	15	22.5	52.5
Cultural and Social Understanding	I have thoughts that are in line with social and cultural understanding	0	0	4	26	50	0	0	5	32.5	62.5
E-safety	I can guarantee safety when exploring with digital technology	2	16	40	4	18	2.5	20	50	5	22.5
	I can guarantee safety when creating with digital technology	4	20	24	14	18	5	25	30	17.5	22.5
	I can guarantee security when collaborating with digital technology	0	0	2	18	60	0	0	2.5	22.5	75

Functional Skills and Beyond are the technical abilities and competencies needed to skillfully operate computers and various digital tools connected to the internet (Davis & Newstrom, 2009; Watulak & Kinzer, 2013). Functional Skills and Beyond development is that students can operate new technology. From the two statements on the Functional Skill and Beyond aspect, it is known that the percentage of students who answered strongly disagree was 0%, disagree 4.17%, neutral 12.33%, agree 30%, and strongly agree 52.5%. Many students who are productive automotive engineering teacher candidates have low functional skills and beyond aspects; even the students are digital natives. Especially during the Covid-19 pandemic, students are required to study online, so they must be able to operate ICT connected to the internet

(Wakijah, Sukardi, Sudira, Pramu, Iskandar, & Haq, 2023). This is because students must learn how to operate by self-teaching or trial and error.

Creativity is a digital literacy ability that is actively involved in exploring digital media and creating and understanding what the media was created for (Syahfira, Siregar, & Purwaningtyas, 2023). Creative students can create products in various formats and models by utilizing digital technology. From the 3 Creativity statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0.83%, Neutral 1.67%, Agree 27.5%, and Strongly Agree 70%. Some students still feel that their creative aspect is not proficient in digital tools such as CAD, which visualizes 3D images.

Collaboration is a process where people talk, discuss, and reach a shared understanding based on each other's views. Collaborative capacity is working together well to develop knowledge and other things. From the 3 Collaboration statements, it is known that the percentage of students who answered strongly disagree was 0%, disagree 0%, Neutral 11.25%, Agree 27.5%, and Strongly agree 61.25%. Prospective teacher students are used to collaborating in writing using Google Docs, Google Spreadsheet, Google Workspace, and Google Colab.

Communication is the ability and willingness to share thoughts, ideas, and understanding that is never separated from human daily life. With today's technological advances, communication not only takes place through conversations, but communication is also developing with the emergence of digital communication, which allows individuals to interact and send messages via computers, cell phones, the internet, and many other devices. From the 3 Communication statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 4.16%, Agree 26.67%, and Strongly agree 69.17%. Prospective teacher students are already skilled at communicating because they are used to communicating using WhatsApp, Gmail, and Zoom meetings.

Understanding how to identify the information type is useful for those who support digital literacy activities. This ensures that people receive up-to-date and reliable information. When selecting information, people should be able to analyze it in detail, including where the information was obtained, who it is displayed to, how the content claims to be accurate, and any copyright issues. From the three statements on The Ability to find and select information, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 3.75%, Agree 13.75%, and Strongly agree 82.5%.

Critical thinking involves changing, analyzing, or processing information given data or ideas to interpret meaning and develop insight. Students must be able to contribute, analyze, and think critically when dealing with information in the digital space. From the 3 Critical Thinking and Evaluation statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 6.67%, Neutral 16.67%, Agree 32.5%, and Strongly Agree 44.16%.

Digital culture and technology have formed new ways of seeing social class theoretically, including immaterial labor, digital labor, informational and cultural work, "concept of free labor under conditions of the New Economy, as well as the now-famous notions of social factory" (Qiu, 2018). From 1 Cultural and Social Understanding statement, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 5%, Agree 32.5%, and Strongly agree 62.5%. Student automotive engineering teacher candidates can become active participants in the construction of their knowledge rather than being passive vessels. In this constructivist environment, student automotive engineering teachers can work on complex global projects through new media.

E-safety is an important component of digital literacy. Ofsted (2013) explains that e-safety is about empowering schools and professionals with knowledge and resources and requires a whole-school approach to educate and protect the well-being of students from online risks and provide appropriate intervention and support mechanisms. Developing security practices that utilize digital technology, such as the internet and smartphones, is part of the digital literacy component. This involves learning how to properly utilize digital technology and deciding what things to post. From the 3 E-Safety statements, it is known that the percentage of students who answered strongly disagree was 3.75%, disagreed 22.5%, Neutral 40%, Agree 11.25%, and Strongly Agree 22.5%. To improve skills in the e-safety aspect, Automotive engineering teacher candidate students must learn to start discussing the benefits and dangers of the internet and learn to create an open environment with other students to ask questions and express concerns (National Society for the Prevention of Cruelty to Children, 2023). Dangers of the internet include cyberbullying, grooming, identity theft, online pornography, hate sites, and sexting.

CONCLUSION

Generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, e-safety, critical thinking, creativity, and aspects of Functional Skills and Beyond are low. Functional Skills and Beyond aspects can be improved by Automotive engineering teacher candidate students by learning new tools on the internet efficiently by reading books, watching videos on YouTube, and asking classmates who are already proficient. Automotive engineering teacher candidate students can improve the e-safety aspect by discussing the dangers of the internet with classmates. Automotive engineering teacher candidate students can improve critical thinking by learning to look for trusted sources of information. Automotive engineering teacher candidate students can increase aspects of creativity by increasing curiosity.

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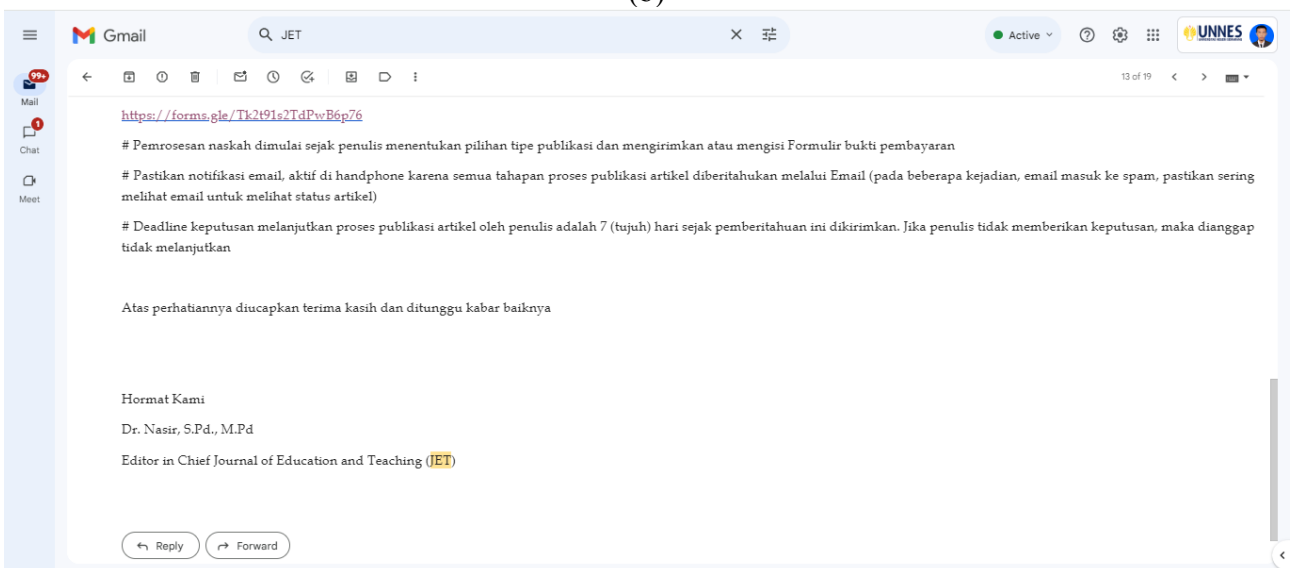**15** e-journal.undikma.ac.id
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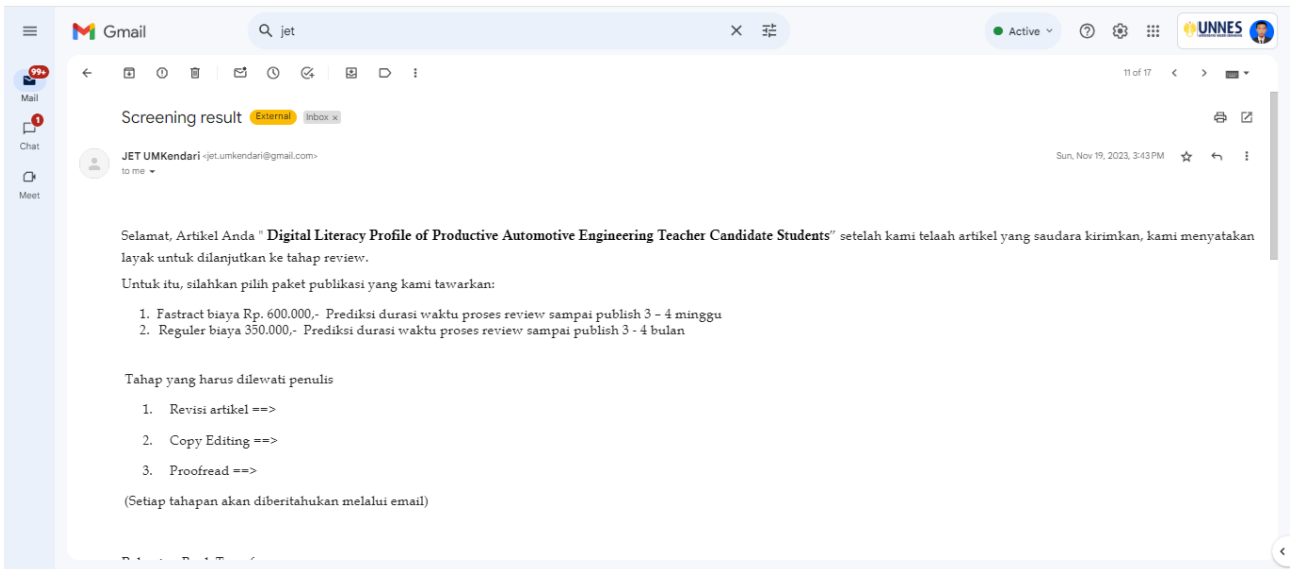
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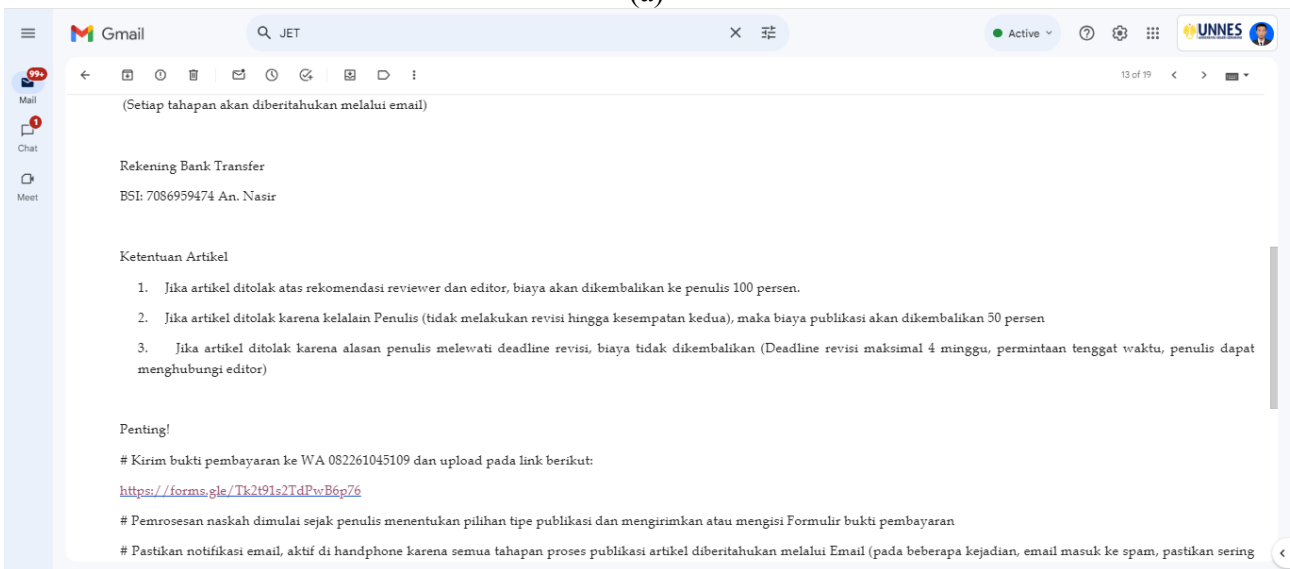
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Gambar 3. Bukti konfirmasi hasil telaah artikel oleh editor di gmail

Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

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1 message

JET UMKendari <jet.umkendari@gmail.com> Sun, Nov 19, 2023 at 3:43 PM
To: ranuiskandar@mail.unnes.ac.id

Selamat, Artikel Anda " **Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students**" setelah kami telaah artikel yang saudara kirimkan, kami menyatakan layak untuk dilanjutkan ke tahap review.

Untuk itu, silahkan pilih paket publikasi yang kami tawarkan:

1. Fastract biaya Rp. 600.000,- Prediksi durasi waktu proses review sampai publish 3 – 4 minggu
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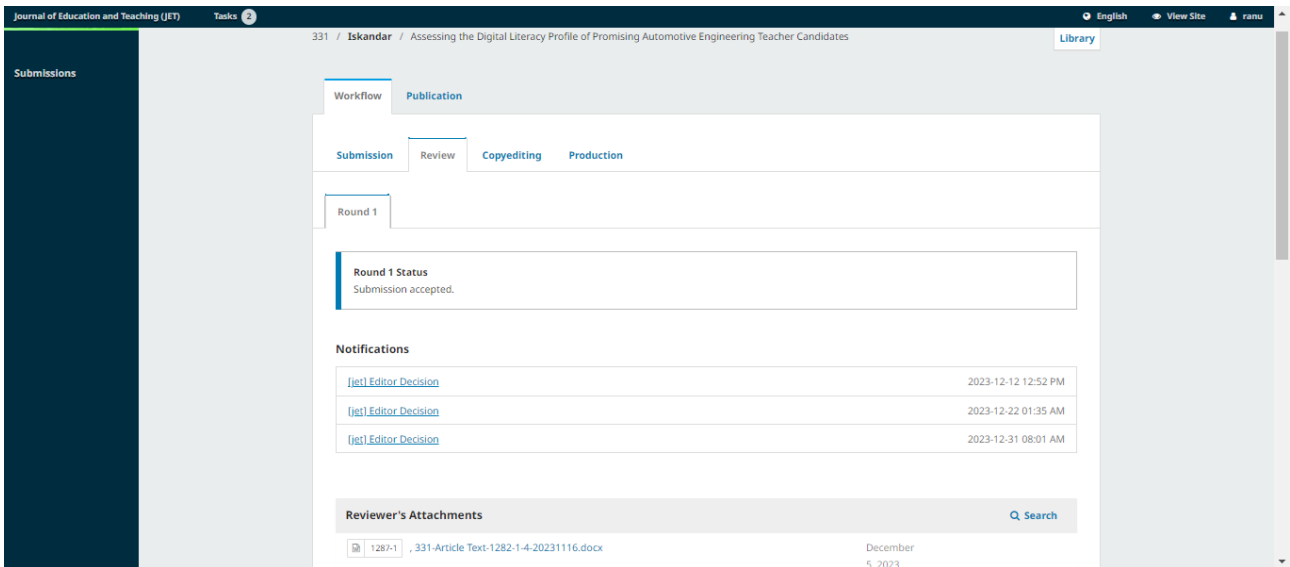
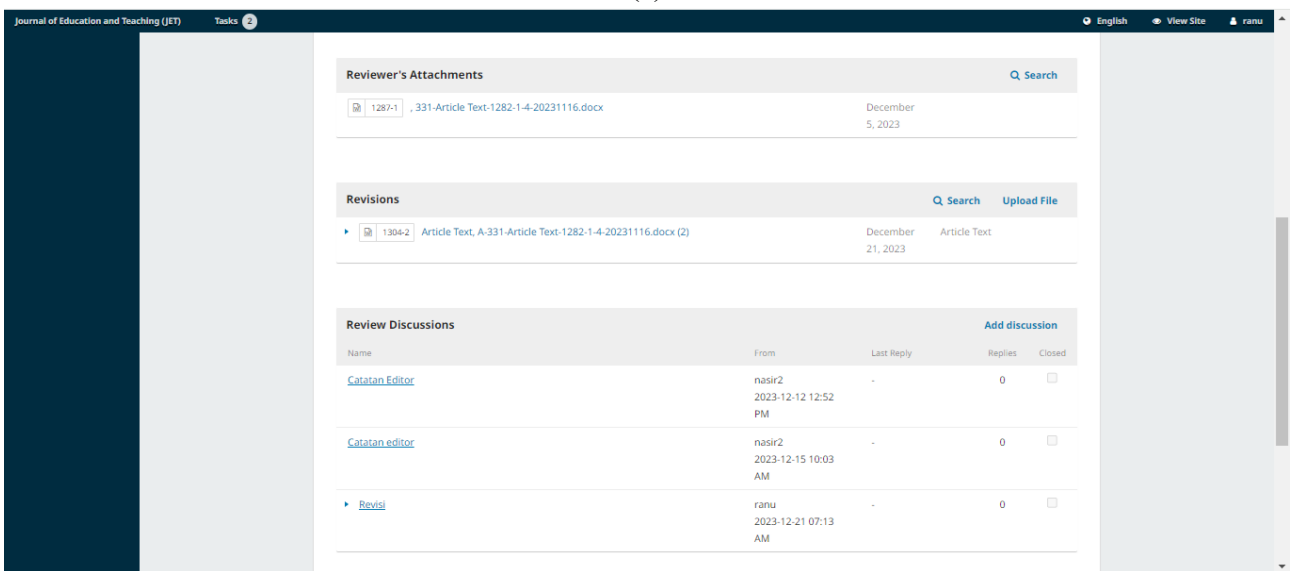Atas perhatiannya diucapkan terima kasih dan ditunggu kabar baiknya

Hormat Kami

Dr. Nasir, S.Pd., M.Pd

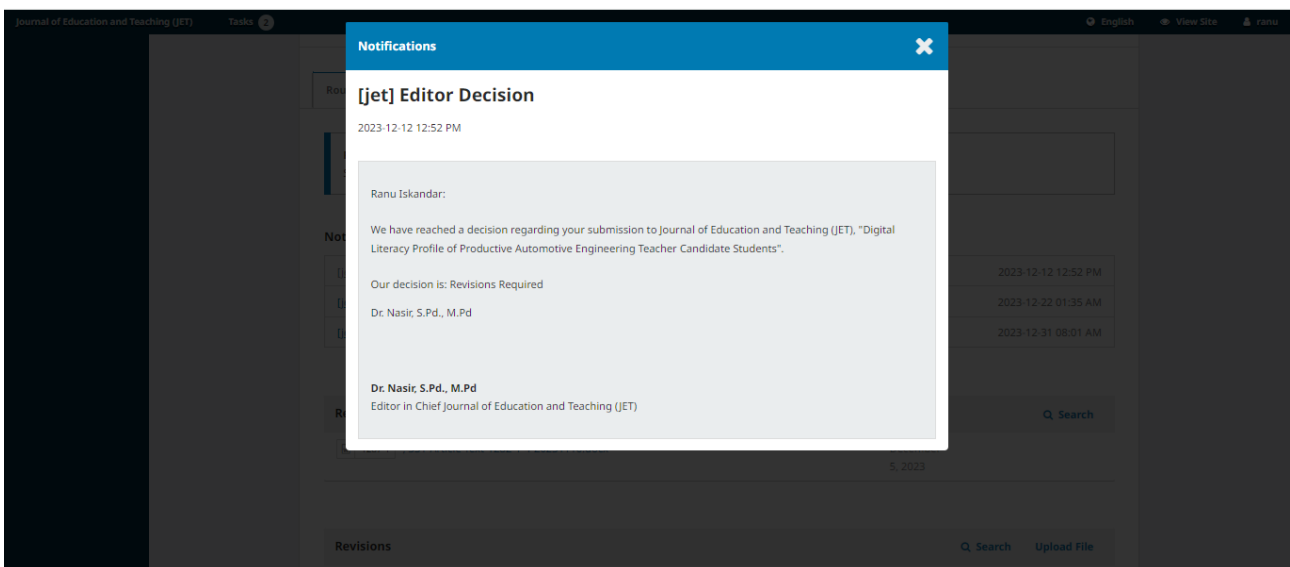Editor in Chief Journal of Education and Teaching (JET)

