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# Assessing Learning Management System (LMS) for The Dairy Farmer: Obstacles to Delivering Online Learning Content

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**Abstract**

Online learning is currently an alternative learning strategy for continuous learning amidst the limitations of face-to-face learning due to the spread of the Covid-19 outbreak. However, the implementation of online learning certainly does not only provide solutions but also provides obstacles in its implementation which result in the non-delivery of learning content in online learning. Of course, this can have an impact on dairy farmers as new users of the Learning Management System. This research aims to analyze the constraints of online learning based on the responses that have been shared by Twitter social media users towards the implementation of online learning and to assess the use of LMS for dairy farmers. This research has a quantitative approach to presenting research data. This research uses the Twitter data crawling method on Twitter social media user responses to the topic of online learning constraints and data visualization to analyze LMS usage by. This research involved two pieces of data, namely data from Twitter and data from the responses of dairy farmers. As many as 269 respondents from Twitter data were used to find out the obstacles experienced in using online learning in general. While the responses of 58 respondents from dairy farmers were used to determine the extent of understanding of dairy farmers in using online learning. The research findings state that most users of online learning complain about internet quota constraints and the technical constraints experienced by them resulting in learning content not being absorbed optimally. This research can enrich research related to the use of social media data as data that can be analyzed and documented for learning development.

**Keywords:** online learning, learning management system, dairy farmers, online learning obstacles

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## INTRODUCTION

Nowadays, there is a lot of talk about online learning. This is also influenced by the covid-19 pandemic conditions, whose cases are currently trending upward. The pandemic condition provides an overview of the current and future transformation needs in online learning. The online learning curriculum is used to implement online learning. Online learning requires good preparation to have a good impact (Anderson, 2008). Furthermore, advances in information and communication technology in the twenty-first century are changing human lifestyles in a variety of behaviors, including working, socializing, and learning.

Because of the sophistication of information and communication technology, information from all over the world is easily accessible. Anyone from any location can gain access to information. In terms of learning, learning through an online system is also very relevant in today's environment. However, many issues continue to arise as a result of the adaptation process. Many factors can contribute to problems in online learning, including learning connectedness and learning engagement (Shahzad et al., 2021). Online learning is not only important for online learning users, but it is also becoming a medium of learning in a variety of fields. It is possible to implement online learning by ensuring interaction between teachers and online learning users. Furthermore, various learning success factors must be met when implementing online learning.

Learning connectedness and learning engagement are two of these indicators. Both indicators are important factors to consider in online learning. This is because engagement between online learning users and lecturers will be limited or indirect in online learning. Similarly, learning connectedness. Lecturers are unable to observe the process of learning connectedness firsthand (Bissoondoyal-Bheenick et al., 2021). Online learning is one of the strategies for implementing the 21st-century learning curriculum in this era. 21st-century skills allow online learning users to be creative while also utilizing the power of technology to support the skills they are learning (Alismail & McGuire, 2015). In online learning, online learning users' attendance shifts from the previous one in the physical classroom to the virtual (online) classroom. However, the presence of online learning users in online classes does not guarantee successful learning. This is just one of the indicators of the online learning process's success (Bolliger & Martin, 2018). Online learning is of course beneficial for other fields. Strengthening literacy is carried out to provide information to users in understanding the extent to which knowledge can be absorbed. LMS is also used in rural communities in terms of developing digital literacy. Digital literacy provides many opportunities for rural communities to obtain complete information. Therefore, this research provides information to rural communities regarding the fields they are engaged in through the media in the form of a learning management system (LMS).

