

Improving the Quality of Education Using Ishikawa Diagram



Suhendi¹, R. Madhakomala²

^{1,2} Universitas Negeri Jakarta, Faculty of Education Management, Indonesia

ABSTRACT: Globalization is an integral part of modern life. Free competition is increasingly evident in its influence in realizing the market. Under these circumstances, all institutions, especially education, are required to be able to create efficiency, prioritize quality, customer satisfaction and take advantage of opportunities quickly in order to compete and survive. Competition is an element that cannot be negotiated anymore. An organization or institution can improve and maintain quality by building a quality improvement system and determining standards (TQM) Total Quality management or called integrated quality management. Based on the background above, the problem in this study is what factors are the root of the problem in improving the quality of graduates, and how the strategic plan in improving the quality of graduates. Ishikawa's statement gives a message that in managing an organization, including an educational organization, it must carry out *process quality control*. This is important to maintain quality and maintain the existence of the organization with the ultimate goal of meeting customer satisfaction, so it is very possible that the concept can be applied to the world of education. For this reason, a comprehensive understanding of the concept is needed so that it can be implemented properly. From this background, this article will examine the concept of improving the quality of education according to Kaoru Ishikawa. Thus, a comprehensive picture of the concept and its implementation in order to improve quality in education will be obtained.

KEYWORDS: Education Quality Improvement, Ishikawa Diagram.

A. INTRODUCTION

Currently, various parties in all fields and sectors are facing the globalization era which is full of quality competition. This readiness must be demonstrated by always improving the competencies possessed in all lines. Likewise in the world of education in Indonesia. Improving the quality of education both qualitatively and quantitatively continuously becomes a necessity for all education providers, so that what is the essence of national education as a vehicle to build the character and morals of the nation's next generation can be implemented optimally. (E. Mulyasa, 2007).

One of the fundamental problems of Indonesia in entering the 21st century is the low quality of education. The low quality of education can be studied from a macro and micro perspective. At the macro level, based on data in the *Education for All (EFA) Global Monitoring Report 2012* issued by UNESCO reported that Indonesia is ranked 64th out of 120. Based on the *Education Development Index (EDI)* assessment, on March 14, 2013, it was reported to have risen three ranks to 121st out of 185 countries. This data covers aspects of labor, health, and education. In terms of rank, it shows an increase, but when viewed from the number of participating countries, the result is still that Indonesia did not move up. On a micro level, based on data from the Ministry of Education and Culture, the average UN score of elementary school students in the 2014/2015 academic year only reached 7.03, the average UN score of junior high school / MTs was 61.80 and senior high school / vocational / MA students reached 61.29. This is worrying because in addition to the national target not being achieved, the pass rate is still below 95%. Even though these scores have exceeded the national graduation targets or standards, they are still fairly low when compared to the graduation rates of other countries. This low passing standard indicates the low quality of education produced as a manifestation of the low quality of education management.

Based on this background, the problem in this study is to examine what factors are the root of the problem in improving the quality of graduates and how the strategic plan in improving the quality of graduates. Quality is something to distinguish between good and bad for a product. Products are considered quality if they can provide satisfaction to consumers in accordance with predetermined standards. In education, quality includes three things, namely *input, process, output, and outcome* (Wara Hapsari et al, 2015). This is in accordance with the opinion of Hanik Umi (2011: 78) who says that the quality of an education is *input, process, output, and outcome*. Educational input means ready to process, the educational process means being able to create an atmosphere of active, creative, fun, and meaningful learning. According to Crosby (in Engkoswara & Komariyah, 2010: 305) "*quality is conformance to customer requirements*". In other words, Quality is individual conformance

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to requirements or provisions.

Meanwhile, according to Ishikawa quoted by Engkoswara & Komariyah, (2010: 305) said that "*quality is customer satisfaction*". Thus the definition of quality cannot be separated from customer satisfaction. From the description of the definition of quality, it can be concluded that quality is a condition that matches and exceeds customer expectations so that customers get satisfaction from the products produced. If applied in education, an education is considered quality if all components have the requirements and conditions desired by the customer and the customer feels satisfaction. The quality of education is relative, because everyone has a measure that is not exactly the same. The quality of education will be said to be good if the education can present services that meet the needs of its customers (Engkoswara & Komariyah, 2010: 305).

