





Digital inclusion status of external supervisors of preservice mathematics teachers in an open distance e-learning environment

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ABSTRACT

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The purpose of this study is to ascertain the digital inclusion status of external supervisors of preservice mathematics teachers in an open distance e-learning (ODeL) environment. The study adopted a survey design with a self-structured Digital Inclusion Status Questionnaire (DISQ). A sample size of 44 preservice mathematics teachers' external supervisors partook in the study. The respondents were selected using simple random sampling techniques from the 93 external supervisors who supervise preservice teachers at the University of South Africa (UNISA). The DISQ was administered to the respondents via email, and data was collated and analyzed using descriptive statistics of means, standard deviations, pie charts and histograms. The study's findings showed that the respondents have devices that they can access the internet with and there is strong internet network in their locations, but internet data is not affordable, they have not undertaken a digital literacy programme and are therefore not digitally literate. The study further revealed that the supervisors cannot sufficiently apply internet usage skills online and they are not satisfied with their internet usage outcome, highlighting the need to improve on their internet usage skills. It was concluded that the external supervisors are not digitally inclusive, therefore subsidized internet data and periodic digital literacy training programmes are recommended.

Contribution/Originality: Digital inclusion among external supervisors is essential for effective delivery. This study contributes by pointing out the need for external supervisors to have access to digital devices, robust internet connectivity and digital literacy for efficient teaching practice supervision of preservice mathematics teachers in an ODeL environment.

1. INTRODUCTION

Digital inclusion to a contemporary educationist is an essential variable that should not be ignored due to its numerous benefits. There is a high degree of expectancy for an educationist who is working in an open distance e-learning (ODeL) environment to be digitally inclusive, and anything short of this expectation is an abnormality that needs to be treated seriously. United Nations (2020) champions the development of effective and inexpensive ICT infrastructure, accessible internet, digital skill promotion, and increased awareness of the benefits of digital skills. Venter et al. (2019) note that despite this advocacy, the issues of digital inclusion remain prevalent. Wilson, Gates, Vijaykumar, and Morgan (2023) state that all facets of our everyday lives are being increasingly by the demand for

digital skills and for reliable, accessible internet. Wang (2010) states that digital inclusion is the process of closing the digital divide. In the view of Reder (2015) the capacity of both individuals and groups to obtain information and communication technology is known as digital inclusion. Reder further explains that digital inclusion includes having access to the internet as well as having hardware and software available. Thomas et al. (2023) consider digital inclusion to be the ability of an individual to connect and use online technologies efficiently, as well as their ability to access and afford them. Leep (2016) states that digital inclusion often encompasses areas of access, technology literacy, relevant content and services, motivation, skills, and trust. Yang et al. (2022) and De Haan (2004) emphasize the importance of digital inclusion and removing obstacles for both individuals and communities to obtain information.

Digital inclusion, according to the National Digital Inclusion Alliance (NDIA), is a set of steps necessary to ensure that information and communication technologies (ICTs) are available and can be used by all individuals and communities, especially the most disadvantaged. The NDIA went on to highlight the five components of digital inclusion, which comprise (i) access to strong, reasonably-priced broadband internet service; (ii) user-friendly internet-enabled devices; (iii) digital literacy instruction; (iv) excellent technical assistance; and (v) online resources and programs that promote and enable independence, involvement, and teamwork. The European Commission defines digital inclusion as a means of guaranteeing that all individuals can participate in and reap the rewards of the digital economy and society. It's also crucial to keep in mind that the context of these definitions implies that using and having access to ICTs is a requirement for engaging in the economy, society, and democracy, and that digital inclusion needs to adapt as technology advances (Abah, 2019; Age & Machaba, 2023).

The importance of digital inclusion in the educational sector has been highlighted by various scholars, especially regarding external supervisors of preservice mathematics teachers who are involved in the supervision process in an ODeL environment. The goal of digital inclusion is to use technology to improve teaching and learning. Adodekun and Zulu (2023) opine that in the 21st century, digital inclusion has frequently been used to describe an effort to ensure that disadvantaged individuals and groups have access and the necessary skills to use ICTs in a rapidly growing information society. Alamelu (2013); Abah (2019) and Nguyen, Hong, and Gardner (2020) highlight the significance of digital inclusion for all stakeholders involved in the education sector. The high level of digital penetration in Nigeria, however, does not imply that mathematics education stakeholders, as digital natives, are fully reaping the educational, economic, and social benefits of digital technologies (Abah, 2019). This implies that despite the numerous benefits of digital inclusion in the mathematics sector, some key stakeholders can't access these opportunities because they are not digitally included. Researchers have tried to determine the factors that hinder individuals from being digitally included. Gibbs, Mengel, and Siemroth (2021) and Matli and Ngoepe (2020) report that in South Africa, data is relatively expensive, and for this reason access to the internet for the purpose of obtaining information is sporadic. This means that if stakeholders in education have these kinds of challenges, then their effectiveness in the field of education is at risk, hence the call for concern among researchers. Considering the fact that the supervision of preservice mathematics teachers is done virtually in ODeL environments, it is pertinent to ascertain the digital inclusion status and internet skills of the external supervisors.