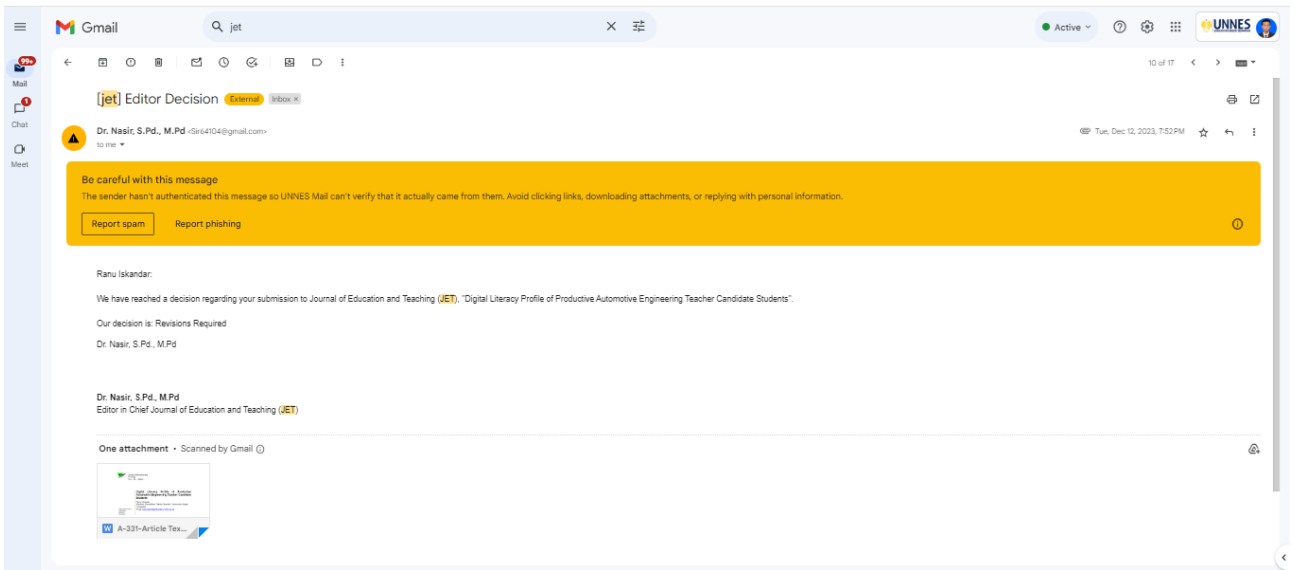**Lampiran 3. Bukti konfirmasi review dan hasil review oleh reviewer (12 Desember 2023)**

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Gambar 4. Bukti konfirmasi review pada website JET (a) (b) (c)

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Gambar 5. Bukti konfirmasi review di gmail (d)

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Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

[jet] Editor Decision
1 message

Dr. Nasir, S.Pd., M.Pd <Sir64104@gmail.com>   Tue, Dec 12, 2023 at 7:52 PM
To: Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

Ranu Iskandar:

We have reached a decision regarding your submission to Journal of Education and Teaching (JET), "Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students".

Our decision is: Revisions Required

Dr. Nasir, S.Pd., M.Pd

Dr. Nasir, S.Pd., M.Pd
Editor in Chief Journal of Education and Teaching (JET)

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Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students

Ranu Iskandar
Afiliation: Pendidikan Teknik Otomotif, Universitas Negeri Semarang
Email: ranuiskandar@mail.unnes.ac.id

ABSTRACT: As automotive Engineering teacher candidates, students of automotive engineering education need to master digital literacy. The productive material taught is complicated, invisible, and requires dismantling to study its components. This research aims to find out how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education. The tool used for data collection is a questionnaire. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form. The results of this research show that generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, in e-safety, critical thinking, creativity, and Functional Skills and Beyond aspects are low.

Keywords Automotive Engineering, Digital Literacy, Productive Teacher Candidate Students

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INTRODUCTION

Technological developments are increasingly rapid. Like it or not, students must be able to adapt to these developments. If students do not master technology, they will be considered behind the times.

Technology, especially ICT, has long been used in the education sector. However, the education sector needs to adopt technology that can increase effectiveness and efficiency in achieving the learning objectives that have been set. This shows the need for competencies possessed by Automotive engineering teacher candidate students in the 21st century.

Currently, Automotive Engineering Teacher Candidate students born in the 2000s and above are native to ICT (Moran, 2016). Since birth, students have been exposed to cell phones and computers. However, the Industrial Revolution 4.0 and the era of massive digitalization mean that Automotive engineering teacher candidate students must adapt to all forms of progress (Purwanto, 2021). This is necessary so that later when you become a teacher, you can integrate technology into the learning process.

Automotive engineering teaching students as automotive engineering teacher candidates need to have mastery of digital literacy. This is because the productive material taught is a) complicated systems such as the common rail fuel system, b)

sometimes it is necessary to disassemble it to find out the components inside, such as the transmission system and cranking system, and c) new technology such as the EFI system (Adnyana & Suyanto, 2013; Iskandar, Arifin, & Sudira, 2020; Supraptono, Khumaedi, Soesanto, & Septiyanto, 2018; Utomo & Ratnawati, 2018). Students need to use technology that makes it easier to learn these difficulties.

Digital literacy is the mastery of various digital technologies in retrieving, assessing, storing, producing, presenting, exchanging information, communicating, and participating in collaborative networks via the Internet confidently and critically (UNESCO Institute of Statistics, 2021).

This control needs to be addressed wisely and ethically so that in the future, we can avoid cyberbullying, which makes social media a means to ridicule someone and give negative comments to someone not in accordance with their thoughts (Rajbhandari & Rana, 2023). Therefore, it is necessary to build media, information, and ICT literacy for both teachers and prospective teachers or teaching students as a form of anticipation of the negative impacts caused by low media, information, and ICT literacy as an essential component of digital literacy.

However, several studies show teachers' and prospective teachers' low levels of digital literacy. Research by

Anori, Faiza, Agustiarmi, & Dewi (2022) show that during the Covid-19 pandemic, there were vocational school teachers in Payakumbuh City who did not understand at all how to operate tools such as Zoom, Microsoft, LMS, and others in the learning process so they always needed help. Other people when using it. Research by Laksono (2021) shows that prospective teachers' theoretical understanding of digital literacy is 80%, social media use is 30%, use at home is 72%, and use for communication is 30%.

Based on field observations, prospective automotive teacher students have smartphones and computers. However, not all existing applications help the learning process—many applications, such as games, fintech, and social media.

Based on the problems above, this research aims to determine how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. The gap in this research is the respondent gap. Whereas in other studies, the students who were respondents were chemistry education students, while in this study, the students who were respondents were automotive engineering education students. It is hoped that this research will provide a unique contribution to prospective students who are productive automotive engineering teachers regarding the issue of digital literacy on campus and become a reference for other universities in Indonesia.

Futurelab (2010) explains that there are 8 components of digital literacy, namely: a Functional Skill and Beyond relating to a person's ICT skills, b) Creativity relating to how we think, build and share knowledge by utilizing digital technology which includes (1) creation products or outputs in various formats and models by utilizing digital technology, and (2) creative and imaginative thinking skills including planning, knitting content, exploring ideas and controlling the creative process, c) Collaboration related to individual participation in the process of dialogue, discussion and building ideas other ideas to create understanding, d) Communication is related to the ability to communicate through digital technology media and the ability to comprehend and comprehend the audience, e) The Ability to find and select Information is related to the ability to search for and select Information, f) Critical Thinking and Evaluation is related to the ability contribute, analyze and sharpen critical thinking when dealing with Information, g) Cultural and Social Understanding relating to digital literacy practices that are in line with the context of social and

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cultural understanding, and h) E-Safety Components related to ensuring security when users explore, create, collaborate with digital technology.

RESEARCH METHOD

This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education Semarang State University. Ideally, the sample is a minimum of 30 respondents. The tool used for data collection is a questionnaire. This questionnaire instrument is prepared starting with a conceptual definition, operational definition, indicators, and statement items. This questionnaire was adapted from an instrument developed by Nugroho & Nasionalita (2020), which is valid and reliable for each question. The questionnaire was distributed using Google Forms. Ordinal data was collected using a Likert scale, namely strongly disagree (SD), disagree (D), neutral (N), agree (A), and strongly agree (SA). The dependent variable of digital literacy is the ordinal data above. The independent variables in this research are gender, age, and class. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form.

RESULT AND DISCUSSION

From the instrument distribution, 80 automotive teacher candidate students completed the questionnaire. The respondents were categorized based on entry class, gender, and age. These categories are shown in Table 1.

Table 1. Characteristics of Respondents

Variables	Measurement Scale	Frequency (n=80)	Percentage (%)
Year Intake	2023	14	17.5
	2021	23	28.75
	2020	43	53.75
Gender	Man	74	92.5
	Woman	6	7.5
Age	<18 years old	5	6.25
	18-19 years old	20	25
	20-21 years old	48	60
	>21 years old	7	8.75

The results of data tabulation on the digital literacy level of Automotive engineering teacher candidate students from each statement can be explained in table 2.