In the practice of organizing education, the above quality concepts are used in an integrated manner. The notion of quality refers to the standards that have been used to check the standards relating to the performance of education units and the feasibility of managing education units. In the context of education, the notion of quality includes: input, process, and output of education (Depdiknas, 2001: 5). Educational *input* is everything that must be available because it is needed for the process to take place. Educational *output* is the performance of the school that can be measured by its quality, effectiveness, productivity, efficiency, innovation and morale. School output is of high quality if the students' achievements are high in academic achievement in the form of general test scores, National Examinations, academic competitions; and non-academic achievements. Meanwhile, Leba (2013) argues that there are four views that have developed to interpret the quality of education, namely: (1) Education quality is seen based on the ability of students after learning a subject matter. (2) The quality of education is viewed from the productivity of its output, namely the work obtained, (3) The quality of education is viewed based on broader social criteria. (4) The quality of education in terms of the components of quality education.

Based on the above description of the quality of education, it can be concluded that the quality of education is the school's ability to manage the components in the school so as to produce graduates who have high learning achievement.

Regulation of the Minister of National Education No. 63/2009 on the Education Quality Assurance System states that the quality of education is the level of intelligence of the nation's life that can be achieved from the implementation of the national education system. Education quality standards in Indonesia are set in national standardization known as the National Education Standards (SNP). SNP are minimum criteria on various aspects that are relevant in the implementation of national education that must be met by the organizers and/or education units, which apply throughout the jurisdiction of the Republic of Indonesia.

This is in accordance with Government Regulation of the Republic of Indonesia Number 19 of 2005 which has been amended by Government Regulation Number 32 of 2013. The SNP includes: 1) graduate competency standards 2) content standards, 3) process standards, 4) educator and education personnel standards, 5) facilities and infrastructure standards, 6) management standards, 7) financing standards, 8) education assessment standards. The eight SNP that have been described above, graduation standards will be used as a guide to evaluate the quality of graduates.

Since the birth of TQM, educational practitioners have flocked to learn TQM from various quality teachers, one of which is from Kaoru Ishikawa. Ishikawa is a person who has had a major influence on quality improvement in the industrial field in Japan. He was the driving force behind quality by introducing and developing *quality control* in the company. Ishikawa's dedication to *quality control* goes beyond expectations, but is also based on religious fervor as he once said: "If every country plays its part in promoting quality control, the world will find peace, and its people will be able to live together harmoniously and happily. Companies that do not do *quality control* will not last long" (Marc Balbirnie, 1989). Edward Sallis (1993:22) puts forward the concept of quality in relation to Total Quality Management (TQM), where according to him quality should be seen as a relative concept rather than an absolute concept.

Ishikawa's statement gives a message that in managing organizations, including educational organizations, the *quality control* process must be carried out. This is important to maintain quality and maintain the existence of the organization with the ultimate goal of meeting customer satisfaction. However, Ishikawa's quality concept is more developed in the *corporate* sector, although he is also an educational practitioner at the University of Tokyo so it is possible that the concept can be applied to the world of education. For this reason, a comprehensive understanding of his concept is needed so that it can be implemented properly. Based on this background, this article will examine Kaoru Ishikawa's concept of quality improvement and its implementation in education quality improvement. Thus, a comprehensive picture of his concept and its implementation in the world of education will be obtained in order to improve its quality (Roni Harsoyo, 2021).

B. METHODOLOGY

This article is written using a descriptive qualitative approach in the form of *library research*. Data were collected using documentation techniques on various literatures related to the concept of quality according to Kaoru Ishikawa and its implementation towards the development of quality education, including various research results relevant to the focus of the study. Meanwhile, the analysis technique used is *content* analysis, thus a study will be obtained that can be presented comprehensively and systematically related to the education quality development model (Roni Harsoyo, 2021).