Open distance electronic learning (ODeL), as the name implies, is a type of learning that caters to students with distance, cost and time barriers to enable them to pursue their studies online, as this type of education doesn't require learners to be physically present at a school. With the help of technology, instructions are transmitted to the learner, who is in separate location to the instructor, and there is regular and constant interaction between the two. In support of the above views, Kaliisa and Picard (2017) and McNaught (2005) highlight that ODeL is gradually being regarded as an acceptable paradigm for enhancing access to educational opportunities for students from diverse regions of the world, in varied situations, and from various backgrounds. Furthermore, Alfonso and Garcia (2015) view ODeL as promoting flexible teaching methodologies as well as the sharing of free learning materials and ICTs, lowering the cost of developing learning material. Saladino, Suelves, and Alonso (2020);

Fernández-Batanero, Cabero-Almenara, Román-Graván, and Palacios-Rodríguez (2022) and Area-Moreira, Bonilla, and Mesa (2020) show that teachers and other relevant stakeholders in the educational sector often use digital tools to enhance learning, inspire students, and facilitate and improve inclusion for all students.

For learning to be successful in an ODeL environment, both the students and lecturers must excel in the use of technology, hence the aim of this study to ascertain the digital literacy status of external supervisors.

Teaching practice is a key component in effective teacher education, and the Council of Higher Education (CHE) and the Higher Education Qualification Committee (HEQC) in South Africa have made it a mandatory requirement for teacher education. Students pursuing various qualifications in the field of mathematics education are not exempt from this academic exercise. It is known that teaching practice plays an important role in teacher education by developing reflective instructors and fostering their professional development (Konyana & Motalenyane, 2022). Teaching practice is essential for the professional growth and training of preservice teachers as it boosts their confidence in the effective delivery of their lessons and prepares them for handling higher classes after graduation. Aglazor (2017) states that at any higher institution of learning, teaching practice is a well-structured programme that offers preservice teachers the chance to develop and assess their potential and proficiency in a real classroom environment. It helps equip preservice teachers with the relevant pedagogical principles and strategies necessary for effective delivery of instruction in the classroom. Teaching practice is also important for professional and personal development since it promotes student–teacher growth and equips preservice mathematics teachers with relevant content knowledge (Azhar & Kayani, 2017; Jarrah, 2020; Mau & Harkness, 2020). Because of the importance of teaching practice in the professional development and initial preparation of preservice teachers, external supervisors are encouraged to take the activity seriously since it is an important aspect of teacher training. Sethusha (2014) opines that because of the numerous benefits of teaching practice, it will be of great value if supervisors consider teaching practice as a discipline rather than just a technical procedure where they complete checklists and assessment forms. Preservice teachers are expected to diligently carry out all their duties assigned to them while on teaching practice whether the supervisors are present or not. Another critical stakeholder in the professional development of preservice teachers is the supervisor, who stands in on behalf of the training institution to evaluate how prepared preservice teachers are for the tasks ahead.

A teaching practice supervisor has a number of roles to play in the professional development of preservice teachers. Supervisors direct teaching practice by assisting student teachers with lesson planning, providing feedback, and serving as role models for teachers (Clarke, Triggs, & Nielsen, 2014; Russell & Russell, 2011). Similarly, Sethusha (2014) and Long, van Es, and Black (2013) posit that during teaching practice supervision, the supervisor serves as a resource person, consultant, feedback translator, evaluator, and assessor. The supervisor goes beyond the assessment of preservice teachers; they also serve as mentors to the upcoming professionally trained teachers. As it is clearly stated in the Supervisors and Mentors Manual (University of South Africa (UNISA), 2012) the supervisor's job includes monitoring the student teacher's lesson presentations, advising on classroom management and organization, assessing the student teacher's performance in teaching practice settings, discussing their progress with them, and offering feedback.

With the enormous task on the shoulders of the preservice teachers' supervisors both within and outside the ODeL environment, are these supervisors adequately equipped to perform these duties? Can they sufficiently apply internet usage skills online to effectively supervise the mathematics education preservice teachers in an ODeL environment? These and many other provoking questions necessitated this study.

1.1. Objective of the Study

The main objective of this study is to determine the digital inclusion status of supervisors in an open distance e-learning environment.

1.2. Research Question

The study was specifically guided by the following research question:

What is the digital inclusion status among mathematics preservice teachers' external supervisors in an ODeL environment?

1.3. Significance of the Study

The study will be significant for stakeholders in open distance e-learning, such as university management and the external supervisors. Good knowledge of the digital inclusion status will enable university management to address the challenges faced by external supervisors in the effective discharge of their duties in an ODeL environment. This intervention will ensure the availability of devices, subsidize the cost of internet connectivity, and provide the necessary digital literacy training for external supervisors. The study will also expose preservice teachers' external supervisors to the fact that the route to full participation in a digital society is made possible by an effective digital inclusion strategy and working toward digitally inclusivity for enhanced service delivery.

2. LITERATURE REVIEW

2.1. Relevant Literature Related to this Study

Students undertaking various programmes in mathematics education embark on teaching practice as a requirement for the award of the various qualifications they are pursuing. Preservice mathematics teachers will teach mathematics upon graduation (Jiang & Jiang, 2022). They are expected to teach mathematics particularly at primary and secondary school levels, and it is expected that the necessary skills needed for effective teaching and learning of mathematics are developed during teaching practice.