Table 2. Frequency Distribution of Perceptions of Digital Literacy of Automotive Engineering Teacher Candidate Students

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
Functional Skill and Beyond	I have ICT skills to operate a computer	0	0	2	18	60	0	0	2.5	22.5	75
	I have ICT skills in the internet field	0	0	4	22	54	0	0	5	27.5	67.5
Creativity	I am able to create products in various formats and models by utilizing digital technology	0	10	26	32	12	0	12.5	32.5	40	15
	I have the ability to think creatively	0	2	4	30	44	0	2.5	5	37.5	55

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
	I have the ability to think imaginatively	0	0	0	26	54	0	0	0	32.5	67.5
Collaboration	I have the ability to participate in the digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to explain ideas with others in groups in digital spaces	0	0	8	18	54	0	0	10	22.5	67.5
	I am able to negotiate ideas with others in the group in the digital space	0	0	10	26	44	0	0	12.5	32.5	55
Communication	I am able to communicate via digital technology media	0	0	0	4	76	0	0	0	5	95
	I understand the audience in the digital space	0	0	4	36	40	0	0	5	45	50
	I understand the audience in the digital space	0	0	6	24	50	0	0	7.5	30	62.5
The Ability to find and select Infomation	I am able to search for information in digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to select information in the digital space	0	0	6	12	62	0	0	7.5	15	77.5
Critical Thinking and Evaluation	I am able to contribute when dealing with information in the digital space	0	0	14	26	40	0	0	17.5	32.5	50
	I am able to analyze when dealing with information in the digital space	0	8	14	34	24	0	10	17.5	42.5	30
	I am able to think critically when dealing with information in the digital space	0	8	12	18	42	0	10	15	22.5	52.5
Cultural and Social Understanding	I have thoughts that are in line with social and cultural understanding	0	0	4	26	50	0	0	5	32.5	62.5
E-safety	I can guarantee safety when exploring with digital technology	2	16	40	4	18	2.5	20	50	5	22.5
	I can guarantee safety when creating with digital technology	4	20	24	14	18	5	25	30	17.5	22.5
	I can guarantee security when collaborating with digital technology	0	0	2	18	60	0	0	2.5	22.5	75

Functional Skills and Beyond are the technical abilities and competencies needed to skillfully operate computers and various digital tools connected to the internet (Davis & Newstrom, 2009; Watulak & Kinzer, 2013). Functional Skills and Beyond development is that students can operate new technology. From the two statements on the Functional Skill and Beyond aspect, it is known that the percentage of students who answered strongly disagree was 0%, disagree 4.17%, neutral 12.33%, agree 30%, and strongly agree 52.5%. Many students who are productive automotive engineering teacher candidates have low functional skills and beyond aspects; even the students are digital natives. Especially during the Covid-19 pandemic, students are required to study online, so they must be able to operate ICT connected to the internet

(Wakijah, Sukardi, Sudira, Pramu, Iskandar, & Haq, 2023). This is because students must learn how to operate by self-teaching or trial and error.

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CONCLUSION

Generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, e-safety, critical thinking, creativity, and aspects of Functional Skills and Beyond are low. Functional Skills and Beyond aspects can be improved by Automotive engineering teacher candidate students by learning new tools on the internet efficiently by reading books, watching videos on YouTube, and asking classmates who are already proficient. Automotive engineering teacher candidate students can improve the e-safety aspect by discussing the dangers of the internet with classmates. Automotive engineering teacher candidate students can improve critical thinking by learning to look for trusted sources of information. Automotive engineering teacher candidate students can increase aspects of creativity by increasing curiosity.

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Lampiran 4. Bukti submit revisi dan artikel yang diresubmit (21 Desember 2023)
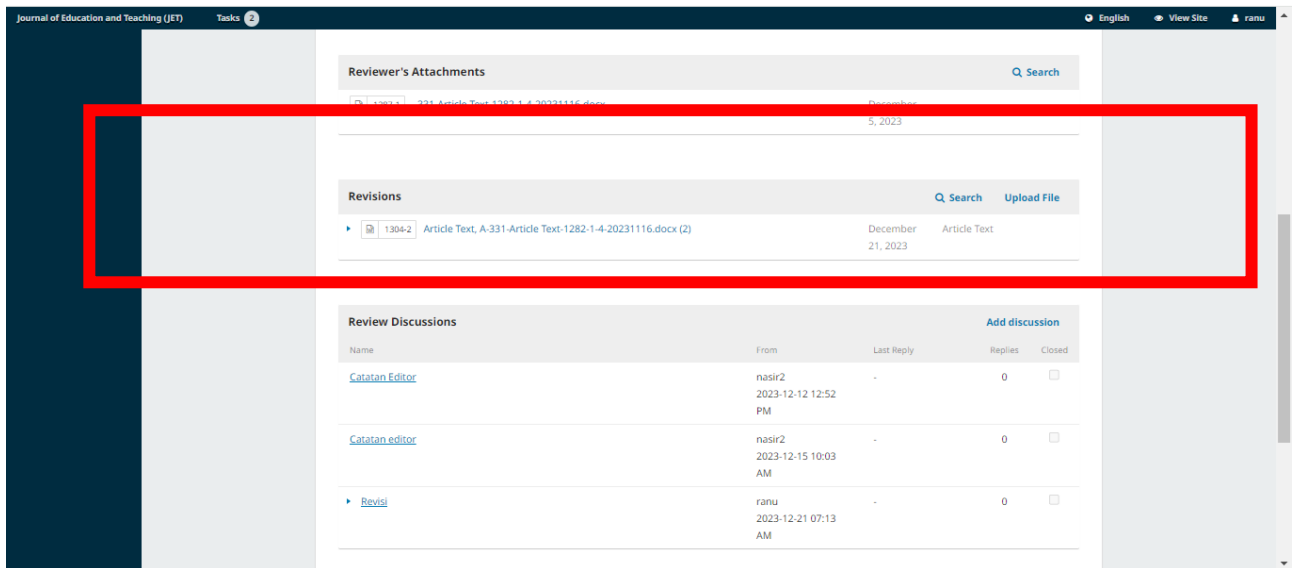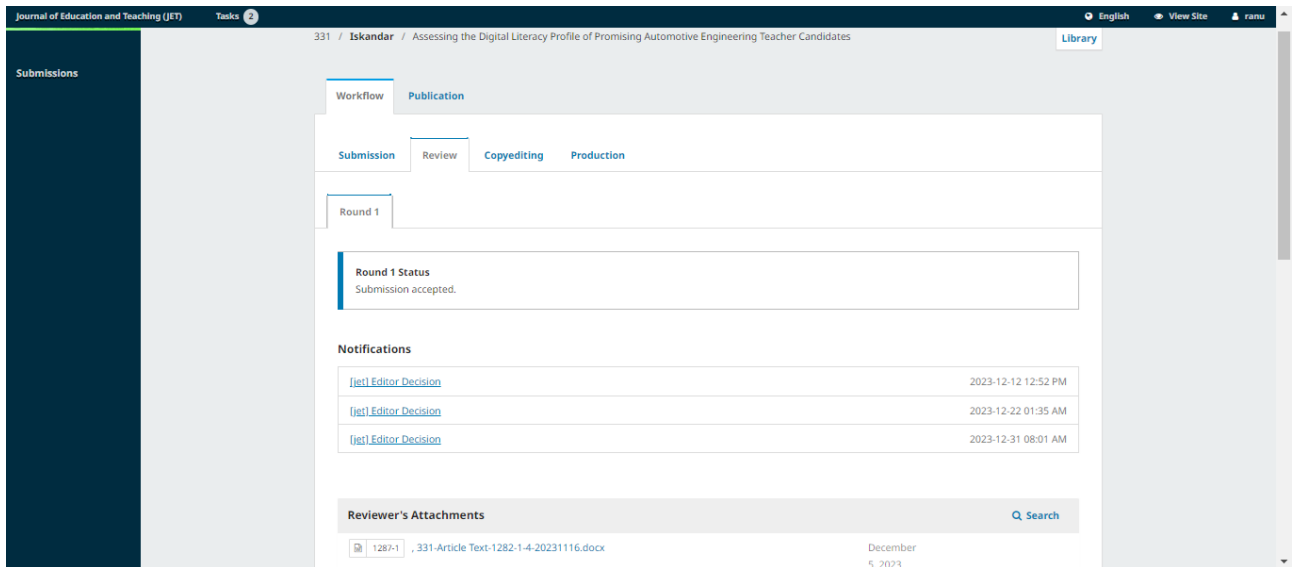
Gambar 6. Bukti submit revisi pada website JET (a) (b) (c)

Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students

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ABSTRACT: As automotive Engineering teacher candidates, students of automotive engineering education need to master digital literacy. The productive material taught is complicated, invisible, and requires dismantling to study its components. This research aims to find out how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were 80 undergraduate students in automotive engineering education. The tool used for data collection is a questionnaire. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form. The results of this research show that generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, in e-safety, critical thinking, creativity, and functional skills and beyond aspects are low.

Keywords Automotive Engineering, Digital Literacy, Productive Teacher Candidate Students

INTRODUCTION

Technological developments are increasingly rapid. Like it or not, students must be able to adapt to these developments. If students do not mastering technology, they will be considered behind the times.

Technology, especially ICT, has long been used in the education sector. However, the education sector needs to adopt technology that can increase effectiveness and efficiency in achieving the learning objectives that have been set. This shows the need for competencies possessed by Automotive engineering teacher candidate students in the 21st century.

Currently, automotive engineering teacher candidate students born in the 2000s and above are native to ICT (Moran, 2016). Since birth, students have been exposed to cell phones and computers. However, the Industrial Revolution 4.0 and the era of massive digitalization mean that Automotive engineering teacher candidate students must adapt to all forms of progress (Maghfiroh & Iskandar, 2023; Purwanto, 2021). This is necessary so that later when you become a teacher, you can integrate technology into the learning process (Iskandar, Syafei, Bahatmaka, Hidayat, & Huda, 2023).

Automotive engineering teaching students as automotive engineering teacher candidates need to have mastery of digital literacy. This is because the productive

material taught is a) complicated systems such as the common rail fuel system, b) sometimes it is necessary to disassemble it to find out the components inside, such as the transmission system and cranking system, and c) new technology such as the EFI system (Adnyana & Suyanto, 2013; Iskandar, Arifin, & Sudira, 2020; Supraptono, Khumaedi, Soesanto, & Septiyanto, 2018; Utomo & Ratnawati, 2018). Students need to use technology that makes it easier to learn these difficulties (Marsyaelina, Sudiyatno, & Iskandar, 2022).

Digital literacy is the mastery of various digital technologies in retrieving, assessing, storing, producing, presenting, exchanging information, communicating, and participating in collaborative networks via the Internet confidently and critically (UNESCO Institute of Statistics, 2021).

This control needs to be addressed wisely and ethically so that in the future, we can avoid cyberbullying, which makes social media a means to ridicule someone and give negative comments to someone not in accordance with their thoughts (Rajbhandari & Rana, 2023). Therefore, it is necessary to build media, information, and ICT literacy for both teachers and prospective teachers or teaching students as a form of anticipation of the negative impacts caused by low media, information, and ICT literacy as an essential component of digital literacy.

