Application of Information and Communication Technology in Improving the Quality of Learning

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Article Info	Abstract
	This research is based on delays in developing the quality of the learning process which results in low student learning outcomes, especially at the basic education level. Thus, through scientific studies in this research, using an exploratory qualitative approach, as well as case studies in superior schools, the results are as follows: (1) a periodic, continuous and sustainable optimization project is needed to develop teachers' abilities in the process of implementing ICT in the learning process , until reaching the advanced category from three categories (advanced, independent and needs guidance); (2) Most of the obstacles faced by teachers originate from the availability of school expenditure budgets, so school principals need special strategies in the process of extracting budgets for spending on facilities and accommodation for activities; (3) Indicators of the success of ICT application in the learning process are aimed at indicators: (a) quality of the ICT application process; (2) impact on students' learning process activities; and (3) increasing student learning outcomes. (4) developing strategies for implementing ICT in the learning process including: (a) Strategic planning for facility preparation; (2) Effectiveness of ICT application in the learning process; (3) the effectiveness of the principal's clinical supervision; (4) Implementation of a technology quality culture in schools; and (5) Sustainable development.
Artikel Info	Abstrak
	Penelitian ini berdasar pada keterlambatan pengembangan mutu proses pembelajaran yang berakibat terhadap rendahnya hasil belajar peserta didik, terutama pada tingkat pendidikan dasar. Dengan demikian melalui kajian ilmiah dalam penelitian ini, dengan menggunakan pendekatan kualitatif eksploratif, serta studi kasus pada sekolah unggulan, menghasilkan gambaran hasil sebagai berikut : (1) dibutuhkan projek optimalisasi pembinaan kemampuan guru secara berkala, kontinyu da berkelanjutan dalam proses penerapan TIK dalam proses pembelajaran, hingga mencapai kategori mahir dari tiga kategi (mahir, mandiri dan perlu binaan); (2) Sebagian besar hambatan yang dihadapi guru, bersumber dari ketersediaan angaran belanja sekolah, sehingga kepala sekolah memerlukan strategi khusus dalam proses penggalian anggaran untuk kebutuhan belanja fasilitas dan akomodasi kegiatan; (3) Indikator keberhasilan penerapan TIK dalam proses pembelajaran ditujukan dengan indikator : (a) kualitas proses penerapan TIK; (2) dampal terhadap aktivitas proses belajar peserta didik; dan (3) peningkatan hasil belajar peserta didik. (4) pengembangan startegi penerapan TIK dalam proses pembelajaran diantaranya: (a) Perencanaan strategik penyiapan fasilitas; (2) Efktivitas penerapan TIK dalam proses pembelajara; (3) efektivitas supervisi klinis kepala sekolah; (4) Penerapan budaya mutu teknologi di sekolah; dan (5) Pengembangan berkelanjutan.

I. INTRODUCTION

Information and Communication Technology (ICT) is a set of tools used to convey information related to processing, management and transfer of information and communication media. Entering the current era of information and communication technology, the use of technology is a very important need to improve the quality and quality of education, as well as widen access to educational knowledge. The development of science and technology in this century is growing very rapidly and requires that everyone in every field of work has adequate understanding and skills, so that everyone can easily follow developments, knowledge, skills and various aspects of life. Likewise in the implementation of the education system.

Apart from the rapid development of science and technology, changes in life patterns and challenges are also occurring rapidly, both with positive and negative impacts. Likewise, the development of information and communication

technolo-gy (ICT) is always accompanied by various problems. Therefore, human resources (HR) are needed who have the ability to obtain, manage and utilize information in order to survive or even adapt to conditions that are always changing, uncertain and competitive.

Likewise, in the implementation of the learning process in educational institutions, the current independent curriculum that is being implemented demands the role of effective scientific development for students. That's why the role of Information and Communication Technology (ICT) is considered very important in the world of education. It is hoped that the use and application of ICT media can improve the quality of education. Because ICT media can be used to simplify, effectively and efficiently support teacher performance management in managing the learning process, both in the preparation and administration aspects, learning process media and work assessment and reporting process media.

