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Implementation Of Integrated Quality Management In Media-Based Chemistry Learning Information And Communication Technology As Graduates

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Abstract

This research is motivated by the low implementation of ICT-based chemistry learning, schools have not been able to implement ICT-based chemistry learning in achieving graduate quality. The purpose of this study was to determine the implementation of integrated quality management of ICT-based chemistry learning as an effort to improve the quality of graduates. This research is a qualitative research with case study method. Data collection techniques used are observation, interviews, and documentation. Data were analyzed using data reduction, data presentation, and drawing conclusions. The technique of checking the validity of the data is by triangulation of sources and techniques. Regulation of the minister of education and culture Number 20 of 2016 concerning competency standards for elementary and secondary education graduates, regarding the meaning, purpose, and scope of SKL as well as Monitoring and Evaluation. Definition of Graduate Competency Standards are criteria regarding the qualifications of graduates' abilities which include attitudes, knowledge, and skills. The results of research at SMAN 1 Bandung City and SMA Al Azhar Syifa Budi Parahyangan West Bandung in general indicate that the implementation of integrated quality management of ICT-based chemistry learning in both schools has been going well so that it can improve the quality of graduates.

Keywords: Learning, ICT Media, Quality.

INTRODUCTION

The government is always trying to improve the quality of learning so that the quality of education increases. In order to improve quality based on national education standards, the government makes various efforts through regulations to standardize national education standards. Various methods are implemented to achieve the desired quality of learning, one of which is through standardized educational processes to uniform the quality of learning throughout the country.

National Education Standards serve as the basis for planning, implementing, and supervising education in the context of realizing quality national education. In accordance with its function, the National Education Standards aim to ensure the quality of national education in the context of educating the nation's life and shaping the character and civilization of a dignified nation. In this case, the National Education Standards are refined in a planned, directed, and sustainable manner in accordance with the changing demands of local, national, and global life.

The scope of SNP includes content standards, process standards, and Graduate Competency Standards (SKL). Content Standards are adjusted to the substance of national education goals in the domain of spiritual attitudes and social attitudes, knowledge, and skills. Therefore, the Content Standards were developed to determine the criteria for the scope and level of competence in accordance with the graduate competencies formulated in the Graduate Competency Standards, namely attitudes, knowledge, and skills. The characteristics, suitability, adequacy, breadth, and depth of the material are determined in

accordance with the characteristics of the competencies and the process of acquiring these competencies. The three competencies have different acquisition processes. Attitudes are formed through receiving, carrying out, appreciating, living, and practicing activities. Knowledge is acquired through activities ranging from knowing, understanding, applying, analyzing, evaluating, and creating. Skills are acquired through activities such as observing, asking, trying, reasoning, presenting, and creating. The characteristics of competence and the differences in the acquisition process affect the Content Standards. Graduate competency standards are graduate ability qualifications that include attitudes, knowledge, and skills. The policy on content standards is contained in Permendikbud No. 21 of 2016 concerning Content Standards for Primary and Secondary Education.

The policy regarding graduate competency standards is contained in the regulation of the national education minister no. 20 of 2016 concerning Graduate Competency Standards for Primary and Secondary Education Units. Standards are criteria regarding the qualifications of graduates' abilities which include attitudes, knowledge, and skills. In order to have quality graduates, a quality assurance system is needed. The quality assurance system for primary and secondary education is developed so that quality assurance can run well at all levels of primary and secondary education management. The quality assurance system for primary and secondary education consists of two components, namely the Internal Quality Assurance System (SPMI) and the External Quality Assurance System (SPME). SPME (external quality assurance system) is a quality assurance system implemented by the government, local governments, accreditation agencies and educational standardization institutions. SPMI (internal quality assurance system) is a quality assurance system that runs within the education unit and is carried out by all components in the education unit.

The elaboration of the Permendiknas is contained in the attachment to the regulation of the minister of national education Number 20 of 2016, which states that the Graduate Competency Standards of Education Units (SKL-SP), include: (a) SD/ MI/ SDLB/ Packages, (b) SMP/ MTs/ SMPLB/ Packages, (c) SMA/ MA/ SMALB/ Packages, and (d) SMK/ MAK. Competency standards for graduates of education units (SKL-SP) are developed based on the objectives of each education unit. Secondary education consisting of SMA/MA/SMALB/Package C, aims to improve intelligence, knowledge, personality, noble character, and skills to live independently and attend further education.

