Utilisation of Information and Communication Technology in Improving the Quality of Learning and the Quality of Education in Mataram City, Indonesia

Fahruddin [1], **Dadi Setiadi** [1], **Mansur Hakim** [1], **Muhammad Makki** [1]

[1] *University of Mataram*
Jl. Majapahit No 62 Mataram, Nusa Tenggara Barat, Indonesia

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Corresponding Author:
Fahruddin
fahruddin.fkip@unram.ac.id

Abstract. The quality of learning will affect the quality of education in educational units, both primary and secondary education and higher education. Improving the quality of learning also depends on human resources, in this case, teachers/lecturers, the availability of hardware and software facilities and infrastructure, and internet networks. The research approach used in this study is empirical research, namely research with data in the field as the primary data source, such as interview results and observations; in this study, researchers focused on junior high schools in Mataram City. The research data obtained were analysed using Data Reduction, Presentation, and Conclusion Drawing/Verification. The study results showed that the Utilization of Information and Communication Technology (ICT) in improving the quality of learning and education in junior high schools in Mataram City is relatively high by maximising the facilities and infrastructure owned by the school. However, schools with minimal ICT facilities and infrastructure only utilise ICT in the learning process and e-report cards. Schools should have adequate facilities and infrastructure, in addition to using ICT in the learning process and e-reports, digital library services, and online-based semester exams. Schools that have utilised ICT in many programs have higher learning and education quality compared to schools that have only utilised ICT a little. The Mataram City High School effectively utilises ICT alongside a well-structured management system, demonstrated through implementing four management functions: planning, organising, implementing, and supervising.

Keywords: Benefits of ICT; Quality of Learning; Quality of Education.

INTRODUCTION

In the era of the Industrial Revolution 4.0, Information and Communication Technology (ICT) is essential for modern human life, and it has touched the broader community in all aspects of daily life, both social, economic, and educational life. The success of advancing ICT depends on people mastering it as one of the key skills. ICT advancements have significantly impacted education by helping overcome student learning loss during the Covid-19 pandemic.

Information and Communication Technology (ICT) is necessary and a demand in the current education process. Support for the availability of ICT equipment with all its supporting facilities is expected to expand the learning resources of students and teachers so that understanding of the material and self-development in all components of education or education stakeholders can synergistically continue to increase. The development of ICT has influenced the world of education, especially in the teaching and learning process. According to the author [1], there are five shifts in the learning process along with the development of the use of ICT: 1) From training to appearance; 2) From the classroom to where and when; 3) From paper to online or channels; 4) From physical facilities to network facilities; 5) From cycle time to real-time.

Teachers and educational institutions are expected to innovate learning resources, transforming the learning process for students. In-

stead of relying solely on printed materials, students now engage with printed materials alongside diverse learning media, such as videos, animations, and e-learning platforms, all accessible online and regularly updated to reflect advancements in science and technology. Of course, the role of ICT equipment is vital in line with the authors [2]. Information and communication technology is a means or media used for file transfer needs, both in the form of information and data and has a higher urgency than just for school administration activities, but can also provide educational services that integrate technological knowledge, pedagogy and content in the context of learning.

The researchers conducted this study to evaluate how schools in Mataram City utilise Information and Communication Technology, focusing on the planning, organisation, implementation, and supervision of its use to improve the quality of learning and education in the city.

METHODS

This research approach uses a descriptive qualitative research approach. Raco, quoted by the author [3], explains that descriptive qualitative research is a study that uses questions starting from general ones, then tapering and detailing. This study provides the broadest possible opportunity for participants to express their thoughts and opinions without any restrictions by the researcher. The researcher centralises the information obtained, emphasising participants as the primary data source. The researcher presents the final results of the qualitative research as a written report. Author [4] explains that qualitative research is based on efforts to build a detailed view of the studied subject formed with words holistic and complex images. This definition looks more at and views something to fulfil what the subject experiences, for example, behaviour, perception, motivation, and actions in a unique, natural context that utilises various natural methods.