The use of ICT as a source and learning medium can be through the use of computer devices as an innovative learning source and media. It is hoped that the use of these sources and media can stimulate students' thinking, understanding, interest and motivation, so that the learning process can run well. Apart from that, the learning process will be more effective because the use of ICT as a learning resource and media allows obstacles in the communication process between teachers and students to be overcome.

As according to Cowell in A.Rohman and AS Hidayat (2023: 112), in his book: Information Systems Management In Education: it is stated that: Information Technology seen from the constituent words is technology and information. Simply put, information technology is the result of human engineering in the process of conveying information from the sender to the recipient so that the delivery of the information will be: (1) faster; (2) more accurate; (3) wider distribution; (4) safer in storage;(5) More attractive in performance; (6) cheaper in financing; (7) In line with current developments in science and technology. Information Technology seen from the constituent words is technology and information. Simply put, information technology is the result of human engineering in the process of conveying information from the sender to the recipient so that the delivery of the information will be: (1) faster; (2) more accurate; (3) wider distribution; (4) safer in storage; (5) More

attractive in performance; (6) cheaper in financing; (7) In line with current developments in science and technology.

Based on the results of the preliminary study conducted, there are several obstacles that are still faced by teachers, especially subjects that are considered difficult by students or require a high level of visualization, including: (1) Limited facilities such as: availability of computers in schools, weak internet network, lack of the existence of adequate ICT laboratories, the availability of special instructors related to ICT developments and the weak availability of school budgets; (2) Limited time for self-development of teachers' abilities in ICT use skills; and (3) Students' readiness to use ICT in learning. The three problems as described above are real in their existence, but the most important thing is that teachers must view the obstacles and obstacles they face as a form of challenge that must be faced.

According to Rosentberg (2001: 12), with the development of the use of ICT, there are five shifts in the learning process, namely: "(1) from training to performance, (2) from the classroom to any place and any time, (3) from paper to " online" or channel, (4) physical facilities to network facilities, (5) from cycle time to real time". Rosentberg added that communication as a media instrument is carried out using communication media such as telephone, computer, internet, email, and so on.

Professional teachers are required to have special skills in carrying out their activities, especially in using management information systems, and teachers need professional training to change their insights and improve their skills. The training will be more beneficial for teachers if teachers have a passion for lifelong learning. The professional competence of teachers whose existence is really needed in the world of education is an agency that has a very important function. In other words, if there are professional teachers, students will automatically gain a lot of experience, because professional teachers will certainly have more knowledge and experience and can help the teaching and learning process and will then increase the use of management information systems.

The main problem in this activity is the use of Information and Communication Technology (ICT) and the obstacles faced by teachers in efforts to improve the quality of learning services and the solutions that must be implemented. With the hope that there will be benefits for both

teachers and the school in general as an effort to improve the quality of services and the quality of education in general.

II. METHOD

This research was carried out using a qualitative approach as developed by Sugiyono (2012), with the following steps: (1) focus on potential and problems; (2) data collection; (3) data reduction and analysis; (4) product design; (4) design validation; (5) design improvements. Data collection techniques used include techniques namely interviews, observation, documentation. Meanwhile, the data analysis stage consists of several steps, namely: induction, typology, conceptualization and interpret-tation which are carried out during research and after completion of the research. To check the legitimacy or validity of data findings obtained in the field, this is done by: (a) extending the researcher's presence; (b) Deeper observations; and (c) Triangulation. The data sources in this research are all competent and related elements, which were taken by purposive sampling, in order to find optimal information about the expected target or data source.

III. RESULT AND DISCUSSION
A. RESULT

The main problem for studies regarding the application of ICT media in the learning process is to improve the quality of the learning process carried out by teachers in their performance, thereby resulting in improved student learning outcomes. Studies are needed on: (1) the problem of teacher mastery in the application of ICT in the learning process; (2) analysis of various obstacles faced by teachers in implementing ICT in the learning process as well as efforts to overcome obstacles, risks and strategic planning for continuous improvement processes; and (3) developing strategies for improving and increasing the quality of ICT application in the learning process so that it is able to improve teacher performance, the quality of the learning process and student learning outcomes.

Produce about the teacher's mastery or ability to use information and communication technology media in the learning process in order to produce and improve student learning outcomes. Which is then described in four (4) focuses of the study, namely: (1) Teacher mastery of the Application of ICT in the Learning Process; (2) The process of applying ICT to improve the quality of the learning process; (3) Obstacles faced in teachers' mastery of ICT; and (4) Strategies for Increasing Teacher Mastery regarding the Application of ICT in the Learning Process.

