

BRIDGING THE DIGITAL DIVIDE AMONG CIVIL SERVANTS USING WEBINAR: A CASE STUDY OF WEBINAR ASN BELAJAR BY EAST JAVA REGION GOVERNMENT

Kusumaningsih I*

Department of Communication Science, Faculty of Social and Political Sciences,

Universitas Gadjah Mada, Indonesia

Abstract: The digital divide remains a significant challenge for *ASN* (civil servants, in Bahasa Indonesia abbreviation of *Aparatur Sipil Negara*), particularly in East Java region. This study explores the strategic implementation of the 'Webinar ASN Belajar' program initiated by the East Java Human Resources Development Agency (*BPSDM*; *Badan Pengembangan Sumber Daya Manusia*) to enhance digital literacy among civil servants (*ASN*). Applying the Diffusion of Innovations Theory, the research analyzes how the webinar has been adopted across stages of knowledge, persuasion, decision, implementation, and confirmation. The research was conducted through in-depth interviews with representatives from East Java Region *BPSDM* to explore the program's development, implementation, and impact. The findings reveal that the webinar improves civil servants digital skills. The study reveals that relative advantage, compatibility, and organizational support significantly influence adoption, while infrastructure limitations remain key challenges, such as limited internet access in remote areas and varying levels of digital literacy among regional civil servants. The study's implications provide a framework for replicating similar programs in other regions and offer practical guidelines to optimize civil servants capacity development, supporting an inclusive and sustainable digital transformation in the public sector.

Keywords: digital divide, civil servants, digital literacy, webinar adoption, digital transformation

Introduction

In its development, digital technology has been widely adopted; however, a significant portion of the population, including civil servants (*ASN* abbreviation for *Aparatur Sipil Negara*) in Indonesia, has yet to utilize it effectively (Herlina, 2014). It is evident that not all *ASN* possess had similar level of proficiency in information and communication technology (ICT). Several factors contribute to this disparity, including differences in educational background and academic attainment, generational and age gaps, environmental conditions and internet accessibility, geographical disparities, and variations in human resource competency in ICT. These factors have led to a phenomenon known as the digital divide. The digital divide, as defined by Onitsuka et al. (2018), refers to inequalities experienced by certain individuals in accessing and utilizing digital technology, which ultimately hinders their ability

*Corresponding Author's Email: irnakusumaningsihskom@mail.ugm.ac.id



to effectively engage with digital tools, a condition often referred to as digital illiteracy. Similarly, Valdez and Javier (2021) conceptualize the digital divide as a societal and national gap that separates individuals into those who have and those who lack access, digital skills, and technological knowledge, leading to disparities in digital utilization, opportunities, and benefits. Additionally, Ragnedda and Ruiu (2017) highlight a recent shift in the discourse surrounding the digital divide, moving beyond mere access disparities to skills-based digital inequalities, which emphasize differences in digital competencies required for effective internet use. Furthermore, this shift extends beyond broadband access to highlight the importance of what users can actually achieve with their connectivity, referred to as digital skills.

Based on the findings from the aforementioned studies, it is evident that competency development programs for Indonesian civil servants, particularly in digital skills, are necessary. Despite these expectations, many ASN remain unaware of or unable to access various digital services due to low digital literacy levels (Haerana, 2022). This lack of digital literacy among ASN presents a significant challenge, as it hinders public sector organizations from evolving and adapting to the digital era. Therefore, it can be concluded that digital literacy is an essential prerequisite for ASN in ensuring the successful digitalization of public service delivery in Indonesia.