Online learning currently acts as a learning strategy that can provide solutions to changes in learning orientation from face-to-face learning to digital-based learning. The choice of online learning as a learning strategy is of course not chosen without reason because online learning develops along with the rapid development of technology, changes in the orientation of digital learning, and the development of the covid 19 outbreak. The rapid expansion of technology encourages the use of the internet resulting in higher education institutions and schools competing to implement online learning (Wei et al., 2015). The development of the internet resulted in a significant transformation of learning, especially in the integration of technology into learning (Forson & Vuopala, 2019). The demand for

the use of online learning is increasing, but until now it has not been possible to determine a method for measuring the effectiveness of online learning (Magen-Nagar & Shonfeld, 2018), because indicators to determine the effectiveness of online learning require several factors. Besides that, the current policy, where the Covid 19 pandemic suddenly hit all regions, made many schools choose to close all face-to-face-based activities and replace them with digital learning. (Dhawan, 2020).

Learning content is often made in attractive packaging to attract online learning users' attention. Interesting content can make online learning users have a great curiosity about the contents of the learning content presented. However, in the era of online learning, of course, some obstacles need to be anticipated. Learning content will be good information for online learning users if the learning content is conveyed. Learning content is one of the learning components apart from teachers, online learning users, and the learning environment. Online learning user interaction is the most important thing in the online learning process where learning content is presented to increase online learning users' understanding (P. Kumar et al., 2021). Online learning users' interaction with learning content occurs when online learning users can access learning content smoothly. However, when online learning users access learning content, of course not everything runs smoothly because there are various obstacles in online learning.

Online learning is currently developing very quickly, but sometimes it is not matched by the initial abilities of online learning users and teachers. Online learning that is so fast, of course, follows major technological developments because the implementation of learning cannot be separated from the readiness of the technology used. Constraints for online learning users facing online learning as cited by (S. Kumar, 2015) consist of five obstacles, namely the adaptation process, technical problems, knowledge of computer literacy, time management, and self-motivation. The adaptation process is often an obstacle for online learning users to gain new experiences in online learning. The transition from face-to-face learning to online learning certainly results in learning anxiety for most online learning users. The adaptation process that is not smooth can cause threats to success in learning.

Learning adaptation often takes a long time for online learning users who are not used to changes in learning orientation. The second obstacle is a technical problem. Technical constraints are often associated with the technological readiness that online learning users have in participating in online learning. It is necessary to identify the technology readiness possessed by online learning users so that online learning can run smoothly. Bandwidth constraints or unstable internet connections can also be categorized as technical constraints which result in low delivery of learning content. Online learning users who have technical problems taking part in online learning tend to be left behind from online learning users who are ready to take part in online learning. The next obstacle is computer literacy, even though

today's online learning users are digital natives, it is not uncommon for many online learning users to have low computer literacy knowledge. Low computer literacy knowledge is characterized by online learning users only being able to use computer equipment but unable to solve problems that arise in the use of computer software and hardware. The ability to operate basic program software such as Microsoft Office is low so they cannot handle the files they have. A readiness is needed in dealing with online learning so that online learning can run smoothly and learning content can be conveyed to online learning users (Kurniawan & Zakaria, 2021). Knowledge of computer literacy is a must for online learning users to take part in online learning so they can manage assignments without experiencing difficulties.

The next obstacle is time management, where the characteristic of online learning is that it can be accessed anywhere and anytime so online learning users have the flexibility to access online learning. However, there are not a few online learning users who do not have the independence to manage online learning time because it will have an impact on the ineffectiveness of online learning. Online learning requires more time management and more intensive work. While the next obstacle is self-motivation. Self-motivation grows from themselves where they will have the enthusiasm to face challenges in online learning and not easily give up. The novelty in this research is an investigation of the constraints experienced by dairy farmers where they are not used to doing online learning and a comparison with the investigation of the general constraints on the use of online learning.