As a paper using the literature review method, there are two kinds of data sources that will be described as follows: 1.

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Primary source is a reference that is used as the main source of reference for the study. In this study, the primary sources used are books from the Ministry of Education, Education Quality Control and the Use of the concept of QC tools Ishikawa diagram (*Fishbone*). 2. Secondary sources are supporting and complementary references to primary sources. (Yuhansil, Silvia Anggreni, 2020).

C. RESULTS & DISCUSSION

1. Quality of Education seen from the output

Beeby (in A. Sabur, 1998: 33) sees the quality of education from three perspectives, namely: economic, sociological and educational perspectives. Based on the economic perspective, quality education is education that has a high contribution to economic growth. Education graduates can directly fulfill the labor force in various economic sectors. With their work, economic growth can be pushed higher. According to the sociological view, quality education is education that benefits the entire community in terms of various community needs, such as social mobility, cultural development, welfare growth, and liberation from ignorance. In the context of schooling, quality is seen as the school's ability to respond to *and* fulfill the needs of students and society, as stated by Phillip (1977:57): '*quality in school is, in part at least, defined by the school's ability to respond to and satisfy these needs*'. Furthermore, "*schools are not only about meeting the needs of children; they must meet the needs of society as well*". Meanwhile, according to the educational perspective, seeing the quality of education in terms of enrichment (*richness*) of the teaching and learning process and in terms of the ability of graduates in terms of problem solving and critical thinking.

According to Beeby (in A. Sabur, 1998:35) quality in education must examine the meaning of a very basic essence that gives certain characteristics to quality education that is different from education that is not quality. To arrive at this concept, quality can be studied both in terms of process and product aspects as well as from the internal side and the fitness or suitability side. Quality in terms of process implies the effectiveness or accuracy and efficiency of all factors or elements that play a role in the educational process. Schools located in slum areas and schools operating in elite areas, for example, although accepting the same prospective students, but because of the qualifications of teachers, completeness of facilities and infrastructure, different learning atmosphere, management of which the level of efficiency is also not the same, the educational process in schools in elite areas will be much better because of the accuracy, completeness, and efficiency of management factors that are more perfect.

Excellence in the education process will naturally produce different products. The level of ability of graduates in the sense of mastery of knowledge, skills and experience of graduates of elite schools with better educational processes, the quality will be different from schools in slum areas. Thus the quality of the process will produce different quality graduates.

From Beeby's view above, it can be concluded that the quality of education can be seen in terms of the process and the graduates it produces. Quality education in terms of the process is measured by the accuracy, completeness and efficiency of the management of factors involved in the educational process and students experience a meaningful learning process, which is supported by an effective teaching and learning process. Meanwhile, the quality of education is seen from the product side, namely if graduates/students (1) can complete their studies with a high level of mastery of science and technology as stipulated in the educational objectives at school, (2) get satisfaction with the results of their education because there is a match between mastery of science and technology with their life needs, (3) are able to functionally utilize the science and technology they have learned for the improvement of their lives; and (4) can easily obtain employment opportunities in accordance with the demands and expectations of the world of work.

Edward Sallis (1993:22) puts forward the concept of quality in relation to *Total Quality Management (TQM)*, where according to him quality should be seen as a relative concept rather than an absolute concept. The relative definition views quality not as something that is ascribed to the product or service. Quality can be said to exist if a service meets existing specifications. Quality is a way of determining whether the final product meets the standards or not. Products or services that have quality, in this relative concept, do not have to be expensive and exclusive. The relative definition of quality has two aspects. The first is conforming to specifications and the second is meeting customer needs. Quality is practiced by manufacturers in a system known as a quality assurance system, which enables consistent production of products and services to meet certain standards or specifications. If the product or service produced has met the specifications or standards that have been set earlier, then the product or service is of quality. (Sabur A, 1998, according to Sallis, Edward 1993). In order to achieve improvements in the quality of education, in this case the quality of graduates, a strategy or technique is needed to identify and solve problems creatively. Analysis techniques to identify the cause and effect of problems through Ishikawa diagrams. Ishikawa diagram or *Fishbone Diagram* (fishbone diagram) is often also called *Cause-and-Effect Diagram* is a technique to map all the factors that cause problems to the desired results. The purpose of the Ishikawa diagram is to list all the factors that affect the quality of a process and to map the inter-relationships between factors. (Sallis Edward, 2008: 202).