This assertion is further supported by Utami (2020), who emphasizes that enhancing digital literacy among ASN is the key to successfully realizing the digitalization of public services. In fact, regulations governing ASN competency development have already been established. The Ministry of Administrative and Bureaucratic Reform (*Kementerian Pendayagunaan Aparatur Negara dan Reformasi Birokrasi; KemenPAN-RB*) has formulated the Grand Design for ASN Development 2020–2024, aimed at fostering a professional, legally grounded, and competent governance system capable of addressing the challenges of the Fourth Industrial Revolution (Humas KemenPAN-RB, 2018). Furthermore, the United Nations (2022) annual report comprehensively discusses global trends in e-Government and digital governance, with one of its key highlights being the importance of digital skills training for public sector employees to ensure the successful implementation of e-Government initiatives. Through the principle of “*leaving no one behind and leaving no country behind*,” the United Nations advocates for governments, including local authorities (*Pemerintah Daerah* in Indonesia), to develop comprehensive strategies that enhance ASN’s digital readiness and capabilities. This, in turn, supports the implementation of e-Government in alignment with the Sustainable Development Goals (SDGs). Digital literacy plays a pivotal role in e-Government services (Masyhura and Ramadan, 2021), as it serves as a bridge to mitigate the digital divide, particularly in rural areas where increased focus on improving digital literacy among ASN is crucial (Liu et al., 2023; Rundel and Salemin, 2021). The government also plays a critical role in fostering digital literacy through policies and initiatives designed to develop individual digital competencies (Alam et al., 2023).

In alignment with this goal, the Provincial Government of East Java (*Pemerintah Provinsi Jawa Timur*), which, according to data from the Central Statistics Agency (*Badan Pusat Statistik/BPS*, 2023), has been the province with the highest growth of civil servants (ASN) over the past ten years in Indonesia, holds a significant responsibility in managing this large number of ASN to prevent a gap in competencies, particularly in digital skills. Therefore, in 2022, Provincial Government of East Java, through the Human Resources Development Agency (*Badan Pengembangan Sumber Daya Manusia/BPSDM*) of East Java initiated the development of an internet-based learning model (online

learning), which can be accessed via two platforms: Zoom and YouTube, through a program called the Webinar Series *ASN Belajar*. This program provides digital literacy training aimed at enhancing the digital skills of all civil servants in East Java by utilizing digital platforms and tools, in alignment with the governance objectives within the framework of Electronic-Based Government System. Through this program, Provincial Government of East Java expects to implement a precise and targeted strategy to improve *ASN*'s digital skills, recognizing the high urgency for enhancing digital competencies among *ASN* in Indonesia due to technological advancements that impact the execution of public service duties within the e-Government framework. Furthermore, it can be concluded that digital literacy is essential for *ASN* as a form of readiness to implement the digitalization of public services in Indonesia.

An essential aspect of electronic-based governance is the digitalization of public services and the equitable development of supporting infrastructure. In the context of public service digitalization, the government requires Civil Servants (*Aparatur Sipil Negara, ASN*) as key actors responsible for service delivery. These individuals must demonstrate accountability, integrity, fairness, professionalism, and expertise in their respective fields, as well as the ability to adapt to technological advancements (Komara, 2019). Competence in this regard refers to the ability to exploit digital technology to convey impactful and streamlined of digital-based services to the public (Iriansyah et al., 2023), a concept further referred to as digital competence or digital skills. However, in practice, a significant number of civil servants still lack proficiency in ICT when carrying out their duties, particularly those in Echelon categories or structural positions within the 35-50 age group. This issue is supported by data from the 2017 World Economic Forum Human Capital Report on Indonesia, which indicates that the quality of Indonesia's civil servants is relatively lower compared to other Southeast Asian countries, such as Thailand, Singapore, and Malaysia (Arrochmah and Nasionalita, 2020).

These findings are further corroborated by research conducted by Ngantung et al. (2018) in their study titled "Analysis of Information and Technology Literacy Among Civil Servants in the Manado City Government". The study revealed that civil servants in structural positions in Manado exhibit significantly lower levels of digital literacy compared to other job categories. Meanwhile, staff members in non-structural roles demonstrate a moderate level of digital literacy, although it remains relatively low overall. Consequently, the study concludes that the overall digital literacy level of civil servants in Manado remains critically low. Although the primary focus of this research was digital literacy levels, one of the key indicators assessed was digital competence (digital skills), making its findings relevant as a reference for the present study. Digital literacy initiatives for Civil Servants (*ASN*) align with the core values of *ASN*, namely *Ber-AKHLAK* (it refers to a person's ethical conduct, moral values, and behaviour based on religious, cultural, or philosophical principles). Civil servants are expected to comprehend and respond swiftly to digitalization trends to enhance their competencies, thereby improving the quality of public sector services.