## METHOD

This research aims to assess the extent to which learning management systems (LMS) are used in rural communities. The research subjects involved in this research were dairy farmers. The reason for determining dairy farmers as research subjects were due to an initial needs analysis that was found, namely the need for digital literacy to develop the potential of Jabung village, Jabung District, Malang, East Java, Indonesia. LMS provides information on how to process livestock products and how to optimize marketing. Dairy farmers are allowed to access the LMS and explore the information that has been provided. This research uses a data visualization approach to assess the use of LMS. In addition to this, the research takes secondary data from Twitter to map the extent of the obstacles that occur in a macro or overall view for LMS users. This research lasted for three weeks, in September and October 2022. This research also uses tweet data as material to identify obstacles to implementing online learning, especially constraints to the delivery of learning content. The research uses the Crawling method on the responses of people who are poured on Twitter social media to the constraints of implementing online learning. A total of 269 responses from people who poured on Twitter social media were obtained with the keyword 'constraints of

online learning, for further analysis using the word cloud technique, as shown in Figure 1.

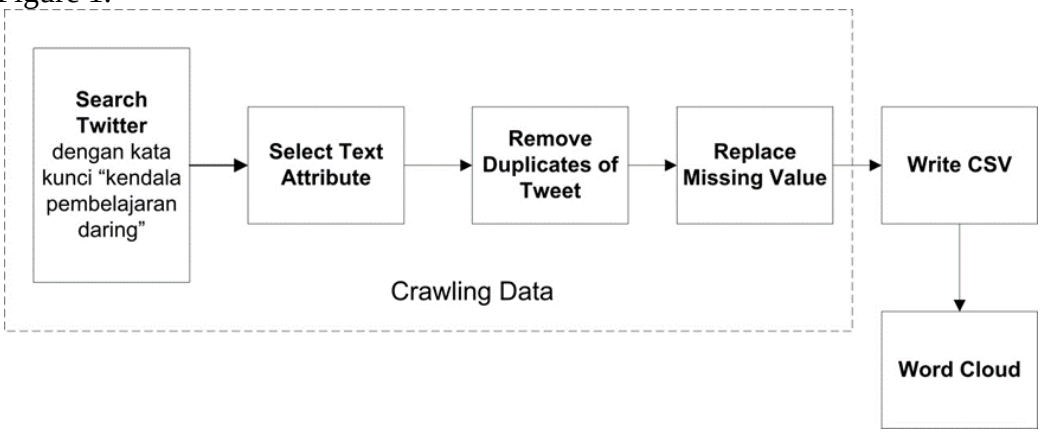


**Figure 1.** Method of crawling data

The crawling method begins by searching for the keyword "constraints of online learning" in responses that have been written on Twitter social media. The selected attribute in the tweet data is the text attribute. The purpose of selecting attribute text is to sort (filter) characters outside of text such as the @ sign, # which is often used in tweets. The next step is to remove empty data. The final process in the crawling method is to retrieve Twitter data in CSV format which is then processed using the Word Cloud technique. This research visualizes tweet data using the word cloud technique. The aim is to describe or visualize text based on the frequency of text that is often used. The search results for constraints on use are then compared with the results of investigations into the constraints experienced by dairy farmers in using online learning. Online learning is of course a new thing for them so it is certain that there will be obstacles to its use. A total of 58 dairy farmers were given open-ended questions to find out about the use of online learning. Dairy farmers are allowed to access online learning and are given time to learn and retrieve information. After that, they were given one question, namely "What are your obstacles when accessing online learning?" Has online learning helped you?". The answers given were analyzed based on the perceptions given by dairy farmers.

## RESULT & DISCUSSION

### Trend Of Online Learning

Online learning is currently one of the popular learning strategies along with the policy of limiting face-to-face learning due to the Covid 19 pandemic. The sudden switch from learning methods to online learning certainly presents problems in learning. Therefore, this research tries to find data related to online learning constraints. In Google search trends during the period August 2021 to July 2022, there were many discussions on topics regarding online learning constraints, as shown in Figure 2.