It is further described in the Appendix to the Regulation of the Minister of Education and Culture Number 20 of 2016 concerning Competency Standards for Elementary and Secondary Education graduates, regarding the meaning, purpose, and scope of SKL as well as Monitoring and Evaluation. Definition of Graduate Competency Standards are criteria regarding the qualifications of graduates' abilities which include attitudes, knowledge, and skills. Objectives Graduate Competency Standards are used as the main reference for the development of content standards, process standards, educational assessment standards, educators and education personnel standards, facilities and infrastructure standards, management standards, and financing standards. The Scope of Graduate Competency Standards consists of qualification criteria for students' abilities that are expected to be achieved after completing their study period in education units at the primary and secondary education levels. Monitoring and Evaluation to determine the achievement and conformity between the Competency Standards of Graduates and graduates of each education unit and the curriculum used in certain educational units, monitoring and evaluation need to be carried out periodically and continuously in each period. The results obtained from monitoring and evaluation are used as input for the improvement of Graduate Competency Standards in the future.

Regulation of the Minister of National Education of the Republic of Indonesia Number 38 of 2008 concerning the management of information and communication technology within the Ministry of National Education. In order to support the achievement of equal distribution and expansion of access to education, improvement of quality, relevance and competitiveness of education, as well as strengthening of governance, accountability, and public image, information and communication technology is needed that is able to improve services and support the provision of information and reporting for education policy makers and stakeholders and the implementation of appropriate, transparent, accountable and efficient learning.

In the 2013 curriculum, the integration of ICT in learning is marked by the abolition of Information and Communication Technology (ICT) subjects for SMP-SMA. The abolition of these subjects is in accordance with Permendikbud number 70 of 2013 concerning the basic framework and structure of the SMA/MA curriculum, which replaces ICT in SMA with crafts and entrepreneurship subjects. The decision to abolish ICT subjects means that ICT no longer stands as a subject but as a learning support technology and a successor to the implementation of ICT integration in learning.

According to Sallis in (Tanjung, 2022) it is said that quality is similar in nature to goodness, beauty, and truth and ideal with there can be no compromise. Quality products are things of perfection made at no expense. They are valuable and convey prestige to their owner. Quality in this sense refers to something that is best, good, and reliable, something that is ideal where there is no compromise at all. The services provided or the goods produced are in a form that is perceived by consumers as very good and reliable, so that there is a perceived value for the services and products that are very good and unlikely to disappoint.

Deming in (Sulaeman, 2022) says that to build quality, continuous quality improvement. The cycle starts from the idea of a product, product development, production process, distribution to customers, until getting feedback from customers which becomes the inspiration to create new products or improve the quality of previous products. Deming's concept of strategic steps for continuous quality improvement is referred to by Deming as The Deming Cycle, which consists of Plan, Do, Control, and Action (PDCA).

Integrated Quality Management (MMT) according to Sallis in (Mayasari, 2021), is a philosophy and method that helps institutions to manage change and determine agendas/activities related to new customer demands that are constantly pressing. “TQM is a philosophy and methodology which assists institutions to manage change and to set their own agendas for dealing with the plethora of new external pressures”. MMT is a philosophy and system to continuously improve the services and/or products offered to customers/clients. In schools or colleges that adhere to MMT, quality teams and individuals continue to improve their performance to improve product/service quality to customers/clients.

School quality is determined by three variables, namely school culture, teaching and learning process, and school reality. School culture is the values, habits, ceremonies, slogans, and various behaviors that have long been formed in schools and passed on from one generation to the next, whether consciously or not. This culture is believed to influence the behavior of all school components, namely teachers, principals, administrative staff, students, and also parents of students. A culture that is conducive to quality improvement will encourage residents' behavior towards improving the quality of schools, otherwise a culture that is not conducive will hinder efforts towards improving school quality.

The quality of learning can be said as a description of the good and bad results achieved by students in the learning process carried out. Schools are considered quality if

they succeed in changing the attitudes, behavior and skills of students in relation to their educational goals. The quality of education as a further system depends on the quality of the components that make up the system, as well as the learning process that takes place until it comes to fruition.

According to (Nata, 2009) states that learning can simply be interpreted as an effort to influence a person's emotions, intellectuals, and spirituals so that they want to learn with their own will. In particular, it can be said that learning is a learning process that is built by teachers to improve morale, intellectually, and develop various abilities possessed by students, both thinking skills, creative abilities, knowledge construction abilities, problem solving abilities, to the ability to master learning materials. well. The abilities stated above are abilities that need to be developed in the 21st century. The 21st century is characterized by the development of digital information. Communities are massively connected to one another. This is what many people said with the industrial revolution, especially the information industry. The digital era has colored human life in the 21st century.