While the method used is a case study, the author [5] stated that the case study method is a study conducted on a case with high uniqueness and specificity. This research focuses on the activity or problem, which is in-depth and tied to its focus (site case). Researchers conduct case or field research to study a particular social unit's current situation, position, and environmental interactions. As it is, the research subject can be an individual, group, institution or community.

Furthermore, the author [5] explains that in qualitative research, data results can be obtained from various sources using multiple data analysis techniques (triangulation) and carried out continuously until the data is saturated. In this study, the researchers carried out the stages of data analysis, namely: 1) Data Reduction; 2) Data Presentation; 3) Drawing Conclusions (Concuting Drawing).

The researchers collected data from April to November 2023 in junior high schools in Mataram City. They gathered the data through observation, interviews, and documentation related to the research topic. Observations were made by observing and paying direct attention to school activities or programs utilising ICT in their implementation process. Interviews were conducted with school officials, principals, educators, and education personnel in junior high schools in Mataram City. The researchers documented ICT utilisation activities in schools in Mataram City by collecting supporting documents and photographs.

RESULTS AND DISCUSSIONS

After researching to collect data on the research topic, the researchers obtained findings that answered the focus of the discussion. The findings are: first, planning. Planning in junior high schools in Mataram City is carried out simultaneously with discussing all school programs. The scheduled programs are adjusted to the needs of students and the curriculum used. There is no special time or planning agenda specifically for discussing the use of ICT in improving learning and the quality of education.

Planning in each school is carried out at the beginning of the new semester, involving all school stakeholders. Starting from the principal to teachers and existing education personnel. As for the things or programs planned during the planning meeting at the Mataram City school, namely the learning process that utilises ICT, such as using learning media and learning resources. Such as displaying photos, videos, or images using LCD and giving presentation assignments using PowerPoint in front of the class; digital library services; planning carried out for digital library services, which includes what is needed and determining SOPs to provide these services. The

equipment required for this program includes computers and barcode scanners; online semester exams; things planned related to this program are the gadgets that students will use, the question links that will be used and adequate and stable internet connections; and e-report cards, Things prepared for this program are the e-report program, computers to input student grades. Using technology with e-report cards helps teachers and education personnel process grades and issue report cards for students; parents of students can also access their son's and daughters' report cards anywhere and anytime.

Second, organisation. The principal organises or divides tasks for each school personnel based on the fields and capabilities of each personnel. The team usually carries out organisation during a planning meeting at the beginning of a new semester. The use of ICT in the learning process is, of course, a responsibility given to all subject teachers who teach at the school. In the digital library service implemented in several schools, the principal directly manages the educational personnel authorised to oversee the library. Tasks are divided into book identity data collection, barcode attachment, and service officers.

Meanwhile, the school assigns the responsibility and authority for online semester exam activities to the school IT team, which consists of educational personnel. This IT team is responsible for ensuring that online exams run smoothly and helps if there are students who experience problems while the exam is in progress. Then, for e-report activities, all teachers accompanied by the IT team or school operators who are not part of the leading team responsible for online semester exams are also accountable. The person in charge of this operator is a monitor and operator to help teachers or homeroom teachers fill out e-report cards if the teacher faces obstacles.

Third, the school implements the plan based on earlier planning. The school implements programs for using ICT to improve learning and education quality starting from the first-day students enter school at the beginning of the new semester. Each school stakeholder has previously received tasks and authority for each program and carries out the implementation. Each teacher implements the use of ICT in the learning process by utilising the facilities and infrastructure available at the school or owned by each student. Facilities like LCD projectors and internet connections such as Wifi are also available to support learning.

Other uses of ICT are also in the form of digital library services. The school has not developed comprehensive digital library services due to constraints related to server facilities, which require a lot of money to obtain. Schools start by providing digital services while waiting for facilities such as servers that can be used to develop digital libraries/e-libraries. These digital services are OPAC (Online Public Access Catalog), digital catalogues, filling out digital visitor lists, and borrowing books with the help of several technological tools such as barcode scanning.