1. Teacher Mastery in the Application of ICT to Improve the Quality of the Learning Process

The competencies teachers must have in managing the learning process in accordance with Law no. 14 of 2005 in article 10 paragraph 1 are: pedagogical competence, personality competence, social competence and professional competence. The competency that teachers must have in using ICT in elementary schools is that teachers are required to be skilled in carrying out learning innovations in using Information and Communication Technology (ICT) both in planning, implementing and assessing learning.

Information technology is related to processes, application as a tool, manipulation and management of information. Meanwhile, communication technology is related to everything that uses tools to process and transfer data from other devices. Thus, information technology and communication technology are two concepts commonly called information and communication technolo-gy (ICT). So ICT has the meaning of everything related to processing, management, manipulation and transfer of information between media. Most people in modern times are aware of and utilize developments in infor-mation and communication technology (ICT).

The use of ICT as a source and learning medium can be through the use of computer devices as an innovative learning source and media. It is hoped that the use of these sources and media can stimulate students' thoughts, feelings, interests and attention in such a way that the learning process can run well. Apart from that, the learning process will be more effective because the use of ICT as a learning resource and media allows obstacles in the communication process between teachers and students to be overcome.

Information and Communication Technology (ICT) is technology that includes all technical equipment for

processing and conveying information. ICT includes two aspects, namely information technology and communication technology. The term information technology includes everything related to processes, use as a tool, manipulation and management of information. Meanwhile, communication technology is everything related to the use of tools to process and transfer data from one device to another. Thus, information and communication technology are two inseparable concepts. Information and Communication Technology contains a broad definition, namely all activities related to processing, manipulation, management, and transfer of information between media. The term ICT emerged after the combination of computer technology (both hardware and software) with communications technology in the mid-20th century. The combination of these two technologies developed rapidly beyond other technological fields. This includes computers, the Internet, broadcasting technology (radio and television), and telephones.

In recent years there has been a surge of interest in how computers and the Internet can best be utilized to increase the efficiency and effectiveness of education at all levels and both formally and non-formally. But ICT is more than just old technologies such as telephones, radio, and television, although they are now getting attention, they have a longer and richer history as learning tools. For example, radio and television have been used for long distance learning for forty years, although they are still the cheapest, most accessible and most dominant delivery mechanisms in developed and developing countries. Computer and internet use is still immature in developing countries, due to limited infrastructure and high access costs.

Additionally different technologies are usually used in combination rather than as a single delivery mechanism. For example, Kothmale internet community radio uses both radio broadcasts and computer and internet technology to facilitate the sharing of information and provide educational opportunities in rural communities in Sri Lanka. The United Kingdom Open University (UKOU), founded in 1989 as the world's first educational institution dedicated entirely to open and distance learning, still relies heavily on print-based materials supplemented by radio, television, and in recent years, online programming. Likewise, the Indira Gandhi National Open University in India combines the use of print, recorded audio and video, radio and television broadcasts, and audio conferencing technology. The following are several types of information and communication technology that are commonly used in education, namely: (1) E-Learning; (2) Blended learning; (3) Distance Learning; and (4) Computer Assisted Learning.

Information and Communication Technology consists of two concepts, namely information technology and communication technology. Information technology is a technology used to process data, including processing, obtaining, compiling, storing, manipulating data in various ways to produce quality information, namely information that is relevant, accurate and timely, which is used for personal, business and other purposes. government and is strategic information for decision making. It is understood by all educators that information and communication technology is: "The use of electronic equipment, especially computers to store, analyze and distribute any information, including words, numbers and images". Information Technology is a technology used to process data, including processing, obtaining, compiling, storing and manipulating data to produce quality information, namely information that is relevant, accurate and timely.