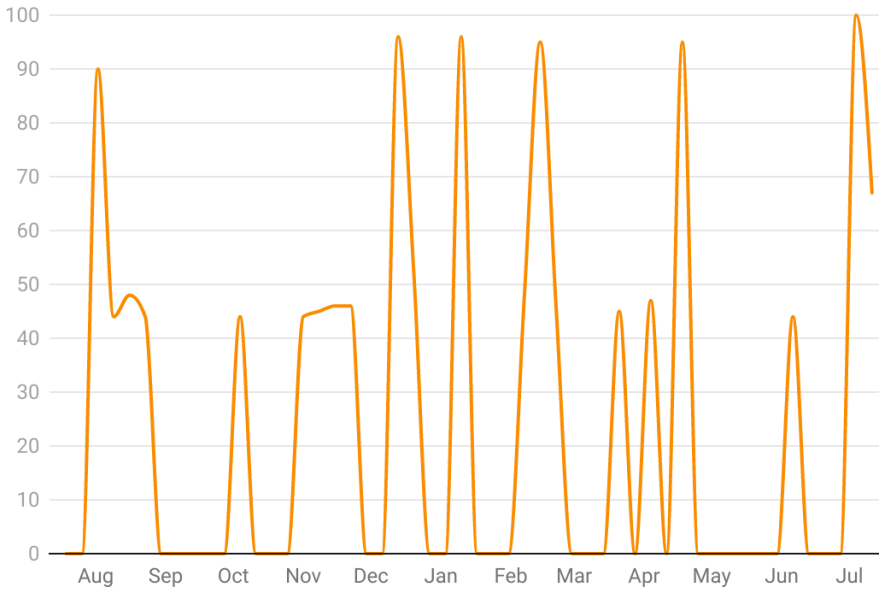


**Figure 2.** Search trends for the topic "obstacles of online learning"

During 12 months, from August 2021 to July 2022, discussions regarding the obstacles to online learning were widely sought on the Google search engine. Of course, this is very interesting to discuss because during that period there were still a lot of discussions about the obstacles to online learning on the internet. This is very natural because the transition to online learning takes most people by surprise. The covid 19 outbreak has had consequences for the implementation of face-to-face learning at closed universities and turned to online learning (Shahzad et al., 2020). Unexpected shifts in learning methods, of course, create difficulties for teachers and online learning users. Technical problems are often a separate obstacle to the implementation of online learning as stated in the responses that have been collected on social media Twitter as shown in Figure 3.