The implications for learning in schools in Indonesia require that all education stakeholders must master Information and Communication Technology (ICT). Teachers, students, even parents of students must be literate in technology and communication media, be able to communicate effectively, think critically, be able to solve problems and be able to collaborate. Teachers as facilitators, motivators and inspiration. Nowadays digital developments are so advanced, teachers are not the only source of information for learning. Therefore, teachers must be able to become facilitators and motivators for their students to find and utilize learning resources through digital progress.

Education in Indonesia must be ready to enter the era of society 5.0. Changes to the educational paradigm in order to improve the quality of competitive human resources in all aspects of life. Because it is faced with increasingly advanced innovations, there is even the term disruptive innovation. Existing disruptive innovations will create tensions, including: global and local; universal with individual; tradition with modernity; long-term and short-term growth; the need for competition with opportunity; knowledge that abounds with human capacity to respond to it; and spiritual with material.

Society 5.0 is an era where all technology is part of humans themselves. Internet is not only for information but for living life. So that technological developments can minimize the gap in humans and economic problems in the future. The characteristics of the market in the coming year are market groups who crave products and services that are specific, unique, and adjustable (personalization) to each customer's wishes that require recognition and high self-esteem, (Suwastika, 2019). This desire for mass personalization forms the psychological and cultural driving force behind Industry 5.0 which involves the use of personalized technology with a human touch to increase added value and experiment differently on each outputs.

Educational institutions that are categorized as superior in Indonesia have not yet implemented this industrial 4.0 and society 5.0 system. Starting from the education system, the way educators and educated people interact, as well as fertilizing the paradigm of modern thinking. As for the communities and organizations, some have independently discussed the industrial revolution 4.0 and society 5.0, but they are only sufficient for personal consumption due to limited power.

The challenges of the 21st Century include: the development of science and technology; Competing HR; world of work; and very fast information. For that education in Indonesia must be able to keep pace with the times so as not to be left behind by other nations in the world. So that the quality of education in Indonesia must be better.

In fact, the quality of education in Indonesia is not yet good. The low quality of education in Indonesia can be seen from the scores issued by the Program for International Student Assessment (PISA). PISA is an examination system initiated by the Organization for Economic Cooperation and Development (OECD).

According to PISA, respectively, the scores for Reading, Mathematics, and Science from the test results in 2018 were 371, 379, and 396. This value has decreased compared to the 2015 test, where Reading, Mathematics, and Science we scored respectively 397, 386, 403. Of all these scores, Reading has the lowest decline in scores, and even below the score in 2012 which was 396 (Dewabrata, 2019). PISA is considered credible enough and for that PISA is used as an international standard of education in Indonesia. Through this benchmark, the public will know Indonesia's position in the world of education compared to other countries. In addition to measuring the quality of education, he also mentioned that PISA was also used as a means for recognition from other countries (Dewabrata, 2019).

Indonesia's position in the lower ranks is indeed a separate note. Indonesia's ranking for the Reading category is 75 out of 80 countries, or 6th from the bottom. Indonesia is only above countries such as Kosovo (only independent in 2008), the Philippines, Lebanon, Morocco. We are even still under North Macedonia (only changed its name from Macedonia this year and only became independent in 1991) and Georgia. When compared with fellow Southeast Asians, Indonesia is below Thailand and Singapore. Indonesia's PISA rating in 2012 is number 64 out of 65 countries; 2015 number 64 out of 72 countries; and 2018 was number 74 out of 79 countries (Kumparan. 2019).

Meanwhile, the students' National Examination scores were not as expected. This can be seen from UNESCO data in the Global Education Monitoring (GEM) Report 2016 showing that education in Indonesia is only ranks 10 out of 14 developing countries. While the important component in learning, namely teachers, ranks 14 out of 14 developing countries in the world. The quality of learning in Indonesia is still far from adequate. The large education budget does not necessarily increase the quality of learning. The results of the average score national exams for high school students (SMA) in the city of Bandung from 2015 to 2019, for specialization in Natural Sciences (IPA) respectively: 72.0; 60.0; 60.80; 60.23; and 63, 82. As for the Social Sciences (IPS) specialization, the average results of the National Examination (UN) are 63.4; 55.0; 53.98; 52.60; and 56.14.

Indonesia needs to spell r lagging behind and trying to improve the quality of education in order to compete with other countries. So that Indonesia must adjust the education curriculum used. The education curriculum in Indonesia develops according to the times. Especially now that education is in the 21st century.