Through the use of ICT in learning, it is believed that the learning process is more active, productive and enjoyable. This will be able to direct learning activities towards achieving learning objectives in cognitive, affective and psychomotor aspects effectively and optimally. The use of ICT in learning activities is unlimited. ICT encourages changes in the curriculum, namely changes in objectives and content, learning activities, exercises, assessments and learning outcomes. Therefore, terms such as e-teacher, e-test, e-library, e-assignment, e-education, virtual school, virtual university, e-learning, and so on

have emerged. Some media that can be used in IT-based learning are: (1) Internet; (2) choice of technology to connect to the global network; (3) Mobile Phone; (4) CD-ROM/Flash. Based on the description above, in mastering ICT, teachers as educators in their performance in the learning management process, require mastery of the following understanding and potential skills:

a) Teachers are required to: (1) know and understand all the main and supporting tools for ICT media; (2) know, know, understand and are skilled in using all ICT devices, both hardware components and software components; (3) understand and be skilled in using hardware and software components in all elements of teacher performance in learning process management, both in preparation elements, for managing the learning process, elements of implementing evaluations and assessing learning outcomes as well as reporting administration and follow-up to improvement processes;

b) Based on the professional competence of educators, pedagogical competence of teachers and understanding and skills of teachers in using ICT media as a whole. Teachers are required to be able to develop solutions to various obstacles, obstacles and risks that may be faced;

c) To produce sustainable teacher performance productivity, it is hoped that teachers will be able to develop themselves both personally and independently, development through education and training, development through workshops and In House Training with the quality control group community at a possible level.

Several types of information and communication technology that are commonly used in learning models are:

a) E-Learning

E-learning includes learning at all levels, both formal and non-formal, which uses intranet (LAN) or extranet (WAN), for all or part, interaction, facilitation. Teachers prefer the term Online Learning. Web-based learning is a subset of e-learning and refers to learning using browsers such as Internet Explorer, Moxilla Firefox, Opera, Netscape or Internet Explorer, and others.

b) Blended learning

Blended learning is a learning model that tries to combine several existing learning models. Generally, the learning models that are combined are face-to-face learning models, offline learning and online learning. The online learning model can take the form of learning using the Web, blogs, e-learning, and so on. Meanwhile, offline learning can take the form of learning using CDs, DVDs, OHPs and so on. The general aim of blended learning models is to find an effective combination of learning models. Ultimately, this learning model aims to achieve learning effectiveness.

c) Distance Learning

Distance learning is learning using a medium that allows interaction between teachers and students. In distance learning between teachers and students who do not meet face to face, learning is possible between teachers and students from different places and can even be separated by very long distances, thus making the learning process easier.

d) Learning with Computer Media

Computers are used in various fields including media in the learning process. Currently, computers are the most important communication tool for billions of people. Entrepreneurs relate to clients, educators to students, and individuals to other parties. This computer-assisted learning program utilizes all the capabilities of a computer, consisting of a combination of almost all media, namely: text, graphics, images, photos, audio, video and animation. All these media convergently, will support each other and merge into one media with extraordinary capabilities. One of the advantages of computers is their ability to facilitate student interactivity with learning resources (Content) on the computer (man and machine interactivity).

Based on the description above, the indicators of success in teacher mastery as

educators in applying ICT in the learning process are based on the teacher's mastery of:

a) Mastery of the skill aspects of all uses of main and ICT supporting media that support smooth learning management in accordance with teacher performance demands;

b) Mastery of teachers' pedagogical aspects in the use of ICT media to support the learning process in various learning models and their ongoing development;

c) Mastery of skills in using ICT media as a learning resource for students;

d) Mastery of skills in using media to monitor students' learning processes;

e) Mastery of skills in using media to process data and obtain information on scientific developments as a basis for teaching materials.

Through the five basic indicators of success above, there is great hope that improvements in the quality of the learning process, the quality of teacher performance and the results of the student learning process can gradually be realized in accordance with their respective targets.

2. Barriers that teachers still face in implementing ICT in the learning process

Based on analysis of a number of data reduction studies on the forms of obstacles and solutions to obstacles, it can be concluded that: (1) Most of the main obstacles in teacher mastery in the application of ICT in improving student learning outcomes, including: (1) obstacles to teachers' internal abilities regarding motivation to increase knowledge, understanding and skills in using ICT facilities; (2) obstacles to the use of ICT in the learning process are caused by limited main and inadequate supporting facilities; (2) The main obstacle that causes the emergence of obstacles felt by teachers in mastering and applying ICT in the learning process in order to improve student learning outcomes, is the lack of a complete budget for the procurement of facilities.