The school has begun implementing another ICT program: the online semester exams. Several schools in Mataram City with supporting ICT infrastructure have implemented online or paperless semester exams. Schools that implement online semester exams usually allow students to choose whether they want to use their gadgets (laptops/smartphones) or those provided by the school. However, based on research results, most students with gadgets/smartphones prefer to use their gadgets to take online semester exams. In contrast to students who do not have them, the school provides them with either computers or tablets so they can take online semester exams.

Another use of ICT is e-reports. All teachers in the school, subject and homeroom teachers, implement e-reports. In addition to teachers, the implementation of e-reports is accompanied by educational staff appointed as the committee in charge or operators so that teachers can ask questions if there is confusion or obstacles. The existence of e-reports helps teachers the processing of student learning reports become more effective and does not take a lot of time to input one student's scores in each lesson; besides that, it also makes it easier for parents to see the academic development of their sons/daughters by only using the technology they have.

Fourth supervision. Supervision of existing programs is carried out directly by the principal. The supervisor carries out supervision in stages as activities progress until completion. In all ICT utilisation programs in schools, the things evaluated are related to obstacles when implementing programs, such as internet connections, lack of gadgets, lack of understanding of teachers and education personnel regarding technology, and lack of funds for development. Supervisors su-

pervise this to ensure that all programs run well and optimally. When they find obstacles or deficiencies during supervision, they can use them as learning opportunities to anticipate and improve the following program.

Information and Communication Technology (ICT), used to improve the quality of learning and education in Mataram City, especially in Junior High Schools (SMP), has been carried out as much as possible by the facilities and infrastructure available in schools. Although the availability of facilities and infrastructure, especially technology, is not evenly distributed and can be said to be lacking in some schools, these schools have implemented and utilised ICT in the learning process and e-reports. For example, in SMPN 9 and SMPN 10 Mataram, the availability of computers/laptops/tablets in these schools is insufficient to accommodate all students to utilise ICT in other programs. The family background of each student is also, on average, a lower-middle-class society, so it is impossible to ask all students to provide smartphones/tablets/laptops to bring to school. Meanwhile, several schools with sufficient ICT facilities and infrastructure have utilised ICT in other programs, such as online library services and online semester exams.
All ICT utilisation programs in schools have gone through good management, starting from planning, organising, implementing, and supervising.

a) Planning. Planning is the determination of an organisation or institution's goals, policies, procedures, budgets and programs author [6]. The school planning process involves all school components, such as the principal, teachers, and all education personnel authors [7, 8]. With the involvement of all these components, we hope that the school community will appropriately channel all thoughts, along with the programs that will be implemented, so that all school stakeholders can understand and comprehend them. The planning process, especially regarding the use of ICT in schools, is also carried out with other program planning. Planning is carried out regarding the use of ICT in the learning process by preparing what technology is needed and whether it is already available at school. Then another thing is that teachers need to prepare for good mastery of the technology used during the learning process; this is explained by the authors [9]; the initial planning is carried out by conducting a needs analysis, re-studying and ensuring the availability of the required resources.

Digital library service planning examines librarians' competence and whether they can carry out digital services well. Then, by preparing the digital facilities needed to support these services. Another thing that needs to be ready is the supervision of the collection and the flow of digital services that will be carried out [10]. The planning of the e-report program is also carried out by preparing experts, in this case, educational staff who already have competence in the IT field. In addition, the necessary infrastructure, such as computers, laptops, and other things, is also ready for the smooth running of the e-report program. As the authors [8] explained, the e-report program is planned by preparing the program's needs, such as computers and preparing experts who will be operators where teachers can ask or complain if they have problems inputting grades.