The 2013 curriculum responds and accommodates the development of ICT to improve the quality of learning. The accommodation is carried out by integrating ICT in all subjects, including chemistry subjects. So that teachers can optimize ICT resources inside and outside the classroom. The high ability of a teacher in ICT does not guarantee that the teacher can integrate ICT well in learning. The Ministry of Education and Culture explained that the function of ICT integration in learning is for the development of learning resources and learning media, preparation of learning, learning processes, assessment of learning, and reporting of learning outcomes. This means that the integration of ICT can be applied to the entire learning process to improve its quality and quality.

According to Paryono & Quito in (Hidayat et al, 2017), despite the varying degrees of integration of ICT in education in Southeast Asia, the use of ICT in the classroom has grown. However, this development was highlighted by Tamba in (Hidayat et al, 2017), who stated that the use of ICT in learning encountered several obstacles. Barriers experienced by teachers in integrating ICT in learning are classified into two,

namelyintrinsic barriersandextrinsic barriers (Becta and Ertmer in Hidayat et al., 2017). Barriers from outside as the first factor, related to time, support, resources, and training organized by the school. Barriers from within as the second factor related to attitude, self-confidence, and willingness to try. With a different approach, (Pelgrum,2001)classifies barriers to ICT integration into 2 types, namely material and non-material. Material barriers include the completeness of computers and software. Non-material barriers include the knowledge and skills of teachers in the field of ICT, difficulties in integrating ICT in learning, and the lack of time that teachers have. Material barriers can be overcome by completing the need for facilities, while non-material obstacles can be resolved by facilitation by fellow teachers and organizing training (Franklin, 2007).

In addition, it was found from international journals that the problems faced in ICT-based learning were the lack of adequate ICT equipment and internet access, ICT infrastructure, technical difficulties, teacher readiness and skills in using ICT, teachers did not maximize the use of the provided technology, skills and teacher talent, technical support and system stability, (Ghavifekr, S. & Rosdy, 2015). The problem of ICT-based learning is reinforced by (Sutama and Utama, 2017), who state that the existing problems are not only related to the bad impacts of ICT such as plagiarism, but also the readiness of teachers to take advantage of technological advances.

According to (Akbar, A. and Noviani, 2019) also stated the obstacles to the use of ICT in education, including: the lack of procurement of ICT infrastructure in various regions, the use of used technology equipment, the lack of legal instruments in the ICT sector, and high costs. procurement and use of ICT facilities, as well as the unpreparedness of Human Resources (HR) in supporting the application of ICT in schools.

The results of the initial research, ICT-based chemistry learning media are not optimal. According to several teachers during interviews in the city of Bandung, it turned out that there were problems, namely: incomplete facilities provided by schools for ICT-based chemistry learning and personal teachers who were not ready to carry out ICT-based chemistry learning because of the limited ability of teachers and time. So this needs to be researched and found a solution.

Based on the considerations above, the authors conducted a research entitled: Implementation of integrated quality management of ICT-based chemistry learning as an effort to improve the quality of graduates (Case Study at SMAN 1 Bandung City and SMA Al Azhar Syifa Budi Parahyangan West Bandung). The reason for choosing these two schools is that both SMAN 1 Bandung City and SMA Al Azhar Syifa Budi Parahyangan West Bandung have implemented ICT-based learning.

IMPLEMENTATION METHOD

This study seeks to analyze and describe the Implementation of Integrated Quality Management of ICT-Based Chemistry Learning to Improve the Quality of Graduates. The type of research used in this research is a case study method. According to (Rahayu & Arifudin, 2020) that a case study is an empirical research that investigates a particular symptom or phenomenon in a real-life setting. The results of this study were collected with primary data and secondary data.

The approach used in this research is a qualitative approach. According to Bogdan and Taylor in (Arifudin, 2019) stated that a qualitative approach is a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior. According to (Arifudin, 2021) that the way is by transcribing the data, then coding on the notes in the field and interpreting the data to obtain conclusions.

Determination of appropriate data collection techniques will determine the scientific truth of a study. Data collection techniques used in this study are:

1. Observation

Observation is part of the direct research process on the phenomena to be studied (Hanafiah, 2021). With this method, researchers can see and feel directly the atmosphere and condition of the research subjects (Arifudin, 2022). The things observed in this study are about the Implementation of Integrated Quality Management of ICT-Based Chemistry Learning to Improve the Quality of Graduates.