However, several studies show teachers' and prospective teachers' low levels of digital literacy. Research by Anori et al. (2022) showed that during the Covid-19 pandemic, there were vocational school teachers in Payakumbuh City who did not understand at all how to operate tools such as Zoom, Microsoft, LMS, and others in the learning process so they always needed help. Other people when using it. Research by Laksono (2021) showed that prospective teachers' theoretical understanding of digital literacy was 80%, social media use was 30%, use at home was 72%, and use for communication was 30%.

Based on field observations, prospective automotive teacher students have smartphones and computers. However, not all existing applications help the learning process—many applications, such as games, fintech, and social media.

Based on the problems above, this research aims to determine how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. The gap in this research is the respondent gap. Whereas in other studies, the students who were respondents were chemistry education students, while in this study, the students who were respondents were automotive engineering education students. It is hoped that this research will provide a unique contribution to prospective automotive engineering teacher candidate students regarding the issue of digital literacy on campus and become a reference for other universities in Indonesia.

There are 8 components of digital literacy, namely: a Functional Skill and Beyond relating to a person's ICT skills, b) Creativity relating to how we think, build and share knowledge by utilizing digital technology which includes (1) creation products or outputs in various formats and models by utilizing digital technology, and (2) creative and imaginative thinking skills including planning, knitting content, exploring ideas and controlling the creative process, c) collaboration related to individual participation in the process of dialogue, discussion and building ideas other ideas to create understanding, d) communication is related to the ability to communicate through digital technology media and the ability to comprehend and comprehend the audience, e) the ability to find and select information is related to the ability to search for and select information, f) critical thinking and evaluation is related to the ability contribute, analyze and sharpen critical thinking when dealing with information, g) cultural and social understanding relating to digital literacy practices that are in line with the context of social and cultural understanding, and h) e-safety

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components related to ensuring security when users explore, create, collaborate with digital technology (Adkha, Sudira, & Iskandar, 2021; Futurelab, 2010).

RESEARCH METHOD

This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education Semarang State University. Ideally, the sample is a minimum of 30 respondents (Alwi, 2012; Amin, Garancang, & Abunawas, 2023). The tool used for data collection is a questionnaire. This questionnaire instrument is prepared starting with a conceptual definition, operational definition, indicators, and statement items. This questionnaire was adapted from an instrument developed by Nugroho & Nasionalita (2020), which is valid and reliable for each question. The questionnaire was distributed using Google Forms. Ordinal data was collected using a Likert scale, namely strongly disagree (SD), disagree (D), neutral (N), agree (A), and strongly agree (SA). The dependent variable of digital literacy is the ordinal data above. The independent variables in this research are gender, age, and class. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form.

RESULT AND DISCUSSION

From the instrument distribution, 80 automotive teacher candidate students completed the questionnaire. The respondents were categorized based on entry class, gender, and age. These categories are shown in Table 1.

Table 1. Characteristics of Respondents

Variables	Measurement Scale	Frequency (n=80)	Percentage (%)
Year Intake	2023	14	17.5
	2021	23	28.75
	2020	43	53.75
Gender	Man	74	92.5
	Woman	6	7.5
Age	Younger than 18 years old	5	6.25
	18-19 years old	20	25
	20-21 years old	48	60
	Older than 21 years old	7	8.75

The results of data tabulation on the digital literacy level of Automotive engineering teacher candidate students from each statement can be explained in table 2.

Table 2. Frequency Distribution of Perceptions of Digital Literacy of Automotive Engineering Teacher Candidate Students

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
Functional Skill and Beyond	I have ICT skills to operate a computer	0	0	2	18	60	0	0	2.5	22.5	75
	I have ICT skills in the internet field	0	0	4	22	54	0	0	5	27.5	67.5
Creativity	I am able to create products in various formats and models by utilizing digital technology	0	10	26	32	12	0	12.5	32.5	40	15
	I have the ability to think creatively	0	2	4	30	44	0	2.5	5	37.5	55

Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
	I have the ability to think imaginatively	0	0	0	26	54	0	0	0	32.5	67.5
Collaboration	I have the ability to participate in the digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to explain ideas with others in groups in digital spaces	0	0	8	18	54	0	0	10	22.5	67.5
	I am able to negotiate ideas with others in the group in the digital space	0	0	10	26	44	0	0	12.5	32.5	55
Communication	I am able to communicate via digital technology media	0	0	0	4	76	0	0	0	5	95
	I understand the audience in the digital space	0	0	4	36	40	0	0	5	45	50
	I understand the audience in the digital space	0	0	6	24	50	0	0	7.5	30	62.5
The Ability to find and select Infomation	I am able to search for information in digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to select information in the digital space	0	0	6	12	62	0	0	7.5	15	77.5
Critical Thinking and Evaluation	I am able to contribute when dealing with information in the digital space	0	0	14	26	40	0	0	17.5	32.5	50
	I am able to analyze when dealing with information in the digital space	0	8	14	34	24	0	10	17.5	42.5	30
	I am able to think critically when dealing with information in the digital space	0	8	12	18	42	0	10	15	22.5	52.5
Cultural and Social Understanding	I have thoughts that are in line with social and cultural understanding	0	0	4	26	50	0	0	5	32.5	62.5
E-safety	I can guarantee safety when exploring with digital technology	2	16	40	4	18	2.5	20	50	5	22.5
	I can guarantee safety when creating with digital technology	4	20	24	14	18	5	25	30	17.5	22.5
	I can guarantee security when collaborating with digital technology	0	0	2	18	60	0	0	2.5	22.5	75

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CONFLICTS OF INTEREST

The author certifies that I has NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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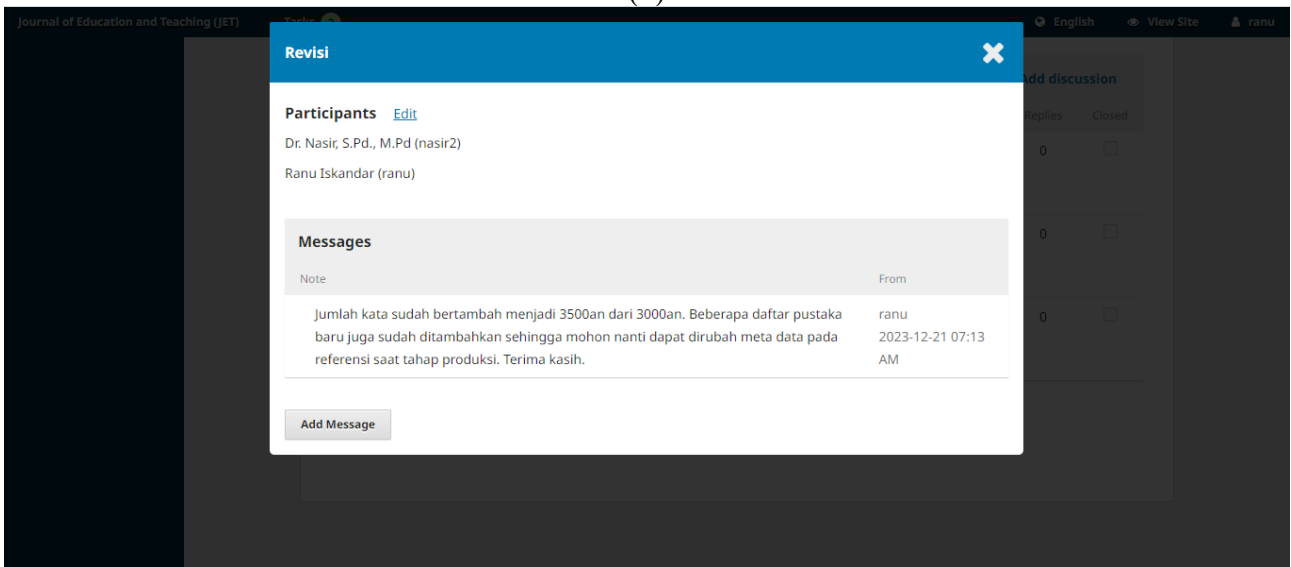
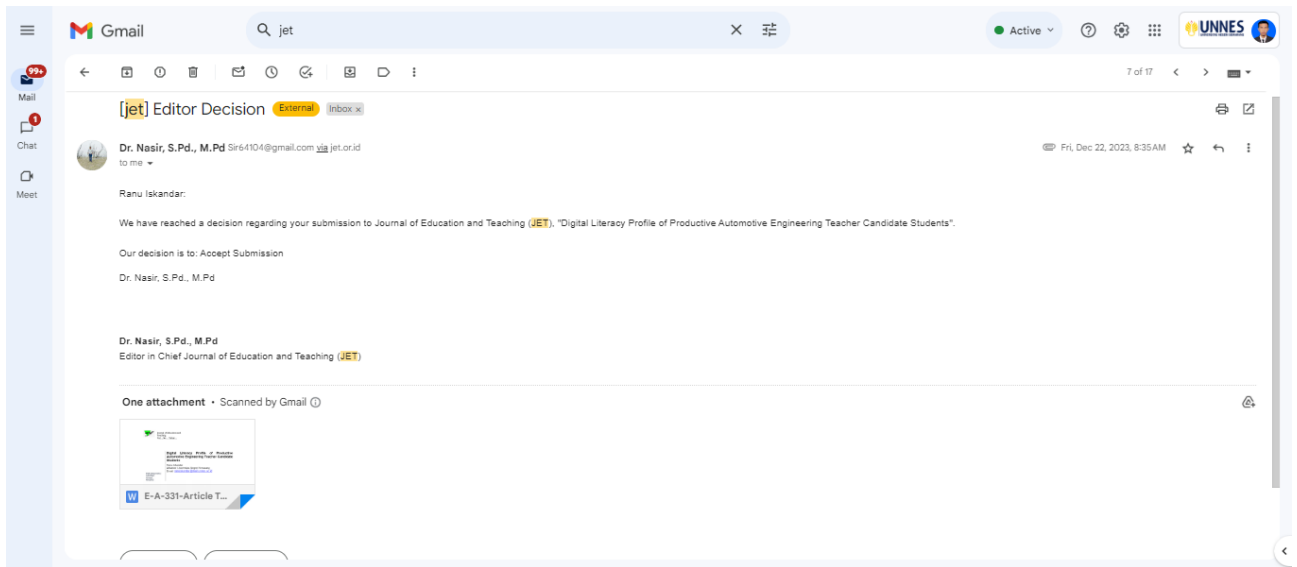**Lampiran 5. Bukti diskusi hasil revisi dengan Editor (12, 15, dan 21 Desember 2023)**
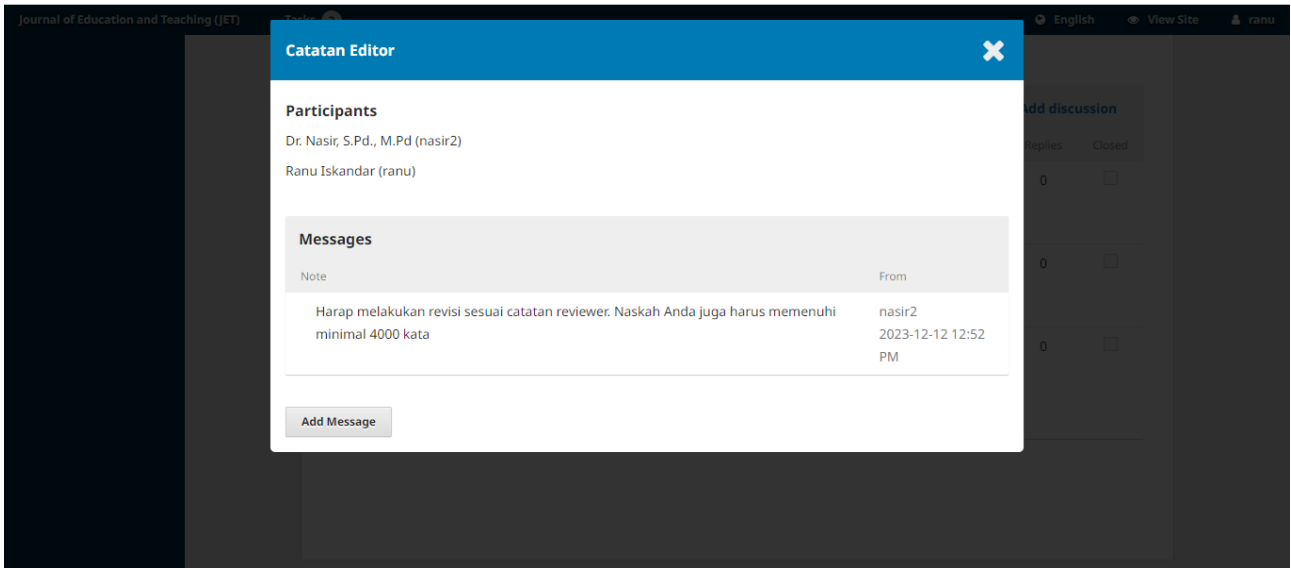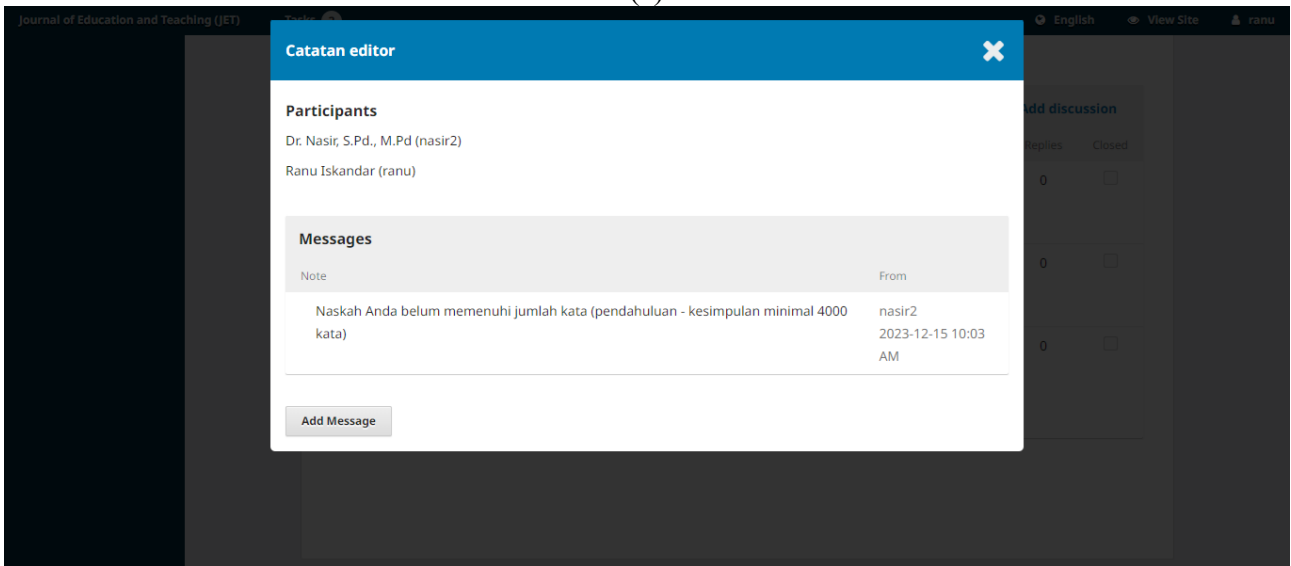
Gambar 7. Bukti diksusi hasil revisi dengan editor pada website JET (a) (b) (c)