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2. Implementation of Ishikawa Quality Concept for Education Quality Improvement

The concept of quality initiated by Kaoru Ishikawa can be implemented into the world of education at least among others for: a) Improving the quality of educational output through quality control; and b) The basis for the preparation of *cause and effect-based* education quality improvement strategies.

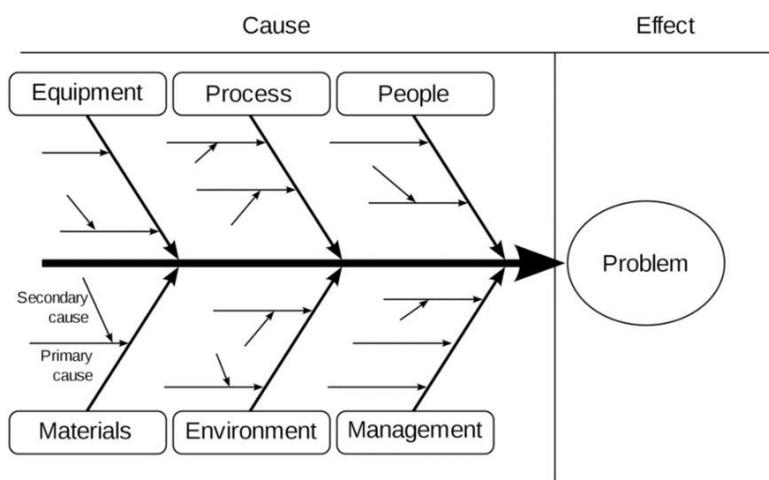
a. Improving the Quality of Educational Output through Quality Control

Education consists of two words: quality and education. In English "*quality*" means quality, quality. In the Big Indonesian Dictionary "*quality*" is (a measure of) good or bad of an object, level or degree (intelligence, intelligence). In terms of quality is the level of quality that has met or can even exceed the standards that have been set. Based on the National Education System Law No. 20 of 2003, education is a planned effort to create a learning atmosphere and learning process so that students actively develop their potential in order to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state (Lukman Ali, 1995), Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System (Jakarta, 2003).

According to Hoy, Jardine and Wood explain that the quality of education is an evaluation of the educational process that increases the need to achieve and the process of developing the talents of customers (students), and at the same time meets the accountability standards set by clients (*stakeholders*) who pay for the process or output of the educational process (*Muhammad Fadhli, 2017*). To realize the quality of graduate quality, a quality improvement program is needed. One of the steps that can be taken to improve this quality is through *quality control*.

Ishikawa defines *quality control* as a process for developing, designing, producing and serving quality products that are most economical, most useful, and always satisfying to consumers. Through Ishikawa's findings on *quality control* this will bring the quality of the *output* (product) to be better. In the context of education, *quality control* is an effort made by educational institutions to control the course of quality in accordance with the capabilities of each educational institution. In controlling quality we must also carry out quality control. Quality control of education can be organized through various quality control management models. One of the management models that can be used is the PDCA model (*plan, do, check, action*) which will result in the continuous development of education quality.

Ishikawa's development of the PDCA concept with its six steps can be an alternative management that can be implemented for quality control. Each step developed by Ishikawa can be implemented systematically and correctly by educational institutions. Thus, the quality of educational output can be achieved maximally (*Aminatul Zahroh, 2015*).



b. A cause and effect-based education quality improvement strategy

Every educational institution always tries to control quality according to the circumstances and capabilities of each educational institution. This aims to facilitate the quality control efforts themselves. School quality control efforts can be done with: *First*, quality control cannot produce an optimal benefit. *Second*, the effort is a scientific management activity aimed at specific targets by following the management cycle. *Third*, quality control is an effort to improve the quality of graduates (output). *Fourth*, quality control is an effort to follow the PDCA management cycle by considering the 5 M elements, namely: man, machine, material, money, and method (Shigeru Mizuno, 1993).