Based on the issues related to the digital skills gap among *ASN* outlined above, this study aims to explain the strategy implemented by Provincial Government of East Java in developing the Webinar Series *ASN Belajar* program as an effort to enhance the digital skills of *ASN* in East Java. Additionally, this research will explore the obstacles or factors hindering the implementation of the program, as well as assess the extent to which the program has been developed to reach *ASN* across all regions of East Java.

Material and Method

This research employed a qualitative case study approach to investigate the implementation and reception of the Webinar ASN Belajar. Data were collected through in-depth interviews with program coordinators at BPSDM East Java, including the Head of BPSDM East Java as the program supervisor, the Head of the Civil Servant Assessment Center, and the Head of the Human Resources Assessment Section, who serve as both program implementers and formulators of the *ASN Learning Webinar* and a purposive sample of webinar participants.

The research was conducted in November 2024, incorporating data from interviews and evaluations of the *ASN Learning Webinar* program spanning 2022, 2023, and 2024. Furthermore, interview findings will be supplemented with documentary evidence, including visual materials and tabular data, to support the discussion of key research findings. Supporting data were drawn from program documentation, social media materials, and recorded webinar sessions. The analysis was framed using Rogers' five-stage innovation-decision model and the innovation attributes influencing adoption.

Results and Discussion

3.1 ASN Belajar Webinar Series: The Strategy of BPSDM East Java Province in Enhancing ASN Digital Skills

To enhance the digital competencies of civil servants (ASN) in East Java Province, the Human Resources Development Agency/Badan Pengembangan Sumber Daya Manusia (BPSDM) of East Java launched an online-based digital literacy program known as the *ASN Learning Webinar Series*. The inaugural session was held on January 10, 2022, with Episode 1 themed "*Dalam Rangka Realisasi Program Kegiatan Yang CETTAR*." The webinar was broadcast live via BPSDM Jatim TV's official YouTube channel. Developed using the Corporate University (Corpu) approach, this program is conducted weekly every Thursday, featuring diverse themes in each episode. According to a telephone interview with Swesti Andini, S.Psi, Head of the Planning and Development of HR Competency Certification Section at BPSDM East Java, the Corpu approach was adopted to design a more innovative competency development model for civil servants, replacing the traditional BangKom approach, which was deemed less relevant in addressing today's strategic environmental challenges. Swesti further explained:

"The Corporate University learning model emphasizes agile learning through self-directed learning supported by information technology. By leveraging an integrated learning system, the approach aims to optimize competency development through collaborative, open, dynamic, and interconnected learning experiences." (Interview conducted on November 15, 2024)

The *ASN Learning Webinar Series* illustrates the interaction between technology and the digital competencies of civil servants. The program is conducted via Zoom, a platform with pre-configured structures such as screen sharing, breakout rooms, and chat functions, which facilitate interaction throughout the webinar sessions. These technological features shape participants' behaviours, enabling collaborative discussions and enhancing accessibility to digital resources. Furthermore, participants appropriated these features innovatively, such as utilizing the chat function for peer support and informal knowledge exchange beyond the webinar's agenda. Initial interactions within the program

revealed gaps in digital skills and internet accessibility among civil servants, prompting the organizers to modify the program by integrating introductory technology training and offline resources.