Lampiran 6. Bukti konfirmasi accepted submission (22 Desember 2023)

Gambar 8. Bukti konfirmasi accepted submissoon di gmail

Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

[jet] Editor Decision
1 message

Dr. Nasir, S.Pd., M.Pd <Sir64104@gmail.com>   Fri, Dec 22, 2023 at 8:35 AM
To: Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

Ranu Iskandar:

We have reached a decision regarding your submission to Journal of Education and Teaching (JET), "Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students".
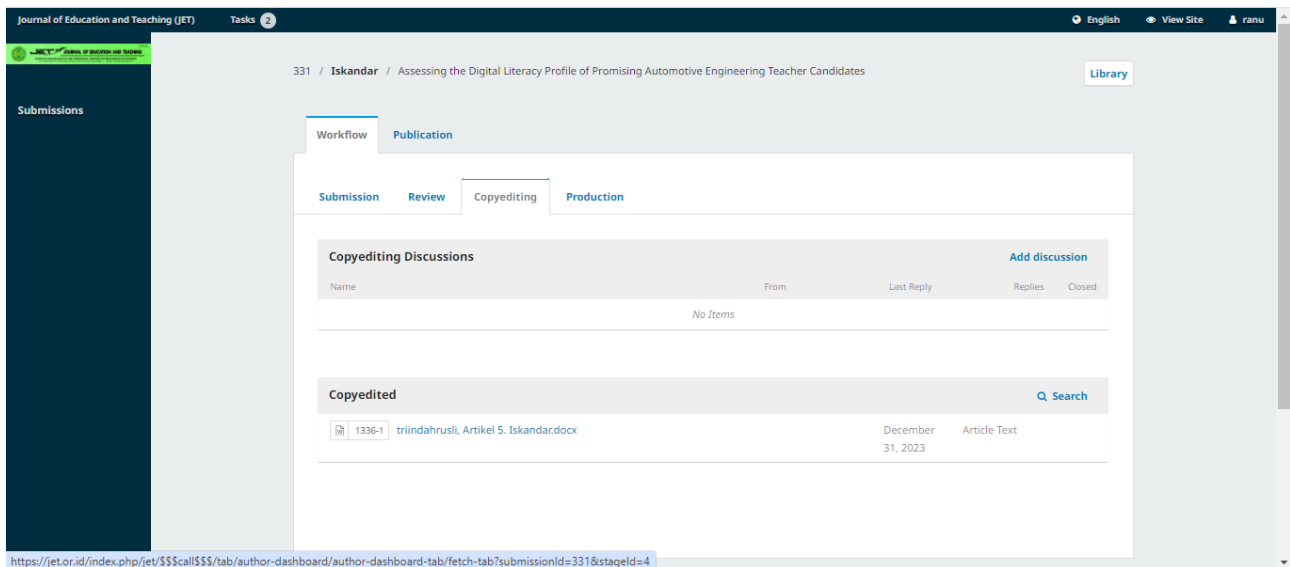
Our decision is to: Accept Submission

Dr. Nasir, S.Pd., M.Pd

Dr. Nasir, S.Pd., M.Pd
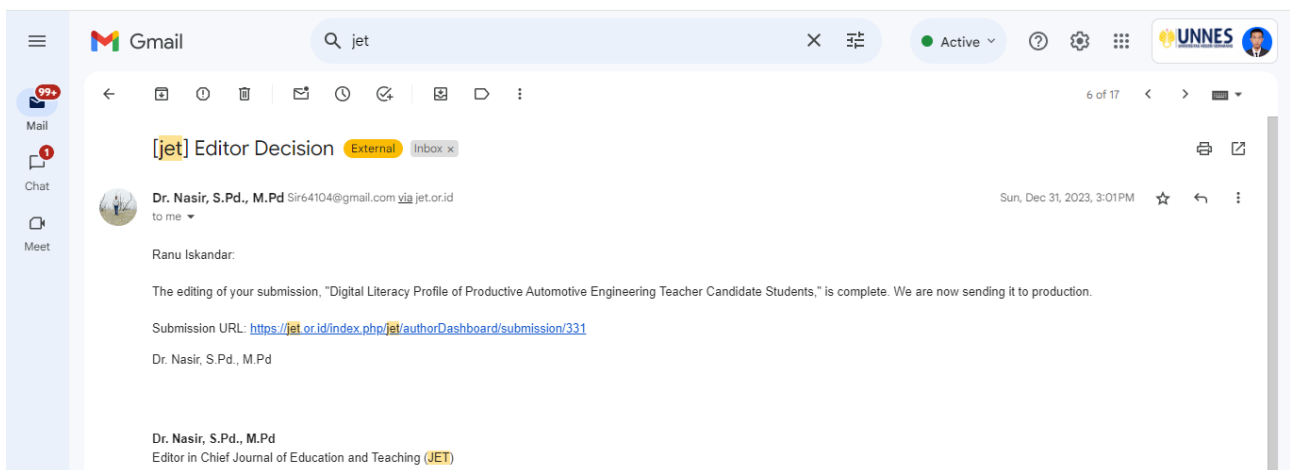Editor in Chief Journal of Education and Teaching (JET)

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Lampiran 7. Bukti konfirmasi copy editing dan production (31 Desember 2023)

Gambar 9. Bukti artikel masuk tahap copy editing pada website JET

Gambar 10. Bukti artikel masuk tahap production di gmail

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Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

[jet] Editor Decision
1 message

Dr. Nasir, S.Pd., M.Pd <Sir64104@gmail.com>   Sun, Dec 31, 2023 at 3:01 PM
To: Ranu Iskandar <ranuiskandar@mail.unnes.ac.id>

Ranu Iskandar:

The editing of your submission, "Digital Literacy Profile of Productive Automotive Engineering Teacher Candidate Students," is complete. We are now sending it to production.