Kilic (2010) studied the nature of preservice mathematics teachers' knowledge of students. The study involved six preservice teachers, and written documentation, interviews, and observations were used to gather data. According to the results, preservice teachers struggled to pinpoint the reasons behind students' misunderstandings and mistakes as well as come up with workable solutions to dispel them. Frequently, they were unable to identify the students' conceptual knowledge gaps, and they tended to rectify students' mistakes by dictating how to follow the process or apply a rule to adequately solve the given problem. The study also states that in the preparation of preservice teachers, teaching practice enhances their knowledge and ability to teach successfully via coursework and practice. It provides preservice teachers with experience in an actual learning environment, which is an added advantage for the smooth teaching of mathematical concepts. The present study uses external supervisors as the respondents, and the study aims to determining their digital inclusion status.

Ubogu (2024) examined the adequacy with which instruction is being supervised, the quality of interpersonal relationships between supervisors and teachers, and the proposals made by teachers to enhance instructional supervision. The findings revealed that supervisors were not carrying out their duties that include routine visits to classrooms and observation of the instruction techniques and logbooks used by teachers, and that instructional supervisors and teachers do not have sufficient interpersonal relationships. A recommendation was made based on the findings that more resources should be devoted to instructional supervisors to strengthen their supervision capacity. Although the respondents were supervisors, the aim of the study was to determine the adequacy of supervision and relationship between supervisors and teachers. The present study also has supervisors as respondents, but the aim is to determine whether supervisors are digitally inclusive, and to make relevant recommendations that will bring about effective supervision among external supervision in ODeL environments.

Yang et al. (2022) carried out a study on digital inclusion and quality of life among older adults in Nanjing, China, with the aim of examining elements affecting China's elderly people's use of digital media and how quality of life and digital inclusion are related. The findings revealed that the attitudes of the respondents toward technology were the primary determinant of their digital inclusion. Living situation, average monthly income, employment, and

ability to carry out instrumental activities of daily living (IADLs) were among the other factors. Furthermore, the findings showed that quality of life is directly impacted by digital inclusion and acts as an intermediary variable that influences the IADL abilities and attitudes of older adults toward technology. Most significantly, digital inclusion enhances older individuals' quality of life by encouraging social integration. Therefore, the study recommended that digital inclusion should not be disregarded, and the attitudes of older people toward technology should be seen as the most important factor in encouraging digital inclusion. The study under review emphasizes digital inclusion among older people in general, irrespective of their profession, and it also focuses on the factors affecting the respondents' digital inclusion status. The present study specifically focuses on external supervisors as the respondents and the indicators that express their digital inclusion status regarding the effective supervision of teaching practice.

Méndez, Suelves, Méndez, and Mas (2023) carried out a study on future teachers facing the use of technology for inclusion. The study explored the main benefits of utilizing technology to highlight diversity, considering the prospective teachers' degree of digital proficiency as well as their opinions on the application of digital tools for inclusive strategy implementation. The findings indicate that, with variations based on gender, age, and degree of proficiency, the participants exhibited an intermediate level of digital competency. Notably, they consider inclusion to be among the primary obstacles facing the education system, and they acknowledge that technology can help educators adopt more inclusive teaching methods, enabling it to be customized to meet particular requirements and emphasizing the significance of teacher preparation for inclusion and digital competency as a pedagogical concept. The study under review focuses on the benefits and level of utilization of technological tools by preservice teachers considering parameters such as gender, age, and qualification. The present study focuses on the status of the supervisors, specifically external supervisors, in ODeL environments, and on the digital literacy and technical support the external supervisors get when faced with challenges in the process of teaching practice supervision.

3. METHODOLOGY

3.1. Research Design

A survey design was adopted for this study with the aim of investigating the digital inclusion status of the mathematics preservice teachers' supervisors in an ODeL environment.

3.2. Research Population

The population of the study comprises 93 external supervisors engaged by the College of Education (CEDU) University of South Africa (UNISA) to supervise the preservice teachers who were participating in teaching practice. A sample size of 44 preservice teachers' external supervisors were selected using simple random techniques. This sampling technique was considered the most appropriate because all participants had the opportunity to be selected for the study.

3.3. Instrument

The Digital Inclusion Status Questionnaire (DISQ) was the tool utilized to gather data. The five NDIA-identified components of digital inclusion—affordable internet service, internet-enabled devices, access to digital literacy training, high-quality technical assistance and applications, and online content—formed the basis for the instrument's development by the researchers. The instrument consists of ten items that are scored on a four-point Likert rating scale [1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), and 4 = Strongly Agree (SA)] with a decision benchmark of 2.50. The respondents received the questionnaire by email, and after filling it out, they returned it to the researcher via email. To address the research questions, data was gathered and analyzed using descriptive statistics such as means, standard deviations, pie charts, and histograms. Items with a mean of less than 2.5 were rejected, whereas items with a mean of more than 2.5 were not rejected.

3.4 Validity and Reliability Tests

Two professionals in the field of mathematics education validated the instrument to determine its face and content validity. Eight external supervisors of preservice teachers not in the study area participated in a pilot study. After distributing the questionnaire to the eight supervisors, the data was analyzed using Cronbach’s alpha to determine the instrument’s internal consistency. The instrument was found to have a reliability coefficient of 0.83, indicating its suitability for use.

4. RESULTS

Data collated from the survey is presented in the Table 1.

Table 1. Means and standard deviations of the respondents.