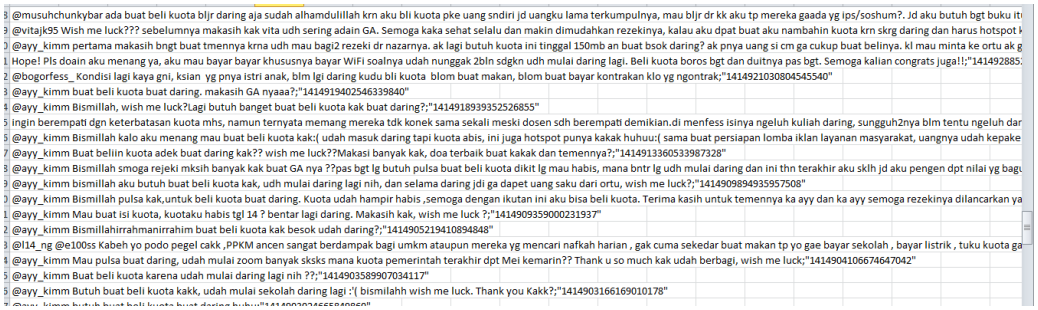
@musuhchunkybar ada buat beli kuota bljr daring aja sudah alhamdulillah krn aku bli kuota pke uang sndiri jd uangku lama terkumpulnya, mau bljr dr kk aku tp mereka gaada yg ips/soshum?. Jd aku butuh bgt buku it
@vitajk95 Wish me luck??? sebelumnya makasih kak vita udh sering adain GA. Semoga kaka sehat selalu dan makin dimudahkan rezekinya, kalau aku dpat buat aku nambahin kuota krn skrg daring dan harus hotspot
@ayy_kimm pertama makasih bngt buat tmennya krna udh mau bagi2 rezeki dr nazarnya. ak lagi butuh kuota ini tinggal 150mb an buat bsok daring? ak pnya uang si cm ga cukup buat belinya. kl mau minta ke ortu ak g
Hope! Pls doain aku menang ya, aku mau bayar bayar khususnya bayar WiFi soalnya udah nunggak 2bln sdgkn udh mulai daring lagi. Beli kuota boros bgt dan duitnya pas bgt. Semoga kalian congrats juga!!;"141492885
@bogorfess_ Kondisi lagi kaya gni, ksian yg pnya istri anak, blm lgi daring kudu bli kuota blom buat makan, blom buat bayar kontrakan klo yg ngontrak;"1414921030804545540"
@ayy_kimm buat beli kuota buat daring. makasih GA nyaaa?;"1414919402546339840"
@ayy_kimm Bismillah, wish me luck?Lagi butuh banget buat beli kuota kak buat daring?;"1414918939352526855"
ingin berempati dgn keterbatasan kuota mhs, namun ternyata memang mereka tdk konek sama sekali meski dosen sdh berempati demikian.di menfess isinya ngeluh kuliah daring, sungguh2nya blm tentu ngeluh dar
@ayy_kimm Bismillah kalo aku menang mau buat beli kuota kak:( udah masuk daring tapi kuota abis, ini juga hotspot punya kakak huhuu:( sama buat persiapan lomba iklan layanan masyarakat, uangnya udah kepake
@ayy_kimm Buat beliin kuota adek buat daring kak?? wish me luck??Makasi banyak kak, doa terbaik buat kakak dan temennya?;"1414913360533987328"
@ayy_kimm Bismillah smoga rejeki mksih banyak kak buat GA nya ??pas bgt lg butuh pulsa buat beli kuota dikit lg mau habis, mana bntr lg udh mulai daring dan ini thn terakhir aku sklh jd aku pengen dpt nilai yg bagu
@ayy_kimm bismillah aku butuh buat beli kuota kak, udh mulai daring lagi nih, dan selama daring jdi ga dapet uang saku dari ortu, wish me luck?;"1414909894935957508"
@ayy_kimm Bismillah pulsa kak,untuk beli kuota buat daring. Kuota udah hampir habis ,semoga dengan ikutan ini aku bisa beli kuota. Terima kasih untuk temennya ka ayy dan ka ayy semoga rezekinya dilancarkan ya
@ayy_kimm Mau buat isi kuota, kuotaku habis tgl 14 ? bentar lagi daring. Makasih kak, wish me luck ?;"1414909359000231937"
@ayy_kimm Bismillahirrahmanirrahim buat beli kuota kak besok udah daring?;"1414905219410894848"
@l14_ng @e100ss Kabeh yo podo pegel cakk ,PPKM ancen sangat berdampak bagi umkm ataupun mereka yg mencari nafkah harian , gak cuma sekedar buat makan tp yo gae bayar sekolah , bayar listrik , tuku kuota ga
@ayy_kimm Mau pulsa buat daring, udah mulai zoom banyak sksks mana kuota pemerintah terakhir dpt Mei kemarin?? Thank u so much kak udah berbagi, wish me luck;"1414904106674647042"
@ayy_kimm Buat beli kuota karena udah mulai daring lagi nih ??;"1414903589907034117"
@ayy_kimm Butuh buat beli kuota kakk, udah mulai sekolah daring lagi :'( bismilahh wish me luck. Thank you Kakk?;"1414903166169010178"

**Figure 3.** The results of crawling tweet data about the constraints of online learning

Figure 3 shows the tweet data which contains responses and responses to the implementation of online learning. Based on some of the obstacles to online learning that have been shared on the Twitter social media page, several obstacles

have been shared, such as the time of implementation of online learning, network constraints, broken networks, and online quota constraints. Twitter is a microblogging social media that allows everyone to respond to a particular topic (Luo et al., 2019). These various kinds of obstacles, of course, cannot be separated from the conditions of each Twitter user, who may be mostly online learning users who use online learning.