The planning process for all school programs utilising ICT to improve learning and education quality is carried out as well as possible at the beginning of the new semester. The team plans by discussing when the program will be carried out and identifying the facilities and infrastructure needed, primarily related to technology, such as computers, laptops, tablets, applications, LCDs, internet, and others.

b) Organising. The organisation ensures that each school stakeholder knows their duties, authorities, and responsibilities. A clear division of tasks and proportionality is expected to make every school stakeholder understand their duties well and produce good performance results [11]. The principal carries out organisation by dividing tasks adjusted to the human resources and learning material sources available. The organisation in management, namely the principal, regulates the division of teaching tasks, such as those responsible for online digital services, online semester exams, and e-reports. As the author [12] explained, the leader or principal determines what needs to be done, how to do it, who should do it, who is accountable to whom, and at what level decisions should be made. The organisation carried out by the principal regulates the division of teaching tasks, the preparation of teaching schedules, and extracurricular activity schedules for teachers at the school according to the competencies of each teacher. School librarians have duties and authorities, including developing and

processing library collection materials so that they are ready for use by users or students. Meanwhile, organising e-reports is done by determining the authority to organise e-reports. The organisation determines the schedule of e-report workshops, the schedule for filling out e-reports, and the division of tasks and responsibilities for implementing e-reports and regarding organising facilities and infrastructure related to e-reports, ensuring that the server computer or laptop has no problems and that the internet network also has no issues.

c) Implementation. Implementation is an effort to make planning a reality in various directions. Teachers in schools implement ICT in the learning process at almost every meeting or every learning process. Whether using PowerPoint, LCD projector, learning videos, quizzes, Google Forms, etc., ICT, which is carried out in addition to improving the quality of learning, also increases students' enthusiasm for learning in class; teachers also feel helped by using ICT in the learning process. The use of ICT in the learning process also results in students in schools being allowed to bring smartphones to school for learning purposes. Implementing online services in school libraries has begun in several schools in Mataram City. Online services are an initial effort schools make before developing a digital library. Digital services refer to services provided to students digitally. For example, filling out visitor lists, searching library catalogues, and borrowing online are all ways to do this. However, they are still in the form of physical books, not digital books. However, the existence of a digital library is a dream that schools in Mataram City want to realise so that it can provide convenience for students to read and borrow books in the school library.

Implementing online semester exams in schools usually allows students to choose whether to use their own devices or those provided by the school. However, based on research results, most students with devices/smartphones prefer to use their own devices to take online semester exams. Unlike students who do not have them, the school provides them with computers, laptops or tablets so they can take online semester exams. Meanwhile, all subject teachers implement e-report cards, and there is a special team, namely the e-report team, which becomes the e-report admin when teachers have difficulty entering grades. The implementation of the e-report program in inputting grades is carried out by the teachers themselves when entering the data. Several parties included in e-report card users are administrators, subject teachers, homeroom teachers, guidance and counselling teachers, students, principals, and guardians.

d) Supervision. Supervision/evaluation includes continuing to see whether the activities or activities carried out are by the plan. Things that are not in accordance or deviate are corrected to achieve the objectives properly [13]. One of the obstacles found when the principal supervises the use of ICT in schools is the lack of understanding of teachers or education personnel regarding technology; this is especially true for the use of technology in the learning process. The use of technology seems limited to using the same applications without continuing to search for and find other applications or technologies that can be used in the learning process. For this reason, training is needed to provide new information to teachers regarding applications or websites that can be used or utilised in the learning process so that the learning process has better quality.

Another obstacle faced is the lack of computer/laptop facilities and infrastructure in schools to support the learning process and the use of other ICT in school programs; this creates a gap between schools with adequate facilities and those without them, which also impacts the quality of education in Mataram City.

So, it can be said that ICT use is carried out evenly in junior high schools in the city of Mataram, only in the learning process and in e-reports. At the same time, other uses, such as online library services and new online semester exams, are only implemented by schools with sufficient supporting facilities and infrastructure.