S/No.	Item	SD	D	A	SA	Mean	Std. dev.	Decision
1	Internet data is affordable	7	24	12	1	2.16	0.71	Rejected
2	There is a strong internet network in my location	0	6	26	12	3.14	0.63	Not rejected
3	I have a device that I can access the internet with	0	3	29	12	3.20	0.55	Not rejected
4	I access the internet frequently	1	10	25	8	2.93	0.70	Not rejected
5	I have formally undertaken a digital literacy programme	15	19	8	2	1.93	0.85	Rejected
6	I am not digitally literate	5	8	13	18	2.86	1.00	Not rejected
7	I always have technical support in case of any challenges	1	10	27	6	2.86	0.67	Not rejected
8	I can sufficiently apply the internet usage skills I have online	9	19	12	4	2.23	0.86	Rejected
9	I am satisfied with my internet usage outcomes	15	15	10	4	2.02	1.00	Rejected
10	I need to improve my internet usage skills	2	2	22	18	3.27	0.76	Not rejected
	Cluster mean					2.66		Not rejected

Table 1 shows the responses of the preservice mathematics teachers’ supervisors to the items in the questionnaire. The results shows that the respondents rejected the statement that “Internet data is affordable” with a mean of 2.16, which is less than the benchmark of 2.50.

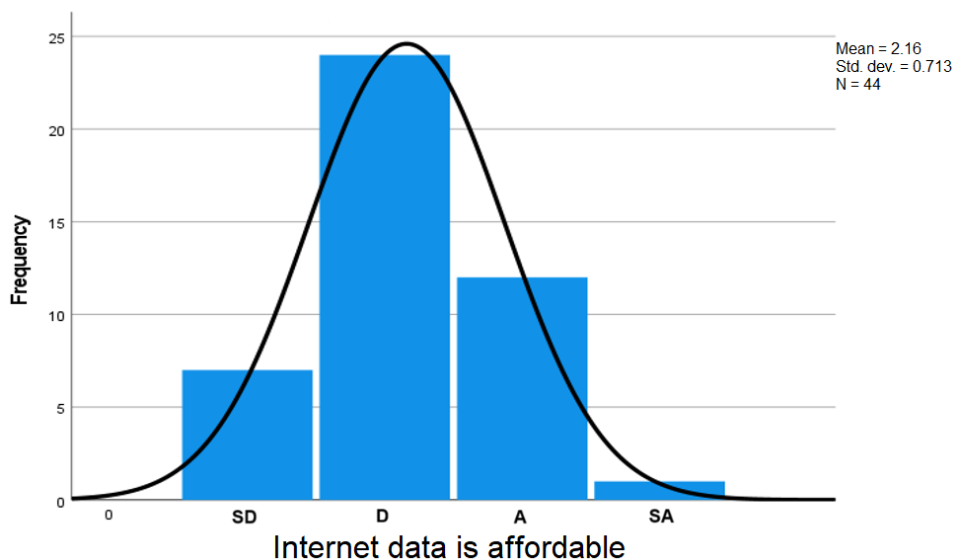


Figure 1. Histogram showing the rate of data affordability.

Figure 1 shows that seven supervisors strongly disagreed with the statement that “internet data is affordable”, 24 disagreed, 12 agreed, and one strongly agreed. The figure clearly indicates that the majority of the supervisors are of the opinion that internet data is not affordable.

The table further reveals that the respondents accept that “There is strong internet network in my location (3.14)”, “I have a device that I can access internet with (3.20)” and “I access the internet frequently” (2.93). The respondent rejected the statement “I have formally undertaken a digital literacy programme” (1.93).

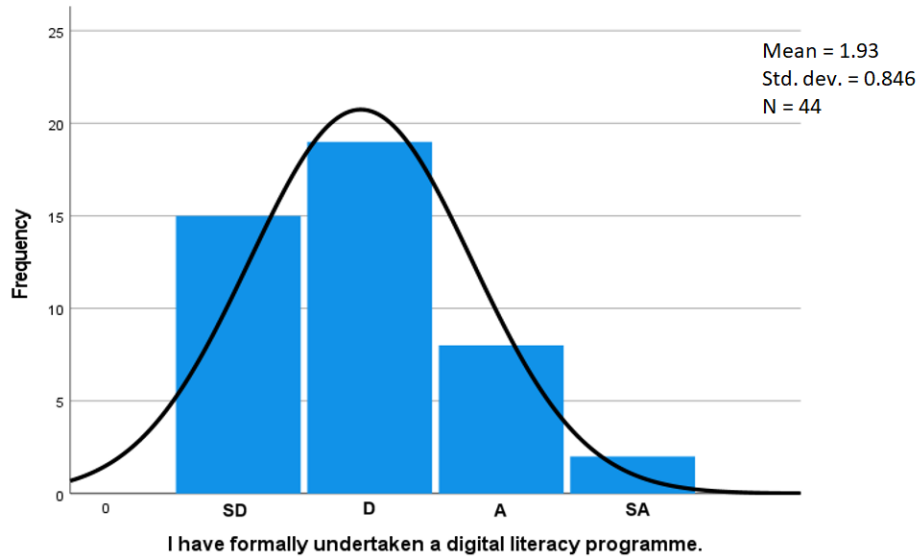


Figure 2. Histogram showing supervisors' response on digital literacy.

Figure 2 shows that 15 respondents strongly disagreed and 19 disagreed with the statement “I have formally undertaken a digital literacy programme.” Eight of the respondents agreed that they had undergone a digital literacy programme, while two strongly agreed with the statement.