Submission URL: https://jet.or.id/index.php/jet/authorDashboard/submission/331

Dr. Nasir, S.Pd., M.Pd

Dr. Nasir, S.Pd., M.Pd
Editor in Chief Journal of Education and Teaching (JET)

Lampiran 8. Bukti konfirmasi artikel published di JET dan akreditas SINTA 4 (1 Januari 2024)

Gambar 11. Tampilan Artikel pada Websiste JET

Link **https://jet.or.id/index.php/jet/article/view/331**

Gambar 12. Sertifikat akreditasi SINTA 4 dari JET
Link: https://jet.or.id/public/site/images/triindahrusli/27461467.jpg
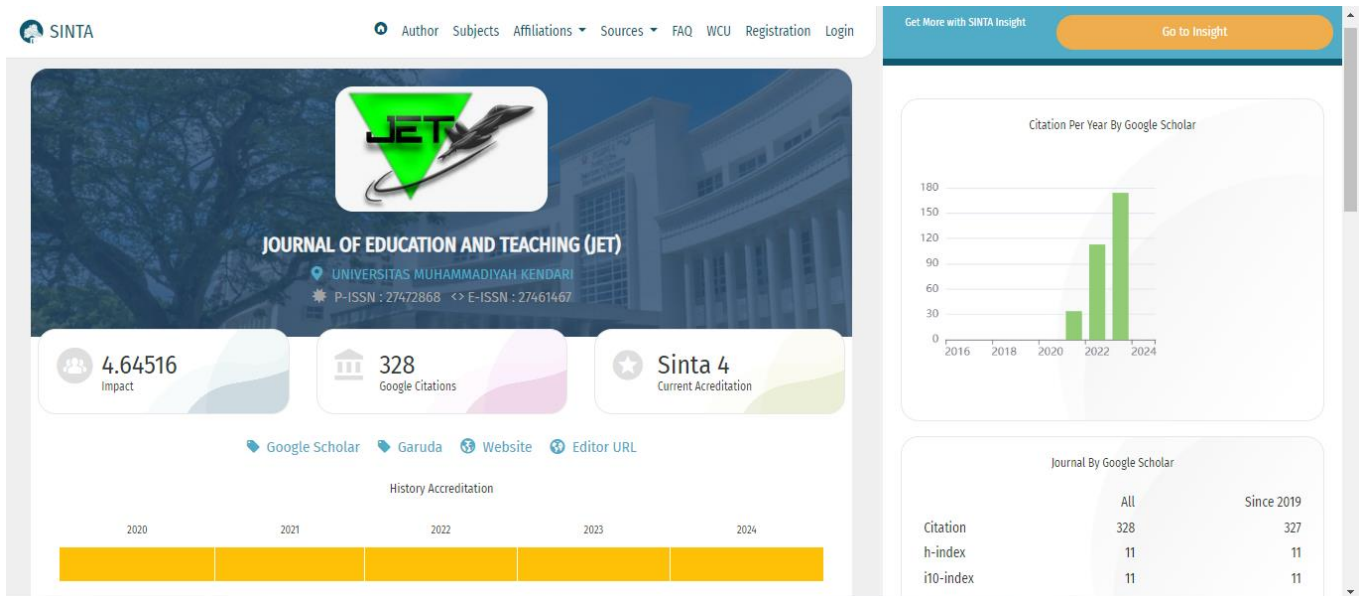
Gambar 13. Tampilan Halaman jurnal JET di website SINTA yang menampilkan terindeks S4 mulai terbitan tahun 2018 sampai dengan tahun 2024

Link: https://sinta.kemdikbud.go.id/journals/google/8391

Assessing the Digital Literacy Profile of Promising Automotive Engineering Teacher Candidates

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ABSTRACT: The objective of this study is to assess the level of digital literacy among aspiring automotive engineering educators. Given the intricate nature of the subject matter, which often necessitates disassembling components for study, it becomes crucial for students to excel in digital literacy. The research, conducted over a week from November 1 to November 7, 2023, employed a descriptive approach with 80 undergraduate automotive engineering education students as participants. Utilizing a questionnaire as the data collection tool, the analysis applied descriptive statistics and presented the findings in tabular form. The results indicate a generally high level of digital literacy among student automotive engineering teacher candidates, particularly in collaboration, communication, cultural understanding, and digital technology. Proficiency in identifying information aspects is also notable. However, areas such as e-safety, critical thinking, creativity, and functional skills, as well as aspects beyond the immediate scope, exhibit lower levels of proficiency.

Key Words: automotive engineering, digital literacy, productive teacher candidate, students.

ABSTRAK: Tujuan dari penelitian ini adalah untuk menilai tingkat literasi digital di kalangan calon pendidik teknik otomotif. Mengingat sifat rumit dari materi pelajaran, yang sering kali memerlukan pembongkaran komponen untuk studi lebih lanjut, menjadi penting bagi mahasiswa untuk memiliki keahlian literasi digital yang baik. Penelitian ini dilakukan selama seminggu, dari 1 - 7 November 2023, dengan pendekatan deskriptif dan melibatkan 80 mahasiswa program pendidikan teknik otomotif sebagai partisipan. Menggunakan kuesioner sebagai alat pengumpulan data, analisis dilakukan dengan menggunakan statistik deskriptif dan hasilnya disajikan dalam bentuk tabel. Hasil penelitian menunjukkan bahwa secara umum, calon pendidik teknik otomotif memiliki profil literasi yang tinggi, terutama dalam kolaborasi, komunikasi, pemahaman budaya, dan teknologi digital, serta pemahaman terhadap cara mengidentifikasi aspek informasi. Namun, dalam hal keselamatan digital, pemikiran kritis, kreativitas, keterampilan fungsional, dan aspek-aspek di luar batas materi tertentu masih memiliki tingkat kemahiran yang rendah.

Kata Kunci: Calon Pendidik Produktif, Literasi Digital, Teknik Otomotif.

INTRODUCTION

The pace of technological advancements is surging, demanding an inevitable adaptation from students (Peimani & Kamalipour, 2021). Inescapably, students find themselves compelled to keep pace with these developments, as a lack of technological proficiency renders them outdated in the contemporary

landscape. Among the various technological realms, Information and Communication Technology (ICT) has entrenched itself in the education sector for an extended period. However, the imperative lies in the education sector's ability to integrate technologies that not only serve as tools but substantially enhance effectiveness and efficiency in attaining predefined learning objectives.

This underscores the vital need for competencies among students aspiring to become automotive engineering teachers in the 21st century. Mastery of technology is no longer a choice but a prerequisite for educators-to-be (Mohamed & Rashid, 2023). The evolving landscape of technology in education demands adaptability, and students must navigate these advancements to stay relevant and effective in their future roles.

The competencies sought after in automotive engineering teacher candidates extend beyond conventional teaching skills. A nuanced understanding of contemporary technologies, particularly those pertinent to the automotive industry, becomes integral. These candidates are expected to leverage technology not merely as an accessory but as a catalyst for transformative and innovative teaching methodologies.

In this era, the effectiveness of education hinges on the seamless integration of technology. Aspiring educators in the field of automotive engineering must be equipped with the skills to navigate digital tools, ensuring that their pedagogical approaches align with the dynamic needs of modern learners (Tyson, 2023). Ultimately, the evolving technological landscape necessitates a paradigm shift in the competencies expected from automotive engineering teacher candidates, solidifying their role as adept facilitators of knowledge in the 21st-century classroom.

Currently, automotive engineering teacher candidate students born in the 2000s and above are native to ICT (Moran, 2016). Since birth, students have been exposed to cell phones and computers. However, the Industrial Revolution 4.0 and the era of massive digitalization mean that Automotive engineering teacher candidate students must adapt to all forms of progress (Maghfiroh & Iskandar, 2023; Purwanto, 2021). This is necessary so that later when you become a teacher, you can integrate technology into the learning process (Iskandar, Syafei, Bahatmaka, Hidayat, & Huda, 2023).

Automotive engineering teaching students as automotive engineering teacher candidates need to have mastery of digital literacy. This is because the productive material taught is a) complicated systems such as the common rail fuel system, b) sometimes it is necessary to disassemble it to find out the components inside, such as the transmission system and cranking system, and c) new technology such as the EFI system (Adnyana & Suyanto, 2013; Iskandar, Arifin, & Sudira, 2020; Supraptono, Khumaedi, Soesanto, & Septiyanto, 2018; Utomo & Ratnawati, 2018). Students need to use technology that makes it easier to learn these difficulties (Marsyaelina, Sudiyatno, & Iskandar, 2022).

Digital literacy is the mastery of various digital technologies in retrieving, assessing, storing, producing, presenting, exchanging information,

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communicating, and participating in collaborative networks via the Internet confidently and critically (UNESCO Institute of Statistics, 2021).

This control needs to be addressed wisely and ethically so that in the future, we can avoid cyberbullying, which makes social media a means to ridicule someone and give negative comments to someone not in accordance with their thoughts (Rajbhandari & Rana, 2023). Therefore, it is necessary to build media, information, and ICT literacy for both teachers and prospective teachers or teaching students as a form of anticipation of the negative impacts caused by low media, information, and ICT literacy as an essential component of digital literacy.

However, several studies show teachers' and prospective teachers' low levels of digital literacy. Research by Anori et al. (2022) showed that during the Covid-19 pandemic, there were vocational school teachers in Payakumbuh City who did not understand at all how to operate tools such as Zoom, Microsoft, LMS, and others in the learning process so they always needed help. Other people when using it. Research by Laksono (2021) showed that prospective teachers' theoretical understanding of digital literacy was 80%, social media use was 30%, use at home was 72%, and use for communication was 30%.

Based on field observations, prospective automotive teacher students have smartphones and computers. However, not all existing applications help the learning process—many applications, such as games, fintech, and social media.

Based on the problems above, this research aims to determine how high the perception of automotive engineering education students as productive automotive engineering teacher candidates is regarding digital literacy. The gap in this research is the respondent gap. Whereas in other studies, the students who were respondents were chemistry education students, while in this study, the students who were respondents were automotive engineering education students. It is hoped that this research will provide a unique contribution to prospective automotive engineering teacher candidate students regarding the issue of digital literacy on campus and become a reference for other universities in Indonesia.