The constraints of online learning in this research were processed based on the responses of people on Twitter media so that all the responses obtained were free essay responses. Twitter social media gives its users the flexibility to produce content in the form of responses or responses which can then be discussed with other users (Ince et al., 2017). Therefore, the responses shared by Twitter users can be ascertained to be responses or user responses in text form to certain topics. The results of tweet data processing using the word cloud technique can be seen in Figure 4.


**Figure 4.** Twitter word cloud data on the topic of online learning constraints

Figure 4 shows the results of data processing using the word cloud technique. most of the obstacles in online learning that can result in the non-delivery of learning content are online quota constraints. Online data can be categorized as a supporting factor in the technical problems of online learning. Technical problems related to the readiness of online learning users to take part in online learning. Of course, this obstacle can be a serious concern, considering technical constraints such as online quotas, and unstable networks are obstacles to the delivery of learning content.

**Use of Online Learning**

The use of online learning is certainly not free from various kinds of obstacles, especially the obstacles felt by new users. Some obstacles felt by dairy farmers as new users of online learning. Some cattle breeders are not used to accessing information online and do not have good preparation to transform into the digital world, making them have difficulties and not access much information, as shown in Figure 5.

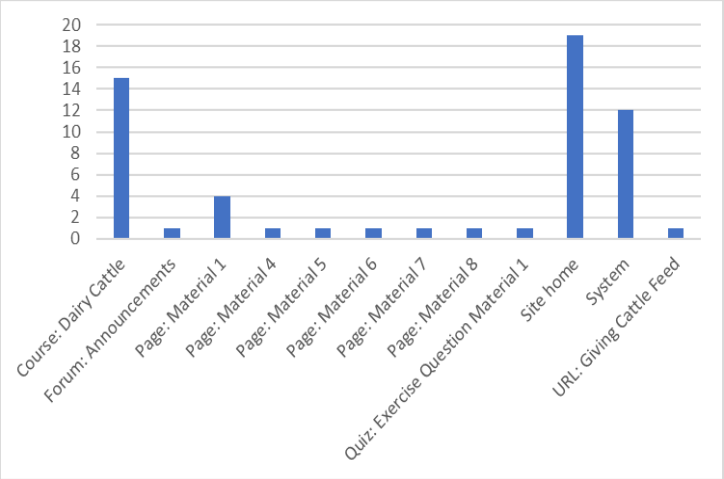


**Figure 5.** Information access

Figure 5 shows that most of the dairy farmers only access the front page and the main class menu. Meanwhile, very few of the entire online learning materials are accessed by dairy farmers. Several reasons that can be expressed by online learning users are unprepared access to online learning. In addition, technological readiness is one of the considerations due to the unavailability of internet access, as shown in Figure 6.