I can sufficiently apply the internet usage skills I have online

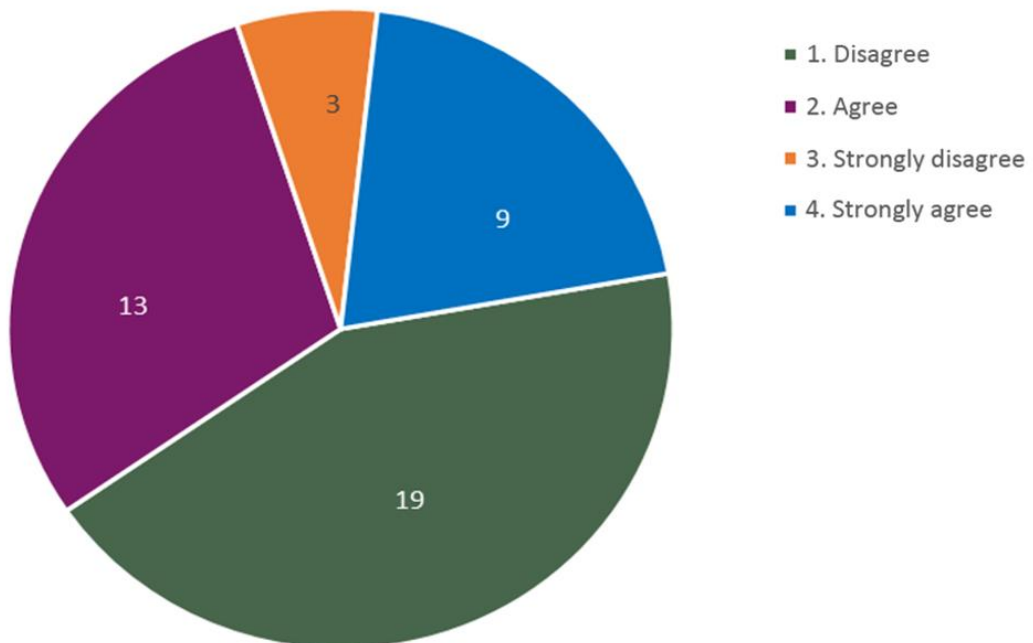


Figure 3. Pie chart showing the internet usage skills of respondents.

Figure 3 reveals that nine supervisors strongly disagreed and 19 respondents disagreed that “I can sufficiently apply the internet usage skills I have online”. It further reveals that 13 supervisors agreed and 3 and strongly agreed that “I can sufficiently apply the internet usage skills I have online.”

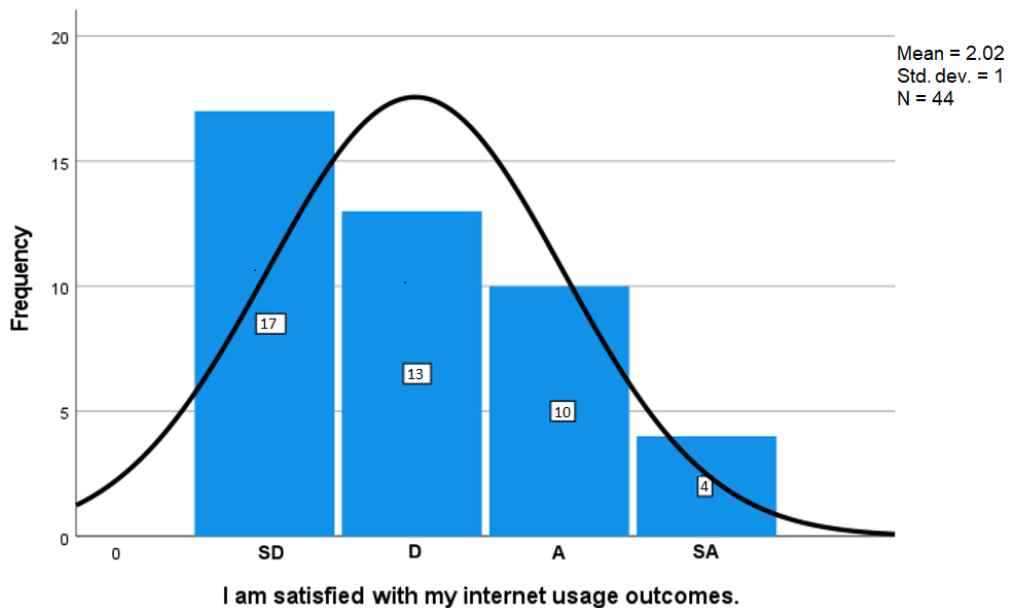


Figure 4. A histogram of supervisors' responses regarding their internet usage outcomes.

Figure 4 shows that 11 supervisors strongly disagreed and 13 disagreed that “I am satisfied with my internet usage outcomes.” The figure also reveals that 10 supervisors agreed and four strongly agreed that they are satisfied with their internet usage outcomes.