Over time, the norms established within the webinar became embedded in the organizational culture, fostering a virtual collaboration mind-set and improving participants' digital literacy. This development exemplifies the practical implementation of technology, demonstrating how civil servants adapt the platform to their behavioural context, influencing both the program's success and its sustainable growth. In response to these evolving dynamics, the ASN Learning Webinar Series organizers formulated several strategies to ensure the sustainability of digital literacy initiatives through webinars, as outlined below:

Selecting Engaging Themes with Credible Speakers

The first strategy employed by BPSDM East Java to develop the *ASN Learning Webinar Series* into an educational yet practically applicable program was the curation of engaging themes aligned with ICT advancements and the knowledge demands of civil servants (*ASN*). According to Dr. Ramliyanto, SP., MP., Head of *BPSDM* East Java Province, the initial process of determining discussion themes for each episode involved a vertical collaboration with central government leaders and institutions to identify trending topics that all *ASNs* must be aware of. Simultaneously, a horizontal approach was adopted, in which *BPSDM* East Java accommodated the needs of other Regional Government Organizations (OPD) regarding technical competencies essential to their respective core duties and functions (*tupoksi*). Typically, these core duties served as the foundation for developing learning themes within each institution. However, over time, limiting the themes strictly to institutional functions resulted in overly compartmentalized content, focusing only on fundamental issues related to specific organizational tasks. As a result, after its first year of implementation, an evaluation of the *ASN Learning Webinar Series* revealed a lack of broad and general themes, leading to limited participation. Additionally, the number of registered *ASN* participants fell short of the 60% target of the total *ASN* workforce in East Java.

In its second year of implementation, the *ASN Learning Webinar Series* was further developed to adopt a more general approach, aligning with trending public issues while ensuring direct applicability to daily professional tasks. This refinement particularly emphasized the integration of information and communication technology (ICT) in its execution. A key factor contributing to the webinar's appeal was the selection of highly credible speakers with extensive teaching experience. The inclusion of keynote speakers from central government institutions facilitated collaboration between national and regional administrations, fostering a more integrated approach to *ASN* competency development. Additionally, the involvement of academic experts provided broader, research-based insights into the selected topics, while practitioners offered practical explanations grounded in their field experiences and professional expertise.

Having been conducted for two years, from 2022 to 2024, with a total of 50 episodes aired annually, the researcher has attempted to map the themes discussed in the *ASN Learning Webinar Series* in the following table:

Table 1: Mapping the Themes of the ASN Belajar Webinar Series

TECHNICAL SKILLS	NON-TECHNICAL SKILLS
Management of Public Service Application Technology	Knowledge of Regulations related to ASN
Mastery of Information and Communication Technology	Managerial and Leadership Education
Speaking Skills	Development of Ethics, Values, and Morality for ASN
Technical Writing Skills	Knowledge of Duties and Positions
	National Awareness
	Emotional Management Skills
	Introduction to New Government Programs
	Human Resources and Organizational Management

Provision of Rewards in the Form of Certificates and Instructional Hours (JP)

Another strategy implemented by BPSDM Jatim to increase participant numbers was to make the Webinar program eligible for the accumulation of Instructional Hours (JP), as evidenced by the details in the electronic certificate (e-Certificate) participants receive after the event. To obtain the certificate, participants are required to complete a link for attendance and provide feedback on the organizers. Some sessions also require participants to fill out a post-test to assess their understanding of the material presented during the Webinar. Typically, post-tests are conducted for topics related to technical learning.

The calculation of JP became crucial following the enactment of Government Regulation (PP) No. 17 of 2020 on Civil Servant Management, which stipulates that each ASN must develop their competencies by a minimum of 20 JP per year. In light of this regulation, BPSDM Jatim also announced that the top 25 ASN participants with the highest JP, as recorded through the Sibangkodir system (Self-Competency Development Information System), will be invited to produce academic papers based on themes discussed in the ASN Belajar Webinar Series. These individuals will then be selected to form a cohort of 10, who will participate in training and educational programs abroad, engaging in employee exchange programs. This initiative serves as an incentive for ASN in East Java to enhance their knowledge by participating in the Webinar.