CONCLUSIONS

Information and Communication Technology (ICT) is used to improve the quality of learning and education in Mataram City, especially in junior high schools in Mataram City, which is relatively high by maximising the facilities and infrastructure owned by the school. However, schools with minimal ICT facilities and infrastructure only utilise ICT in learning and e-reports. Schools should have adequate facilities and infrastructure, in addition to using ICT in the learning process and e-reports, digital library services, and online-based semester exams. So, schools that have utilised ICT in many programs have higher learning and education quality compared to

schools that have only utilised ICT a little. Junior high schools in Mataram City use ICT and manage it with a pretty good system, as shown by implementing the four management functions: planning, organising, implementing, and supervising.

REFERENCES

1. Suyanto, & Djihad, A. (2012). *Bagaimana Menjadi Calon Guru dan Guru Profesional* [How to Become a Teacher Candidate and Professional Teacher]. Yogyakarta: Multi Pressindo (in Indonesian).
2. Azhariadi, Desmaniar, I., & Geni, Z. L. (2019). *Pembelajaran Berbasis Teknologi Informasi Dan Komunikasi (Tik) Di Daerah Terpencil* [Information and Communication Technology (ICT)-based Learning in Remote Areas]. *Prosiding Seminar Nasional Pendidikan Program Pascasarjana Universitas Pgri Palembang* (in Indonesian).
3. Raco, J. R. (2010). *Metode Penelitian Kualitatif* [Qualitative Research Methods]. Jakarta: Grasindo (in Indonesian).
4. Moleong, L. J. (2007). *Metodologi Penelitian Kualitatif* [Qualitative Research Methodology]. Remaja Rosdakarya (in Indonesian).
5. Sugiyono (2020). *Metode penelitian kuantitatif, kualitatif dan R&D* [Quantitative, qualitative and R&D research methods]. Bandung: Alfabeta (in Indonesian).
6. Wiyani, A. (2015). *Manajemen kelas : Teori dan aplikasi untuk menciptakan kelas yang kondusif* [Classroom management: Theory and applications to create a conducive classroom]. Yogyakarta: Ar-ruzz Media (in Indonesian).
7. Apriwandi., & Supriyono, R. A. (2021). Actual participation: the effects of information sharing and familiarity team on budget decision quality. *International Journal of Monetary Economics and Finance, 14*(2), 188–195.
8. Hikmah, R. L., Ramdani, A., & Asrin, A. (2021). *Manajemen Program E-Rapor di SMA Negeri 7 Mataram* [Management of the E-Report Programme at SMA Negeri 7 Mataram]. *Jurnal Ilmiah Mandala Education, 7*(3). doi: 10.58258/jime.v7i3.2315 (in Indonesian).
9. Dewi, S. Z., & Hilman, I. (2019). *Penggunaan TIK sebagai Sumber dan Media Pembelajaran Inovatif di Sekolah Dasar* [Using ICT as an Innovative Learning Resource and Media in Primary Schools]. *Indonesian Journal of Primary Education, 2*(2), 48. doi: 10.17509/ijpe.v2i2.15100 (in Indonesian).
10. Novrianto. S, A., Sufyarma, M, Hadiyanto, H., & Irsyad, I. (2020). *Perencanaan Pengembangan Perpustakaan Digital di Sekolah Menengah Atas (SMA) Negeri 1 Padang* [Planning for Digital Library Development at Senior High School (SMA) Negeri 1 Padang]. *Journal of Educational Administration and Leadership, 1*(2) (in Indonesian).
11. Sagala, S. (2004). *Manajemen berbasis sekolah dan masyarakat: strategi memenangkan persaingan mutu* [School and community-based management: strategies to win the quality competition]. Jakarta: Nimas Multima (in Indonesian).
12. Hery, S. E. (2018). *Pengantar Manajemen* [Introduction to Management]. Jakarta: Grasindo (in Indonesian).
13. Suherman, U. (2007). *Manajemen Bimbingan Konseling* [Counselling Management]. Bekasi: Madani Production (in Indonesian).