2. Interview The

interview technique in this study is a structured interview, namely interviews conducted using various standard guidelines that have been set, the questions are arranged according to the information needs and any questions needed to uncover any empirical data (Ulfah, 2022).

3. Documentation

Documentation is one of the data collection techniques through existing written documents or records (Nasser, 2021). Documentation comes from the word document, which means written items. In carrying out the documentation method, researchers investigate written objects, such as books, magazines, meeting minutes, and diaries. According to Moleong in (Hanafiah, 2022) that the documentation method is a way of collecting information or data through testing archives and documents. Documentation strategy is also a data collection technique proposed to research subjects. The method of data collection using the documentation method is carried out to obtain data about the state of the institution (object of research), namely the Implementation of Integrated Quality Management of ICT-Based Chemistry Learning to Improve the Quality of Graduates. According to Muhadjir in (Arifudin, 2018) stated that data analysis is an activity of conducting, searching and compiling records of findings systematically through observations and interviews so that researchers focus on the research they are studying. After that, make a finding material for others, edit, classify, and present it.

RESULTS AND DISCUSSION

In discussing the results of research on the Implementation of Integrated Quality Management of ICT-Based Chemistry Learning as an Effort to Improve the Quality of Graduates at SMAN 1 Bandung City and SMA Al Azhar Syifa Budi Parahyangan West Bandung, this research focuses on 7 (seven) subjects, namely planning, implementation, evaluation, follow-up, problems and impacts of integrated quality management of ICT-based chemistry learning as an effort to improve the quality of graduates.

Planning the quality of ICT-based chemistry learning in improving the quality of graduates needs to pay attention to the principles of quality better. The components in the quality principle need to be included in the quality planning of learning so that learning will run better because it has been well prepared. Student background which includes individual differences (initial abilities), talents, potential, interests, learning motivation, intellectual level, social abilities, emotions, learning styles, special needs, learning speed, cultural background, norms, values, and/or environment learners; needs to be explored so that teachers as teachers and educators can prepare learning well. If the student's background is understood by the teacher, the teacher can serve each student effectively and efficiently. Students who participate actively and student-centered learning is sought in lesson planning. The active role of students and the concentration of learning on students are expected to encourage enthusiasm for learning, motivation, interest, inspiration,

innovation, creativity, initiative, and independence. So that students will be directed to have 21st century skills, namely 4C (Creativity and Innovation, Critical Thinking and Problem Solving, Communication, Collaboration). The culture of reading and writing is designed to develop a love of reading, understanding various readings, and expressing in various forms of writing. So that learning plans are always given reading materials or other stimuli (pictures, graphics, videos). From this reading or stimulus students can write notes in the form of writing. It is hoped that in this way students can learn actively and will be creative. The provision of feedback and follow-up is designed to provide positive feedback, reinforcement, enrichment, and remedial. Positive feedback will increase the desired behavior and make students more confident. Besides, giving positive feedback can reduce unwanted behavior.

The implementation of learning will be carried out if there is good cooperation and participation between all parties, both teachers, students, parents, stakeholders, the community, school committees, and the education office. Each of these components will support one another. With good cooperation between these components, the needs of students will be met. Student needs that must be met include: a) intellectual needs, namely the needs of students who have curiosity, students are motivated to excel when challenged, and students are able to overcome complex problems in learning; b) Social needs, namely that students have strong expectations of belonging and being accepted by their peers while seeking their own place in the world; c) Physical needs, namely students develop at different rates and experience rapid and irregular growth; d) Emotional and psychological needs, namely students are vulnerable and self-aware and often experience unexpected "mood swings"; e) Moral needs, namely students who are idealistic and want to have a strong will to make the world themselves and the world outside themselves a better place; and f) Homodivinous needs, namely students recognize themselves as beings with needs or homoreligious beings aka religious people. The four dominant characteristics of students are as follows: a) Basic abilities, for example, cognitive or intellectual abilities, affective and psychomotor; b) Local cultural background, social status, economic status, religion and so on; c) Personality differences such as attitudes, feelings, interests and others; and d) Aspirations, foresight, self-confidence, endurance and others. In order to fulfill the needs of students, there must be supervision. Supervision of learning is carried out by the principal. This is done to ensure whether the learning process runs as it should or not. If there are things that need to be improved, a discussion will be held between the teacher and the principal as a follow-up as a result of supervision. Then make efforts to improve / revise so that the learning process is even better to meet the needs of students and improve the quality of graduates.