Use of Social Media as a Promotional Medium for the Program

Another strategy employed by *BPSDM* East Java was to conduct massive promotion through various public communication channels managed by the government, along with providing rewards for Webinar participants. Information about the *ASN Belajar* Webinar Series, held weekly, is published through digital flyers distributed via the official Instagram account of *BPSDM* East Java and *WePro Communication*, a third-party organizer. These flyers are designed attractively, containing essential details such as the event theme, speaker names and photos, the date of the event, registration links, and Zoom Meeting and YouTube channel links. This information is usually disseminated up to four days prior to the Webinar. In addition, to ensure that all *ASN* across East Java are informed, *BPSDM* East Java also sends official notification letters to all government agencies and OPD unit offices throughout the province, ensuring no *ASN* is left unaware of the Webinar. Below are some examples of promotional flyers for the *ASN Belajar* Webinar Series program:



Figure 1: Collection of Flyers Containing Information on the *ASN Belajar* Webinar

3.2 Enhancement of Digital Skills for ASN through Webinars as a Digital Literacy Medium

In its implementation, the author seeks to provide an analytical example related to the organization of Webinars as an innovation that requires a process of technological adaptation, the evolution of norms within specific group structures, and the practical application of these in the group. The East Java Government launched the "Webinar *ASN Belajar*," a program aimed at enhancing digital skills among civil servants. This program utilizes the Zoom video conferencing platform and integrates structured modules, including live lectures, interactive discussions, and digital tool tutorials.

Applying the Diffusion of Innovations framework revealed that adoption was significantly influenced by institutional support, social influence, and individual readiness. The program's adaptability and use of familiar platforms lowered perceived complexity, while JP certification and peer recognition increased engagement. Despite success in reaching early and early majority adopters, continued barriers highlight the need for policy interventions to support late adopters through infrastructure investment and personalized learning models.

The study identified key adoption enablers: relative advantage (certification, relevance to job), compatibility (fit with ASN roles), and observability (visibility of benefits). Early adopters included younger ASN (around 20 - 35 age group) and those in urban areas. However, late adopters and laggards—typically older (36 - 55 age group) or rural-based ASN—faced challenges due to limited infrastructure and digital skills. Program modifications like foundational digital modules and YouTube archives improved inclusivity. The hierarchy among ASN and traditional training norms (e.g., formal classroom sessions) also shape how the program is received and utilized. Most participants use Zoom as intended, such as joining sessions on time, engaging via chat, and accessing shared documents through provided links during the Webinar. Some participants, who find the chat function more engaging than the learning content, use it for informal discussions with peers, sharing tips, and solving practical challenges unrelated to the direct agenda of the session. This adaptation adds value, even though it diverges from the platform's primary structure and function.

Early sessions revealed that some participants struggled with technology, while others dominated the discussions due to superior digital skills. The instructors then adapted by introducing introductory modules at the beginning of the Webinar to ensure fair participation. Interactions during the Q and A segments also highlighted regional disparities in internet access, prompting the organizers to provide offline resources (e.g., recorded sessions) and post sessions on YouTube, which could be viewed at any time to assist participants with connectivity issues.

Over time, as ASN participated in multiple Webinars, they became comfortable with the platform and accustomed to using it. Zoom became the standard tool for training and interdepartmental meetings, establishing a new norm for virtual collaboration in the government. New digital habits fostered by the Webinar program extended into daily work practices, such as using online tools for reporting and coordination. Although the Webinar platform was initially intended for knowledge dissemination, its implementation revealed new uses. For example, participants used the platform for peer-to-peer learning and problem-solving, illustrating innovation in the use of technology. Program organizers, recognizing this trend, may refine future Webinars by including dedicated peer-sharing sessions or even consider alternative platforms that better support collaborative learning.