The temporary view regarding the solution to these 2 big obstacles, including: (1) The solution to teacher limitations

personally is by organizing educational activities, training, workshops, IHT, FGD and other activities regarding mastery, understanding and skills of teachers in using ICT facilities. in the learning process; (2) Meanwhile, the solution to the constraints of limited ICT facilities and weak spending budgets for the provision of facilities, is a form of joint effort to extract independent budgets carried out by the school, both grant budgets, non-binding donation budgets and forms of collaboration with certain possible parties.

3. Strategy for Implementing ICT in Implementing Teacher Performance and Improving the Quality of the Learning Process

The basic pattern of strategy for implementing ICT in implementing teacher performance and efforts to improve the quality of the learning process is described in the following basic strategy pattern:
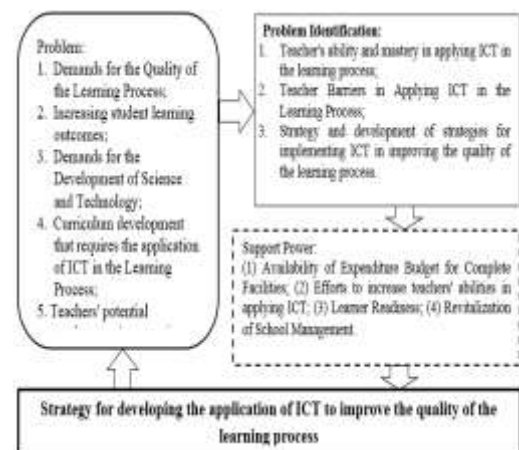
Figure 1. Basic Pattern of Development Strategy

Based on the description in Figure 1 above, it is clear that teachers must be able to develop several special strategies to strengthen the ability to apply ICT to improve the quality of the learning process. And several strategies that are worth implementing include: (1) Strategy for strengthening teacher abilities; (2) Strategy for strengthening teacher functions; and (3) Strategy for strengthening carrying capacity. One strategy for strengthening teachers' abilities in using ICT to improve the learning process is the strategy of independent learning teachers and independent learning teachers. This

implies that: (1) the teacher is aware that learning is a necessity, and learning can be done at any time and in any way according to possible conditions; (2) concern from the relevant institutions and government, is part of management's work to support strengthening teacher capabilities.

Strategy for strengthening the function of teachers as educators. What is meant is that the teacher understands the teacher's functions related to the use of ICT in improving the quality of the learning process, namely: (1) The teacher as an organizer, where the teacher is the one who accommodates media equipment, preparation processes and program preparation; (2). Teachers as demonstrators, teachers who must be able to use ICT media in learning; (3) Teachers as learning managers, are meant by teachers whose role is to organize and manage the learning process; (4) Teacher as facilitator, meaning the teacher must act as a learning facilitator, between students and the ICT media used; (5) Teacher as mediator, meaning that the teacher acts as a mediator between students and learning resources; (6) The teacher as a motivator means that the teacher must arouse students' learning motivation; (7) The teacher as an inspiration means that the teacher provides inspiration so that students actively think, act and reveal their conclusions or ideas; (8) The teacher as a climator means that the teacher plays a role in creating through ICT media that students like and feel a comfortable climate; (9) The teacher as an informant means that the teacher must be a source of scientific information; (10) The teacher as an evaluator means that the teacher must evaluate and evaluate the process and results of students.

The successful use of ICT in improving the quality of the learning process is not absolutely the responsibility of the teacher as an educator. Therefore, the third strategy is the strategy of strengthening carrying capacity. The supporting capacity referred to in this case is the supporting capacity of teachers' external parties, including: (1) the supporting capacity of the school management system; (2) supporting capacity of government authorities; (3) supporting capacity on the part of the students' parents/guardians; (4) supporting capacity of education stakeholders.

Thus, through these three strategies, optimizing the application of information and communication technology in the learning process can result in improving the quality of the learning process so that it can improve student achievement and learning outcomes. And focusing on the third strategy, namely that the development of a school management support capacity strategy prioritizes the following aspects: (1) strategies for efforts to change school internal governance; (2) school work program development system strategy; (3) system strategy for strengthening school work programs; and (4) student learning outcome orientation strategies.