There are 8 components of digital literacy, namely: a Functional Skill and Beyond relating to a person's ICT skills, b) Creativity relating to how we think, build and share knowledge by utilizing digital technology which includes (1) creation products or outputs in various formats and models by utilizing digital technology, and (2) creative and imaginative thinking skills including planning, knitting content, exploring ideas and controlling the creative process, c) collaboration related to individual participation in the process of dialogue, discussion and building ideas other ideas to create understanding, d) communication is related to the ability to communicate through digital technology media and the ability to comprehend and comprehend the audience, e) the ability to find and select information is related to the ability to search for and select information, f) critical thinking and evaluation is related to the ability contribute, analyze and sharpen critical thinking when dealing with information, g) cultural and social understanding relating to digital literacy practices that are in line with the context of social and cultural understanding, and h) e-safety components related to ensuring security when

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users explore, create, collaborate with digital technology (Adkha, Sudira, & Iskandar, 2021; Futurelab, 2010).

RESEARCH METHOD

This research is descriptive research. This research was carried out for a week, from November 1, 2023, to November 7, 2023. The subjects of this research were undergraduate students in Automotive Engineering Education Semarang State University. Ideally, the sample is a minimum of 30 respondents (Alwi, 2012; Amin, Garancang, & Abunawas, 2023). The tool used for data collection is a questionnaire. This questionnaire instrument is prepared starting with a conceptual definition, operational definition, indicators, and statement items. This questionnaire was adapted from an instrument developed by Nugroho & Nasionalita (2020), which is valid and reliable for each question. The questionnaire was distributed using Google Forms. Ordinal data was collected using a Likert scale, namely strongly disagree (SD), disagree (D), neutral (N), agree (A), and strongly agree (SA). The dependent variable of digital literacy is the ordinal data above. The independent variables in this research are gender, age, and class. The data analysis technique used is descriptive statistics. The data has been tabulated and presented in tabular form.

RESULT AND DISCUSSION

From the instrument distribution, 80 automotive teacher candidate students completed the questionnaire. The respondents were categorized based on entry class, gender, and age. These categories are shown in Table 1.

Table 1. Characteristics of Respondents

Variables	Measurement Scale	Frequency (n=80)	Percentage (%)
Year Intake	2023	14	17.5
	2021	23	28.75
	2020	43	53.75
Gender	Man	74	92.5
	Woman	6	7.5
Age	Younger than 18 years old	5	6.25
	18-19 years old	20	25
	20-21 years old	48	60
	Older than 21 years old	7	8.75

The results of data tabulation on the digital literacy level of Automotive engineering teacher candidate students from each statement can be explained in Table 2.

Table 2. Frequency Distribution of Perceptions of Digital Literacy of Automotive Engineering Teacher Candidate Students

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Aspects	Statements	Frequency					Percentage (%)				
		SD	D	N	A	SA	SD	D	N	A	SA
Functional Skill and Beyond	I have ICT skills to operate a computer	0	0	2	18	60	0	0	2.5	22.5	75
	I have ICT skills in the internet field	0	0	4	22	54	0	0	5	27.5	67.5
Creativity	I am able to create products in various formats and models by utilizing digital technology	0	10	26	32	12	0	12.5	32.5	40	15
	I have the ability to think creatively	0	2	4	30	44	0	2.5	5	37.5	55
	I have the ability to think imaginatively	0	0	0	26	54	0	0	0	32.5	67.5
Collaboration	I have the ability to participate in the digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to explain ideas with others in groups in digital spaces	0	0	8	18	54	0	0	10	22.5	67.5
	I am able to negotiate ideas with others in the group in the digital space	0	0	10	26	44	0	0	12.5	32.5	55
Communication	I am able to communicate via digital technology media	0	0	0	4	76	0	0	0	5	95
	I understand the audience in the digital space	0	0	4	36	40	0	0	5	45	50
	I understand the audience in the digital space	0	0	6	24	50	0	0	7.5	30	62.5
The Ability to find and select Infomation	I am able to search for information in digital space	0	0	0	10	70	0	0	0	12.5	87.5
	I am able to select information in the digital space	0	0	6	12	62	0	0	7.5	15	77.5
Critical Thinking and Evaluation	I am able to contribute when dealing with information in the digital space	0	0	14	26	40	0	0	17.5	32.5	50
	I am able to analyze when dealing with information in the digital space	0	8	14	34	24	0	10	17.5	42.5	30
	I am able to think critically when dealing with information in the digital space	0	8	12	18	42	0	10	15	22.5	52.5
Cultural and Social Understanding	I have thoughts that are in line with social and cultural understanding	0	0	4	26	50	0	0	5	32.5	62.5
E-safety	I can guarantee safety when exploring with digital technology	2	16	40	4	18	2.5	20	50	5	22.5
	I can guarantee safety when creating with digital technology	4	20	24	14	18	5	25	30	17.5	22.5
	I can guarantee security when collaborating with digital technology	0	0	2	18	60	0	0	2.5	22.5	75

Functional Skills and Beyond are the technical abilities and competencies needed to skillfully operate computers and various digital tools connected to the internet (Davis & Newstrom, 2009; Watulak & Kinzer, 2013). Functional Skills and

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Beyond development is that students can operate new technology. From the two statements on the Functional Skill and Beyond aspect, it is known that the percentage of students who answered strongly disagree was 0%, disagree 4.17%, neutral 12.33%, agree 30%, and strongly agree 52.5%. Many students who are productive automotive engineering teacher candidates have low functional skills and beyond aspects; even the students are digital natives. Especially during the Covid-19 pandemic, students are required to study online, so they must be able to operate ICT connected to the internet (Wakijah et al., 2023). This is because students must learn how to operate by self-teaching or trial and error.

Creativity is a digital literacy ability that is actively involved in exploring digital media and creating and understanding what the media was created for Syahfira et al. (2023). Creative students can create products in various formats and models by utilizing digital technology. From the 3 Creativity statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0.83%, Neutral 1.67%, Agree 27.5%, and Strongly Agree 70%. Some students still feel that their creative aspect is not proficient in digital tools such as CAD, which visualizes 3D images.

Collaboration is a process where people talk, discuss, and reach a shared understanding based on each other's views. Collaborative capacity is working together well to develop knowledge and other things. From the 3 Collaboration statements, it is known that the percentage of students who answered strongly disagree was 0%, disagree 0%, Neutral 11.25%, Agree 27.5%, and Strongly agree 61.25%. Prospective teacher students are used to collaborating in writing using Google Docs, Google Spreadsheet, Google Workspace, and Google Colab.

Communication is the ability and willingness to share thoughts, ideas, and understanding that is never separated from human daily life. With today's technological advances, communication not only takes place through conversations, but communication is also developing with the emergence of digital communication, which allows individuals to interact and send messages via computers, cell phones, the internet, and many other devices. From the 3 Communication statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 4.16%, Agree 26.67%, and Strongly agree 69.17%. Prospective teacher students are already skilled at communicating because they are used to communicating using WhatsApp, Gmail, and Zoom meetings.

Understanding how to identify the information type is useful for those who support digital literacy activities. This ensures that people receive up-to-date and reliable information. When selecting information, people should be able to analyze it in detail, including where the information was obtained, who it is displayed to, how the content claims to be accurate, and any copyright issues. From the three statements on The Ability to find and select information, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 3.75%, Agree 13.75%, and Strongly agree 82.5%.

Critical thinking involves changing, analyzing, or processing information given data or ideas to interpret meaning and develop insight. Students must be

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able to contribute, analyze, and think critically when dealing with information in the digital space. From the 3 critical thinking and evaluation statements, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 6.67%, Neutral 16.67%, Agree 32.5%, and Strongly Agree 44.16%. Prospective teacher students consider critical thinking to help them express ideas, assess the benefits of new ideas, choose the best ideas, modify them, and solve problems and build strategies that make them better at work.

Digital culture and technology have formed new ways of seeing social class theoretically, including immaterial labor, digital labor, informational and cultural work, "concept of free labor under conditions of the New Economy, as well as the now-famous notions of social factory" (Qiu, 2018). From 1 Cultural and Social Understanding statement, it is known that the percentage of students who answered strongly disagree was 0%, disagreed 0%, Neutral 5%, Agree 32.5%, and Strongly agree 62.5%. Student automotive engineering teacher candidates can become active participants in the construction of their knowledge rather than being passive vessels. In this constructivist environment, student automotive engineering teachers can work on complex global projects through new media.

E-safety is an important component of digital literacy. (National Society for the Prevention of Cruelty to Children, 2023) explains that e-safety is about empowering schools and professionals with knowledge and resources and requires a whole-school approach to educate and protect the well-being of students from online risks and provide appropriate intervention and support mechanisms. Developing security practices that utilize digital technology, such as the internet and smartphones, is part of the digital literacy component. This involves learning how to properly utilize digital technology and deciding what things to post. From the 3 e-safety statements, it is known that the percentage of students who answered strongly disagree was 3.75%, disagreed 22.5%, Neutral 40%, Agree 11.25%, and Strongly Agree 22.5%. To improve skills in the e-safety aspect, Automotive engineering teacher candidate students must learn to start discussing the benefits and dangers of the internet and learn to create an open environment with other students to ask questions and express concerns (National Society for the Prevention of Cruelty to Children, 2023). Dangers of the internet include cyberbullying, grooming, identity theft, online pornography, hate sites, and sexting.

CONCLUSION

Generally, student automotive engineering teacher candidates have a high literacy profile, especially in collaboration, communication, culture, and digital technology, and understand how to identify information aspects. However, e-safety, critical thinking, creativity, and aspects of Functional Skills and Beyond are low. Functional Skills and Beyond aspects can be improved by Automotive engineering teacher candidate students by learning new tools on the internet efficiently by reading books, watching videos on YouTube, and asking classmates who are already proficient. Automotive engineering teacher candidate students can improve the e-safety aspect by discussing the dangers of the internet with

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classmates. Automotive engineering teacher candidate students can improve critical thinking by learning to look for trusted sources of information. Automotive engineering teacher candidate students can increase aspects of creativity by increasing curiosity.

Conflicts of Interest

The author certifies that I has NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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