3.3 Challenges in Enhancing Digital Skills of ASN in East Java Province

Based on the evaluation results of the "Webinar Series *ASN Belajar*" program since 2022, several challenges have been identified in its implementation. One such issue is that many Webinar participants attend the training merely to fulfil regulatory requirements and to earn credit points for career advancement. However, if participants engage in digital literacy training, the knowledge gained could enhance public services that are digital-based. Given this rationale, it is undeniable that the government often faces criticism from the public regarding the transparency, accuracy, and timeliness of its services, which are perceived as slow or inefficient.

Another challenge is the varying ability of participants to absorb the digital literacy material due to several underlying factors, such as age and educational background. Civil servants above the age of 40, for example, have been found to struggle with following the material due to their inability to implement the technical aspects of the taught content. A lack of proficiency in operating digital technology devices has been identified as a key reason why digital literacy materials cannot be applied. Additionally, for ASN with an educational background that does not involve extensive use of digital technology, there are further barriers to understanding the material. This highlights the challenge that the Webinar program has not yet sufficiently bridged the digital skills gap among *ASN*.

Moreover, other obstacles that present challenges in the execution of the Webinar Series *ASN Belajar* program include accessibility disparities. *ASN* located in remote areas with inadequate infrastructure often face issues such as unstable internet signals and incompatible digital devices, preventing them from fully participating in the training. If the training materials are not directly implemented in everyday work, the improvement and acceleration of digital transformation in public services will not be achieved. Therefore, further evaluation and research are needed to measure the effectiveness of the digital literacy program via webinars, in order to assess how effectively *ASN* are acquiring digital literacy in the future.

Conclusion

Applying the Diffusion of Innovations framework revealed that adoption was significantly influenced by institutional support, social influence, and individual readiness. The program's adaptability and use of familiar platforms lowered perceived complexity, while JP certification and peer recognition increased engagement. Despite success in reaching early and early majority adopters, continued barriers highlight the need for policy interventions to support late adopters through infrastructure investment and personalized learning models.

Overall, this research provides valuable insights into how digital literacy can be effectively implemented at the local level to support digital literacy for collaborative governance. These findings can serve as a foundation for the development of digital literacy programs in other regions and contribute to the advancement of collaborative governance theory within the digital context.

The Webinar Series *ASN Belajar*, organized by the East Java Provincial Government through the East Java Human Resources Development Agency (*BPSDM*), not only covers basic technical skills but also higher-level competencies necessary for effective participation in digital governance. This multidimensional approach ensures that participants become not only technology users but also critical thinkers and ethical practitioners in the rapidly digitalizing public sector. Thus, the Webinar Series *ASN*

Belajar can effectively prepare *ASN* to meet the demands of modern governance, reduce the digital gap, and foster a more inclusive digital ecosystem for all *ASN* in East Java.

Acknowledgement

The author would like to express gratitude to the Indonesian Endowment Fund for Education (*LPDP*) for their support and financial assistance provided in the preparation of this paper, enabling this research to be successfully conducted and presented at an international conference, and published as a Scopus-indexed proceeding. The author hopes that this paper will have tangible benefits in the field of digital communication media development.

Declaration

This manuscript is based on original research conducted by the author and has not been submitted elsewhere for publication. All data and interviews were conducted ethically with participant consent.

Conflict of Interest

The author declares no conflict of interest.