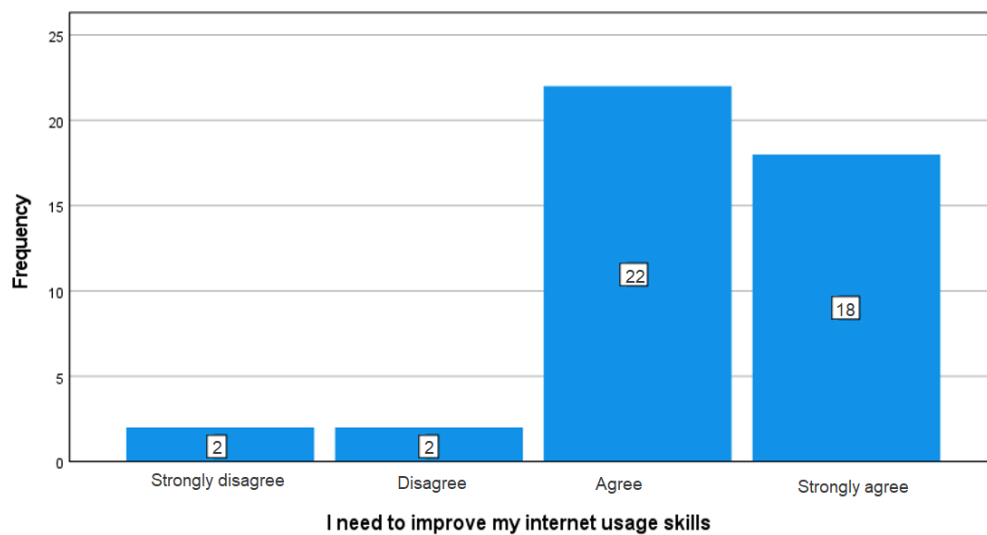


Figure 5. A bar chart showing the supervisors' responses on their need to improve their internet usage skills.

Figure 5 reveals that two of the supervisors strongly disagreed and another two disagreed that they did not need to improve their internet usage skills, whereas 22 agreed and 18 strongly agreed that they need to improve their internet usage skills.

5. DISCUSSION OF RESULTS

The results are discussed based on the items accepted and rejected by the external supervisors. The study revealed that internet data is not affordable for the supervisors, they have not formally undertaken a digital literacy

programme, they cannot sufficiently apply their internet usage skills online, and they are not satisfied with their internet usage outcome. All these pose a challenge to the external supervisors whose duty is to supervise the student teachers online. These findings are in agreement with Joy and Serena (2021), cited in Jojo (2023), who see a lack of all these as digital poverty, which is detrimental to the success of the external supervisors of mathematics student teachers, especially in an ODeL environment. Supervisors are expected to exhibit knowledge of the procedures that are currently used in the education system, including integrated communication technology (Frick, Carl, & Beets, 2010; Sethusha, 2020). Based on these results, it can be concluded that not all external supervisors are efficient in carrying out their duties during teaching practice.

The study further reveal that the external supervisors have a strong internet network in their various locations, they have devices that they can access the internet with, and they access the internet frequently. The results also show that the supervisors agreed that they are not digitally literate, though they always have technical support in case of any challenges, and they need to improve on their internet usage skills. The findings of the study are in agreement with Thomas et al. (2023) and Abah (2019) who see digital inclusion as the availability of internet network, devices, and digital literacy skills. Furthermore, Adodekun and Zulu (2023) and Leep (2016) affirm that access; knowledge of technology, pertinent information and services; drive; competence; and trust are all frequently included in the definition of digital inclusion. Furthermore, the International Telecommunication Union (ITU) is in agreement with the findings and opines that the term "digital inclusion" describes the various tactics employed to guarantee that everyone has equal access to, and the ability to utilize, digital technologies and ICTs (ITU, 2018). For the digital inclusion status of the mathematics student teachers' external supervisors to be complete, internet data must be affordable for them, there must be a strong internet network, and they must have formally undertaken a digital literacy programme. They should also be able to sufficiently apply internet usage skills online, have access to technical support in case of any challenges, and constantly improve their internet usage skills.

6. CONCLUSION

The following are deduced from the study based on the findings:

- i. Internet data is not affordable, even though there is strong internet network where the external supervisors are located.
- ii. The supervisors have devices, and they access the internet frequently.
- iii. The supervisors have not formally undertaken a digital literacy programme, and hence are not digitally literate.
- iv. Technical support is always given to the supervisors in case of any challenges, and they cannot sufficiently apply their internet usage skills online.
- v. The supervisors are not satisfied with the internet usage outcomes and they need to improve their internet usage skills.

7. IMPLICATIONS AND SUGGESTIONS

Based on the study's findings, it was concluded that the digital inclusion status of the mathematics student teachers' external supervisors needs to be improved to bring about effective teaching practice supervision in ODeL environments. Educational institutions operating in ODeL environments must make network data affordable for the external supervisors either by subsidizing the price or supplying it to the supervisors on duty. The institutions and other relevant stakeholders must ensure that the supervisors have undertaken a digital literacy programme and are equipped with internet usage skills to yield the desired outcome of teaching practice supervision in an ODeL environment.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