Evaluation and revision of ICT media-based chemistry learning outcomes according to standards, namely formative carried out at the end of a discussion of a subject, sub summative (mid semester) which is carried out in the middle of the semester, and summative which is carried out at the end of the semester. The results of the assessment in ICT media can then be transferred by the teacher to be processed into report cards. So that it can show comparisons and assessments of each material that has been studied. The teacher provides suggestions or corrective actions to students if needed or reinforcement at the end of the lesson. Reflection activities at the end of the learning implementation in addition to providing conclusions about the material given on that day, can be in the form of corrective actions to students if needed or reinforcement. The teacher also provides information to students about the things that will be done in learning. The things or activities that will be done in learning are always explained by the teacher to the students. This is so that the implementation of learning runs smoothly and students are not confused

in carrying out the learning process. The assessment given by the teacher to students is always adjusted to the ongoing learning objectives. The assessment given by the teacher, both process assessment and learning outcome assessment can be submitted/viewed directly online by students in ICT media (LMS). In addition, at the end of each semester, the assessment is reported to parents through an offline report card. The evaluation carried out was also an evaluation of the use of ICT media in the learning process. This is done so that the ability to use ICT media by teachers and students is increasing. So that it can be followed up by holding trainings.

Evaluation of improvements in the use of ICT includes technical support (professionals will support ICT-based learning), resources (human resources and non-human resources), protection of fake system security, training of technical personnel, and data backup strategies. In addition to professional staff who support the implementation of ICT-based learning, good device support is also needed so that it is compatible. Security protection for ICT is very important both hardware and software. For example, an unanticipated electrical disturbance can damage a set of devices, a hacker insect attack can also damage a device, and the spread of a virus can paralyze operations. So it is necessary to carry out regular maintenance and inspections. Training of technical personnel should be a priority. Technical personnel who have a thorough understanding will be able to more quickly detect problems that occur and can immediately solve these problems. Data backup strategies to organize and protect information (data) as well as data backups are also made Copies to avoid the worst that may arise (loss of important data).

The problems faced by teachers in ICT-based chemistry learning as an effort to improve the quality of graduates are that both schools have found problems faced by teachers in ICT-based chemistry learning. These problems are: a) the time the teacher has; b) support for facilities and infrastructure (computer and software equipment); and c) human resources (attitude, self-confidence, willingness to try, knowledge and skills of teachers in the ICT field and difficulties in integrating ICT in chemistry learning).

The solution to the problem of learning chemistry based on ICT as an effort to improve the quality of graduates is basically the biggest problem faced is related to limited time, because the number of teaching hours is very dense. The solution being worked on is to focus on developing learning and assessments that are basic but have a big impact. In addition, the use of ICT media through LMS Scola to streamline assessment activities was also carried out. The selection of essential concepts and effective media was also carried out and for students who lacked learning facilities, quotas were given so that they could study according to a predetermined schedule. In addition, students are provided with wifi facilities in the school environment.

The impact of ICT-based chemistry learning as an effort to improve the quality of graduates is that it can improve student learning outcomes; increase students' learning motivation; and improve literacy and ICT. Based on the data that has been processed, from the two schools, the results of chemistry learning show an increasing trend, especially towards the achievement of the quality of graduates at the point of planning the quality of chemistry learning. Likewise, students' learning motivation is marked by a participatory attitude and interest in chemistry lessons. Reading literacy and ICT are also facilitated to be given a stimulus. Each chemistry subject matter has provided reading material (learning material) that can be read by students anytime and anywhere. Learning materials have been provided in ICT media. Students are given the opportunity and are able to search on the internet related to learning chemistry. Students can acquire a variety of knowledge according to their learning needs. So that the acquisition of student scores increases. Besides, teachers can make it easier to provide learning media in accordance with learning

objectives and create interesting learning. So that the quality of graduates can increase and many are accepted in higher education. The negative impact of using ICT media is that there are students who open other links during learning (social media, games, etc.); make it easier to violate intellectual property rights (IPR) such as plagiarism; The ICT media system is connected to every device that is connected to the same network so that if there is an administrative system from the Institution that has a loophole, irresponsible people can commit crimes such as changing test scores so there must be system security.

CONCLUSION

The implementation of integrated quality management of ICT-based chemistry learning in both schools is carried out according to the principles of ICT-based chemistry learning with an integrated quality management approach. However, with all the limitations of the implementation of integrated quality management of ICT-based chemistry learning, the impact has not been in accordance with the objectives set. This is due to the limited ability of teacher and student resources.

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