References

- Alam, M. J., Ogawa, K., and Islam, S. R. Bin. (2023). e-learning as a doubled-edge sword for academic achievements of university students in developing countries: Insights from bangladesh. *Sustainability*, 15(9), 72-82. <https://doi.org/10.3390/su15097282>.
- Arrochmah, N. P., and Nasionalita, K. (2020). The digital divide between x and y generation in a government province of dki jakarta. *Diakom*, 3(1), 26–39. <https://doi.org/10.17933/diakom.v3i1.97>.
- Badan Pusat Statistik. (2024). *Jumlah pegawai negeri sipil menurut provinsi danjenis kelamin, 2004-2023*. <https://www.bps.go.id/id/statistics-table/1/MTE2MyMx/jumlah-pegawai-negeri-sipil-menurut-provinsi-dan-jenis-kelamin--2004-2023.html>.
- Haerana, R. (2022). Literasi digital dalam pelayanan publik. *Wikrama Parahita: Jurnal Pengabdian Masyarakat*, 6(2), 131-137. <https://doi.org/10.30656/jpmwp.v6i2.4052>
- Herlina, S. D. (2014). *Membangun karakter bangsa melalui literasi digital*.
- Indonesia. Kementerian Pendayagunaan Aparatur Negara dan Reformasi Birokrasi. (2018). *Kementerian panrb susun grand design pembangunan asn era industri 4.0*. <https://menpan.go.id/site/berita-terkini/kementerian-panrb-susun-grand-design-pembangunan-asn-era-industri-4-0kementerian-panrb-susun-grand-design-pembangunan-asn-era-industri-4-0>
- Iriansyah, A., Gafallo, M. F. Y., Widiatmaka, P., Adiansyah, and Akbar, T. (2023).Penguatan literasi digital pada aparatur sipil negara untuk memberikan pelayanan publik berbasis digital strengthening digital. *Jurnal Kebijakan dan Manajemen PNS*, 17(1), 28-42. <https://doi.org/10.61133/pns.v17i1.409>.
- Komara, E. (2019). Kompetensi profesional pegawai asn (aparatur sipil negara) di indonesia. *Mimbar*

Pendidikan, 4(1), 73–84. <https://doi.org/10.17509/mimbardik.v4i1.16971>.

Liu, S., Lu, Y., Wang, D., He, X., Ren, W., Kong, D., and Luo, Y. (2023). Impact of digital health literacy on health-related quality of life in Chinese community-dwelling older adults: the mediating effect of health-promoting lifestyle. *Frontiers in Public Health*, 11. <https://doi.org/10.3389/fpubh.2023.1200722>.

Masyhura, N., and Ramadan, Z. H. (2021). Implementation of digital literacy in elementary schools. *International Journal of Elementary Education*, 5(4), 639–647. <https://doi.org/10.23887/ijee.v5i4.39480>.

Merriam-Webster. (2016). *Merriam-Webster's Collegiate dictionary*.

Ngantung, D. R. A., Lumenta, A. S. M., and Karouw, S. D. S. (2018). Analisa literasi tik aparatur sipil negara (asn) pemerintah kota manado. *Jurnal Teknik Informatika*, 13(4), 1–8. <https://doi.org/https://doi.org/10.35793/jti.13.4.2018.28090>.

Onitsuka, K., Hidayat, A. R. T., and Huang, W. (2018). Challenges for the next level of digital divide in rural Indonesian communities. *The Electronic Journal of Information Systems in Developing Countries*, 84(2), 1–25. <https://doi.org/10.1002/isd2.12021>.

Ragnedda, M., and Ruiu, M. L. (2017). Social capital and the three levels of digital divide. In M. Ragnedda., G. Muschert. (Eds). (2017), *Theorizing digital divides*. Routledge, pp. 21-34. <https://doi.org/10.4324/9781315455334-3>.

Rundel, C., and Salemin, K. (2021). Bridging digital inequalities in rural schools in Germany: geographical lottery?. *Education Sciences*, 11(4), 181. <https://doi.org/10.3390/educsci11040181>.

United Nations Statistics Division. (2017). *Sustainable development goals*. <https://sdgs.un.org/goals>.

Utami, M. A. (2020). *Peningkatan literasi media digital sebagai langkah edukasi new normal dimasa pandemi*. https://kkn.unnes.ac.id/lapknunnes/32004_33290520 11_6_Desa Sridadi_20200921_103508.pdf.

Valdez, V.B., and Javier, S.P. (2021). Digital divide: from a peripheral to a core issue for all SDGs. In W.L. Filho., A. M. Azul., L. Brandli., A. L. Salvia., P. G. Özuyar., and T. Wall. (Eds) *Reduced inequalities. Encyclopedia of the UN sustainable development goals*. Springer, pp 1-14. https://doi.org/10.1007/978-3-319-95882-8_107.