REFERENCES

- Abah, J. A. (2019). Theoretical and conceptual framework for digital inclusion among mathematics education students in Nigeria. *Global Perspectives on Educational Issues. Makurdi: College of Agricultural and Science Education, Federal University of Agriculture, Makurdi, Benue State, Nigeria*, 79-111.
- Adodekun, & Zulu. (2023). Towards digital inclusion in South Africa: The role of public libraries and the way forward. *Interdisciplinary Journal of Economics and Business Law*, 1(4), 127-154. <https://doi.org/10.7553/71-1-645>
- Age, T. J., & Machaba, M. F. (2023). Effect of mathematical software on senior secondary school students' achievement in geometry. *Eureka: Social and Humanities*, 5, 82-93. <http://doi.org/10.21303/2504-5571.2023.003151>
- Aglazor, G. (2017). The role of teaching practice in teacher education programmes: Designing framework for best practice. *Global Journal of Educational Research*, 16(2), 101-110. <https://doi.org/10.4314/gjedr.v16i2.4>
- Alamelu, K. (2013). Digital inclusion-a conceptual framework. *International Journal of Advanced Research in Management and Social Sciences*, 2(12), 228-248.
- Alfonso, G. J., & Garcia, P. G. (2015). Open and distance eLearning: New dimensions in teaching, learning, research, and extension for higher education institutions. *International Journal on Open and Distance e-Learning*, 1(1-2), 1-13.
- Area-Moreira, M., Bonilla, P. J. S., & Mesa, A. L. S. (2020). The digital transformation of schools: Obstacles and resistance. *Digital Education Review*, 37, 15-31. <https://doi.org/10.1344/der.2020.37.15-31>
- Azhar, M., & Kayani, M. M. (2017). Study of the impact of training of novice teachers in the context of transformative learning in Punjab, Pakistan. *Advanced Education*, 4(8), 84-91. <https://doi.org/10.20535/2410-8286.112533>
- Clarke, A., Triggs, V., & Nielsen, W. (2014). Cooperating teacher participation in teacher education: A review of the literature. *Review of Educational Research*, 84(2), 163-202. <https://doi.org/10.3102/0034654313499618>
- De Haan, J. (2004). A multifaceted dynamic model of the digital divide. *It & Society*, 1(7), 66-88. <https://doi.org/10.1002/9780470773529.ch1>
- Fernández-Batanero, J. M., Cabero-Almenara, J., Román-Graván, P., & Palacios-Rodríguez, A. (2022). Knowledge of university teachers on the use of digital resources to assist people with disabilities the case of Spain. *Education and Information Technologies*, 27(7), 9015-9029. <https://doi.org/10.1007/s10639-022-10965-1>
- Frick, L., Carl, A., & Beets, P. (2010). Reflection as learning about the self in context: Mentoring as catalyst for reflective development in pre-service teachers. *South African Journal of Education*, 30(3), 421-437. <https://doi.org/10.15700/saje>
- Gibbs, M., Mengel, F., & Siemroth, C. (2021). Work from home & productivity: Evidence from personnel & analytics data on IT professionals. *University of Chicago, Becker Friedman Institute for Economics Working Paper, (2021-56)*, 1-30. <http://dx.doi.org/10.2139/ssrn.3841567>
- ITU. (2018). *Measuring the information society report*. Retrieved from <https://www.itu.int/pub/D-IND-ICTOI>
- Jarrah, A. M. (2020). The challenges faced by pre-service mathematics teachers during their teaching practice in the UAE: Implications for teacher education programs. *International Journal of Learning, Teaching and Educational Research*, 19(7), 23-34. <https://doi.org/10.26803/ijlter.19.7.2>
- Jiang, P., & Jiang, Y. (2022). Online live teaching is effective: An empirical study. *International Journal of Emerging Technologies in Learning*, 17(11), 73-83. <https://doi.org/10.3991/ijet.v17i11.28611>