4. Developing strategies for implementting ICT in the learning process to improve teacher performance, the quality of the learning process and student learning outcomes

Thus, through these three strategies, optimizing the application of information and communication technology in the learning process can result in improving the quality of the learning process so that it can improve student achievement and learning outcomes. And focusing on the third strategy, namely that the development of a school management support capacity strategy prioritizes the following aspects: (1) strategies for efforts to change school internal governance; (2) school work program development system strategy; (3) system strategy for strengthening school work programs; and (4) student learning outcome orientation strategies.

In line with advances in information technology in improving the quality of learning and school management, every school needs to implement information and technology-based learning management. Appropriate information-based learning governance will support the achievement of learning objectives as determined by school administrators. Information technology with communication has advantages in learning because: (1) developing technology provides

enormous opportunities to develop educational management in the learning process in schools, (2) specific student learning outcomes can be identified by using new technology, and (3) information and communication technology has great potential for all aspects of school education by utilizing learning objectives.

Based on consideration of several aspects of obstacles that occurred and are still felt by all target participants, with standards for optimizing the use of ICT media in the learning process, in summary they include:

a) Weaknesses in the governance system and limited capabilities in providing supporting facilities.
b) Limited teacher skills, motivation and work creativity caused by limited supporting facilities.
c) Weaknesses in efforts to build powerful solution strategies within limitations.
d)

This is the main cause of the emergence of several difficulties and weaknesses that occur. Therefore, to cover this weakness, managerial work is carried out with achievement targets to build creativity, innovation and creative motivation for sustainable development. So that the results of the skills possessed become the character of a quality culture that continues to develop.

B. Disscusion

To optimize the application of ICT in the learning process, there are 9 elements that must be considered by the school principal, namely: (1) Teacher mastery in the management of the learning process; (2) Teacher mastery in the use of ICT media; (3) Teacher insight into the development of science and technology in the learning process; (4) Mastery of teachers in applying ICT media in learning administration; (5) Mastery of teachers in applying ICT media in the learning process; (6) Teacher mastery in using other ICT supporting media; (7) Teachers' mastery of the operational part of ICT media hardware; (8) Teacher mastery of the operational part of ICT software; and (9) Facts about the development of student learning outcomes.

Based on the research results of Dewi & Hilman (2018), it shows that obstacles to the use of ICT are due to the lack of teacher capacity in using ICT, namely developing and using ICT-based teaching materials or software requires teacher knowledge and skills, where not all class teachers have the ability in programming languages, research results in line with the opinion of Aka (2017), where developing ICT-based teaching materials requires programming skills and knowledge.

According to Ghafur in (Koontz, Harold and Cyril O'Donnell, (1986)), the results of this research emerged because of teachers' lack of awareness of the important role of ICT in improving the quality of learning. However, according to Sinaga et al. (2020) shows that obstacles can come from teachers' capacity to utilize ICT-based media which is still lacking because teachers do not want to learn and are supported by their age, as well as the assumption that using textbooks alone in learning has shown encouraging achievements for students. In order to achieve this goal, there are several factors that influence the success of information and communication technolo-gy, namely:

1. Infrastructure. The purpose of the factors above is that in order for information technology to develop rapidly, first an infrastructure is needed that allows access to information anywhere at sufficient speed.
2. Human Resources. The HRS factor requires the availability of human brains that master high technology.
3. Policy. Factors require macro and micro scale policies that support long-term information technology development.
4. Financial. Financial factors require a positive attitude from banks and other financial institutions to support the information technology industry.
5. Content and Applications. Content and application factors require information to be delivered to the right person, place and time as well as the availability of applications to deliver this content comfortably to its users.

Bishop G. (1989) predicted that future education will be flexible, open, and accessible to anyone who needs it regardless of type, age, or previous educational experience. Information and Communication Technology (ICT) is a vehicle for improving the quality of

education. As the world moves rapidly towards digital media and information, the role of ICT in education is becoming more important in the 21st century. With increased access to IT at home, at work, and in educational institutions, it could mean that learning activities become truly lifelong, the pace of activity Technological changes force constant evaluation of teaching and learning. Technology, especially Informa-tion and Communication Technology (ICT), plays an important role in almost all stages of the educational process. The Internet has emerged as the main driving force for the dynamic development of Information and Communication Techno-logy (ICT) which has a positive impact on almost every economic sector, education sector, educational institutions use computers in their academic programs to produce good quality learning outcomes.