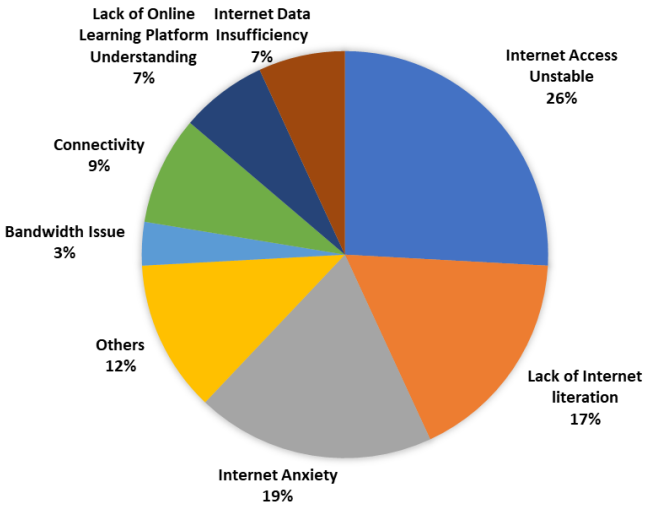


**Figure 6.** Online learning obstacles of dairy farmers

Figure 6 shows that most dairy farmers have difficulty accessing online learning due to unstable internet access, amounting to 26%. Then proceed with internet anxiety by 19% or as many as 11 people. This is of course a natural obstacle experienced by online learning users because they have new experiences and this causes anxiety in using the LMS, as shown in Table 1.

**Table 1.** Detail of online learning obstacles

| Online Learning Obstacles | User |
|---|---|
| Internet Access Unstable | 15 |
| Lack of Internet literation | 10 |
| Internet Anxiety | 11 |
| Others | 7 |
| Bandwidth Issue | 2 |
| Connectivity | 5 |
| Lack of Online Learning Platform Understanding | 4 |
| Internet Data Insufficiency | 4 |

## DISCUSSION

According to Abdurrahmansyah et al., (2022) and Baticulon et al., (2021), obstacles that can be identified in online learning include technological constraints, individual constraints, local (domestic) constraints, institutional constraints, and social constraints. Technological constraints include constraints caused by hardware, software, and other things such as access quality, bandwidth, and access continuity components. Individual constraints include learning styles in online learning and online learning users' mental health. Meanwhile, local (domestic) constraints are more due to the situation of online learning users in the learning environment at home which can affect online learning.

These institutional constraints are more related to the infrastructure that schools and universities have built to support the continuity of online learning and ensure interaction between teachers and online learning users. Meanwhile, social constraints cover more matters related to infrastructure challenges and policies related to online learning. Therefore, this research is expected to be able to provide insight into the constraints of online learning. Online learning that is currently being implemented is expected to be carried out not only because of coercive conditions that result in changes in learning orientation but online learning that is carried out based on needs in learning (Li, 2022; Richmond & Conrad, 2012). Finally, in this research, we can anticipate the obstacles to the delivery of learning content through the process of identifying online learning.

The many obstacles to disconnection during the online learning process cause online learning users to be unable to continue online classes, and unable to carry out the assignments that have been given (Abuhammad, 2020). In addition, the low quality of internet access is incompatible with online learning content that uses

learning content in the form of videos. In another research, online learning users often lost their focus level due to distractions while participating in online learning (Oyedotun, 2020).

## CONCLUSION

Online learning is currently one of the online learning strategies that are widely used in the Covid 19 pandemic era. Schools and universities not only limit learning activities but also close physical buildings so that it has an impact on the continuity of the learning process. Therefore, online learning was chosen as an alternative learning strategy that can guarantee the continuity of learning. Of course, the transition from face-to-face learning to online learning is not entirely smooth and presents potential obstacles in its implementation.

This research found that one of the obstacles found in the implementation of online learning was technical constraints such as online data and bandwidth which caused learning content not to be conveyed clearly and completely. Implementation of online learning that is not supported by a readiness to participate in online learning can result in the achievement of learning objectives not being successful and learning content not being delivered.

The limitation of this research is that this research only uses one keyword topic to identify obstacles to the delivery of learning content by searching for the word "constraints of online learning". More keywords are needed to identify the obstacles to delivering learning content on social media. The findings of this research are expected to be able to provide an alternative method of searching for information on certain topics that are shared by social media users.

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## REFERENCES

Abdurrahmansyah, A., Sugilar, H., Ismail, I., & Warna, D. (2022). Online Learning Phenomenon: From the Perspective of Learning Facilities, Curriculum, and Character of Elementary School Students. *Education Sciences*, *12*(8), 508. https://doi.org/https://doi.org/10.3390/educsci12080508

Abuhammad, S. (2020). Barriers to distance learning during the COVID-19 outbreak: A qualitative review from parents' perspective. *Heliyon*, *6*(11). https://doi.org/10.1016/j.heliyon.2020.e05482

Alismail, H. A., & McGuire, P. (2015). 21st century standards and curriculum: Current research and practice. *Journal of Education and Practice*, *6*(6), 150–154.