- Jojo, Z. (2023). Enhancing mathematics teaching practice supervision in an open distance e-learning context: Challenges and successes with 4IR. *Journal of Educational Studies*, 2023(si2), 76-88. <https://doi.org/10.59915/jes.2023.special.2.5>
- Kaliisa, R., & Picard, M. (2017). A systematic review on mobile learning in higher education: The African perspective. *Turkish Online Journal of Educational Technology*, 16(1), 1-18.
- Kilic, H. (2010). The nature of preservice mathematics teachers' knowledge of students. *Procedia-Social and Behavioral Sciences*, 9, 1096-1100. <https://doi.org/10.1016/j.sbspro.2010.12.292>
- Konyana, S., & Motalenyane, M. A. (2022). A changing world and a changing teaching practice model for Zimbabwe in a post covid-19 context. *Journal of Culture and Values in Education*, 5(1), 43-58. <https://doi.org/10.46303/jcve.2022.5>
- Leep. (2016). *Digital inclusion and the digital divide white Paper, December, 2016*. Retrieved from <http://www.leep.ngo>
- Long, J. J., van Es, E. A., & Black, R. W. (2013). Supervisor–student teacher interactions: The role of conversational frames in developing a vision of ambitious teaching. *Linguistics and Education*, 24(2), 179-196. <https://doi.org/10.1016/j.linged.2013.02.002>
- Matli, W., & Ngoepe, M. (2020). Capitalizing on digital literacy skills for capacity development of people who are not in education, employment or training in South Africa. *African Journal of Science, Technology, Innovation and Development*, 12(2), 129-139. <https://doi.org/10.1080/20421338.2019.1624008>
- Mau, S. T., & Harkness, S. S. (2020). The role of teacher educators and university supervisors to help student teachers reflect: From monological reflection toward dialogical conversation. *Reflective Practice*, 21(2), 171-182. <https://doi.org/10.1080/14623943.2020.1716710>
- McNaught, C. (2005). Understanding the contexts in which we work. *Open Learning: The Journal of Open, Distance and e-Learning*, 20(3), 205-209. <https://doi.org/10.1080/02680510500298626>
- Méndez, V. G., Suelves, D. M., Méndez, C. G., & Mas, J. A. R.-L. (2023). Future teachers facing the use of technology for inclusion: A view from the digital competence. *Education and Information Technologies*, 28(8), 9305-9323. <https://doi.org/10.1007/s10639-022-11105-5>
- Nguyen, A., Hong, Y., & Gardner, L. A. (2020). *A taxonomy of digital learning activities for digital inclusion*. Paper presented at the In Proceedings of the 28th European Conference on Information Systems (ECIS), An Online AIS Conference, June 15-17, 2020. Association for Information Systems.
- Reder, S. (2015). *Digital inclusion and digital literacies in the United States: A portrait from PIAAC's survey of adult skills. US PIAAC commissioned paper, February, 2015*. Washington, DC: US Program for the International Assessment of Adult Competencies.
- Russell, M. L., & Russell, J. A. (2011). Mentoring relationships: Cooperating teachers' perspectives on mentoring student interns. *Professional Educator*, 35(1), n1.
- Saladino, M., Suelves, D. M., & Alonso, Á. S. M. (2020). Teachers' perception of technologically mediated learning in Italian classrooms. *Revista Interuniversitaria de Formación del Profesorado*, 34(3), 175-194. <https://doi.org/10.47553/rifop.v34i3.80593>
- Sethusha, M. J. (2014). Challenges experienced by teaching practice supervisors in an open and distance learning environment. *Mediterranean Journal of Social Sciences*, 5(15), 409-413. <https://doi.org/10.5901/mjss.2014.v5n15p409>
- Sethusha, M. J. (2020). Exploring teaching practice supervisors' experiences of student support in an open, distance and e-learning institution. *Journal of Social Science and Humanities*, 18(8), 1-13.
- Thomas, J., McCosker, A., Parkinson, S., Hegarty, K., Featherstone, D., Kennedy, J., . . . Ganley, L. (2023). Measuring Australia's digital divide: The Australian digital inclusion index 2023.
- Ubogu, R. (2024). Supervision of instruction: A strategy for strengthening teacher quality in secondary school education. *International Journal of Leadership in Education*, 27(1), 99-116. <https://doi.org/10.1080/13603124.2020.1829711>
- United Nations. (2020). COVID-19 and human rights we are all in this together.
- University of South Africa (UNISA). (2012). *College of education Supporting teaching practice: A manual for supervisors and mentors*. Retrieved from

www.unisa.ac.za/static/corporate_web/Content/Colleges/CEDU/Schools,%20departments%20&%20centres/Centre%20for%20Teaching%20Practice%20Office/documents/GUIDELINES-FOR-PRINCIPALS-MENTORS-AND-STUDENTS_10Dec15.pdf

- Venter, M., Craffert, L., Van Greunen, D., Veldsman, A., Candi, M., & Sigurdarson, H. (2019). Diagnosis of the digital landscape in South Africa—skills, infrastructure and available technologies. *European Union Erasmus Plus*.
- Wang, Y. M. (2010). Digital inclusion in information society: From a social inclusion aspect of a new generation of rural migrant workers. *Chin Inform World*, 8, 30–32. <https://doi.org/10.3969/j.issn.1671-3370.2010.09.008>
- Wilson, G., Gates, J. R., Vijaykumar, S., & Morgan, D. J. (2023). Understanding older adults’ use of social technology and the factors influencing use. *Ageing & Society*, 43(1), 222-245. <https://doi.org/10.1017/S0144686X21000490>
- Yang, H., Chen, H., Pan, T., Lin, Y., Zhang, Y., & Chen, H. (2022). Studies on the digital inclusion among older adults and the quality of life—a Nanjing example in China. *Frontiers in Public Health*, 10, 811959. <https://doi.org/10.3389/fpubh.2022.811959>

APPENDIX

Appendix A shows the Microsoft Word version of the questionnaire.

Appendix A. Microsoft word version of the questionnaire.

Digital inclusion status questionnaire (DISQ)

Instructions: Please, answer the questionnaire with sincerity, as information given is treat with confidentiality.

Mark (x) as appropriate

S/No.	Item	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
1	Internet data is affordable				
2	There is a strong internet network in my location				
3	I have a device that I can access the internet with				
4	I access the internet frequently				
5	I have formally undertaken a digital literacy programme				
6	I am not digitally literate				
7	I always have technical support in case of any challenge				
8	I can sufficiently apply the internet usage skills I have online				
9	I am satisfied with my internet usage outcomes				
10	I need to improve my internet usage skills				

Appendix B shows the Google Forms version of the questionnaire.

Appendix B. Google forms version of the questionnaire.

Digital inclusion status questionnaire (DISQ)

Please answer the questionnaire with sincerity. All information is treated with confidentiality.

1. Internet data is affordable.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

2. There is a strong internet connection in my area.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

3. I have a device that I can access the internet with.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

4. I access the internet frequently.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

5. I have formally undertaken a digital literacy programme.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

6. I am not digitally literate.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

7. I always have technical support in case of any challenges.	
Mark only one box.	
<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

8. I can sufficiently apply the internet usage skills I have online.

Mark only one box.

<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

9. I am satisfied with my internet usage outcomes.

Mark only one box.

<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

10. I need to improve my internet usage skills.

Mark only one box.

<input type="checkbox"/>	Strongly disagree
<input type="checkbox"/>	Disagree
<input type="checkbox"/>	Agree
<input type="checkbox"/>	Strongly agree

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