Specific reasons for implementing technology-based ICT for teachers are:

1. New ICT facilities enable students and teachers to control, manipulate and contribute information to learning and teaching environments as interactive books, journals and the like are usually available via the Internet. (Oxfam Education Report, 2002)
2. The use of new multimedia technology and the internet will improve the quality of effective learning activities
3. As a social process it will facilitate interaction and collaboration not only among students, but between teachers as well both at the local and/or global level.
4. It will provide opportunities for individuals who may wish to combine work and self-paced learning, regardless of location.
5. Can improve teacher performance to the maximum in delivering lesson materials and providing student feedback because they can meet via email or other information facilities.
6. A flexible user interface, because it is attractive and interactive, can motivate learner interest, which in turn will maintain ongoing learning.
7. Promote human resources capable of responding to the demands of a new world economy that is supported and driven by ICT.

Thus, with the new evolution of Information and Communication Technology, educational institutions are able to provide a flexible and more open learning environment for students and teachers alike. The strategy model for developing teacher mastery in the application of ICT in the learning process to improve student learning outcomes is depicted in the development strategy model in the following figure:

Figure 2. Strategy Model for Developing Teacher Mastery in the Application of ICT in the Learning Process to Produce Improved Student Learning Outcomes

Thus, with the new evolution of Information and Communication Technology, educational institutions are able to provide a flexible and more open learning environment for students and teachers alike. In the final assessment of the study above, it can be stated that the application of ICT makes institutions more efficient and productive, giving rise to various tools to improve and facilitate teachers' pedagogical activities. For example, elearning is becoming one of the most common ways of using ICT to provide education to both students and ensure campuses with online teaching offered through web-based systems. Seeing the role of education in the development of every society, schools will be very necessary in developing an ICT-based learning culture in any country. Schools must provide effective leadership in ICT integration, through research, modeling effective integration of ICT, and providing opportunities for educator professional development.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

Several conclusions that can be conveyed from the results of this scientific activity include:

1. Optimizing teacher mastery in the application of ICT in the learning process is a very important modality for improving the quality of the learning process so that it is able to produce student learning achievements. There are 9 important elements that teachers must have as educators, including: (1) Teacher mastery in the management of the learning process; (2) Teacher mastery in the use of ICT media; (3) Teacher insight into the development of science and technology in the learning process; (4) Mastery of teachers in applying ICT media in learning administration; (5) Mastery of teachers in applying ICT media in the learning process; (6) Teacher mastery in using other ICT supporting media; (7) Teachers' mastery of the operational part of ICT media hardware; (8) Teacher mastery of the operational part of ICT software; and (9) Facts about the development of student learning outcomes.

2. There are several obstacles that are often faced by teachers as educators in implementing ICT in the learning process. However, in essence, the source of these obstacles mostly comes from weaknesses in the supporting capacity of the school management system itself. So the most likely solution to implement apart from demands for teacher creativity as educators, what is more important is to return to efforts to revitalize the quality management system in the school managerial system.

3. Strategies for optimizing the application of ICT to improve the quality of the learning process include 3 main strategies, namely: (1) Strategy for strengthening teacher abilities; (2) Strategy for strengthening teacher functions; and (3) Strategy for strengthening carrying capacity. As for strategies for strengthening teacher abilities and functions, returning to the quality of teacher performance and strategies for strengthening supporting capacity is the responsibility of school management.

4. To develop strategies that make it possible to implement them, focus on strategies for strengthening the supporting capacity of optimizing the application of ICT in the learning process, namely, developing strategies for supporting school management that prioritize the following aspects: (1) strategies for efforts to change school internal governance; (2) school work program development system strategy; (3) system strategy for strengthening school work programs; and (4) student learning outcome orientation strategies.

B. Suggestion

Kegiatan pembelajaran selanjutnya guru harus menyiapkan model pembelajaran dan media yang sesyai dengan materi agar siswa mampu memahami materi yang disampaikan oleh guru dengan baik dan kelas menjadi hidup karena siswa aktif bertanya.

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