Anderson, T. (2008). *The theory and practice of online learning*. Athabasca University Press.

Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., Tiu, C. J. S., Clarion, C. A., & Reyes, J. C. B. (2021). Barriers to Online Learning in the Time of COVID-19: A National Survey of Medical Students in the Philippines. *Medical Science Educator*, *31*(2). https://doi.org/10.1007/s40670-021-01231-z

Bissoondoyal-Bheenick, E., Do, H., Hu, X., & Zhong, A. (2021). Learning from SARS: Return and volatility connectedness in COVID-19. *Finance Research Letters*, *41*, 101796.

Bolliger, D. U., & Martin, F. (2018). Instructor and student perceptions of online student engagement strategies. *Distance Education*, *39*(4), 568–583.

Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, *49*(1). https://doi.org/10.1177/0047239520934018

Forson, I. K., & Vuopala, E. (2019). Online learning readiness: perspective of students enrolled in distance education in Ghana. *The Online Journal of Distance Education and E-Learning*, *7*(4).

Ince, J., Rojas, F., & Davis, C. A. (2017). The social media response to Black Lives Matter: how Twitter users interact with Black Lives Matter through hashtag use. *Ethnic and Racial Studies*, *40*(11). https://doi.org/10.1080/01419870.2017.1334931

Kumar, P., Saxena, C., & Baber, H. (2021). Learner-content interaction in e-learning- the moderating role of perceived harm of COVID-19 in assessing the satisfaction of learners. *Smart Learning Environments*, *8*(1). https://doi.org/10.1186/s40561-021-00149-8

Kumar, S. (2015). *5 Common Problems Faced By Students In eLearning And How To Overcome Them*. ELearning Industry. https://elearningindustry.com/5-common-problems-faced-by-students-in-elearning-overcome

Kurniawan, C., & Zakaria, Z. (2021). Pengembangan Pengukuran Kesiapan Pembelajaran Online dengan Pendekatan Data Demografis. *Jurnal Pendidikan Edutama*, *8*(2).

Li, M. (2022). Learning Behaviors and Cognitive Participation in Online-Offline Hybrid Learning Environment. *Journal of Emerging Technologies in Learning*, *17*(1). https://doi.org/10.3991/ijet.v17i01.28715

Luo, T., Shah, S. J., & Crompton, H. (2019). *Using Twitter to support reflective learning in an asynchronous online course*. *35*(3).

Magen-Nagar, N., & Shonfeld, M. (2018). The impact of an online collaborative learning program on students' attitude towards technology. *Interactive Learning Environments*, *26*(5). https://doi.org/10.1080/10494820.2017.1376336

Oyedotun, T. D. (2020). Sudden change of pedagogy in education driven by COVID-19: Perspectives and evaluation from a developing country.

*Research in Globalization*, *2*(June). https://doi.org/10.1016/j.resglo.2020.100029

Richmond, A. S., & Conrad, L. (2012). Do Thinking styles predict academic performance of online learning? *... Journal of Technology in Teaching \& Learning*. https://sicet.org/main/wp-content/uploads/2016/11/ijttl-12-02-3_Aaron.pdf

Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2020). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality and Quantity*. https://doi.org/10.1007/s11135-020-01028-z

Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality & Quantity*, *55*(3), 805–826.

Wei, H. C., Peng, H., & Chou, C. (2015). Can more interactivity improve learning achievement in an online course? Effects of college students' perception and actual use of a course-management system on their learning achievement. *Computers and Education*, *83*. https://doi.org/10.1016/j.compedu.2014.12.013