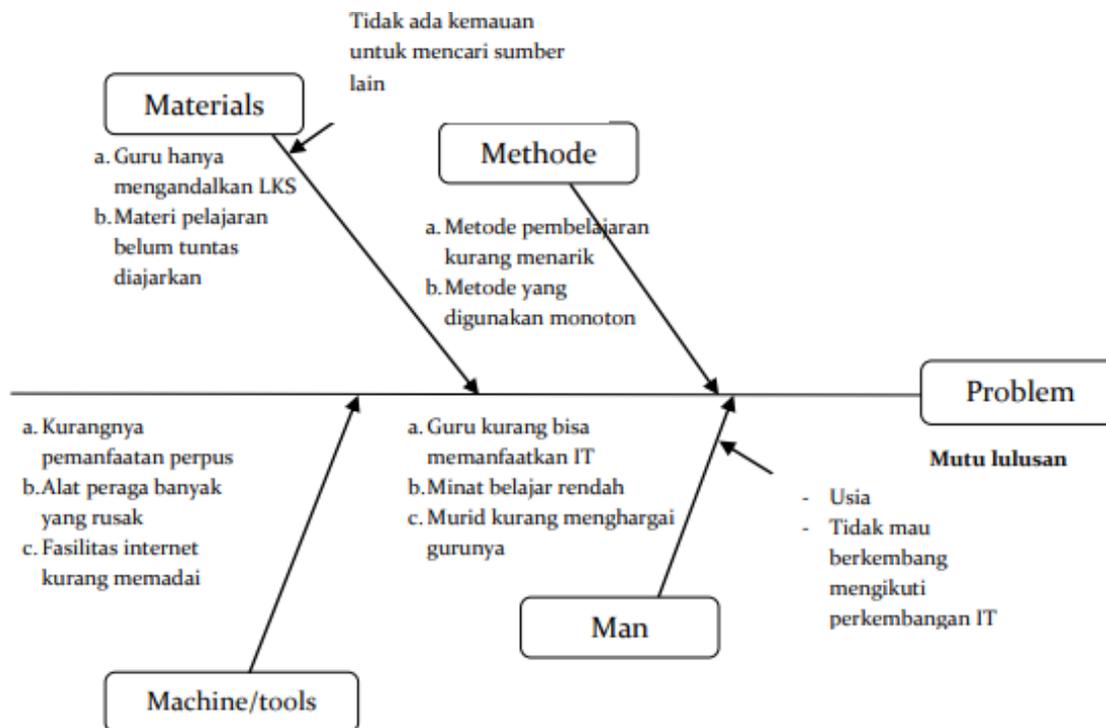
Eris Kusnadi (2011:1) suggests that Ishikawa diagrams identify various potential causes of an effect or problem, and analyze the problem through *brainstorming* sessions. The problem will be broken down into a number of related categories, including people, materials, machines, procedures, policies, and so on. Each category has causes that need to be described through *brainstorming* sessions. (Kusnadi, Eris. 2011).

An analysis technique to identify the cause and effect of problems through Ishikawa diagrams. Ishikawa diagram or

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Fishbone Diagram is also called *Cause-and-Effect Diagram* is a technique to map all the factors that cause problems in the desired results. The purpose of the Ishikawa diagram is to record all factors that affect the quality of a process and to map the inter-relationships between factors (Edward Sallis, 2008).

To strengthen, the following research results Wara Hapsari Oktriany, et al. About Education Quality Improvement Strategy Using Ishikawa Diagram at SMA Negeri 1 Suruh (Roni Harsoyo). The results showed that regarding the factors that influence the decline in the quality of graduates at SMA Negeri 1 Suruh using the Ishikawa diagram, visually showing the results of identifying the causes of a problem as the following diagram (Wara Hapsari et al, 2015).



Gambar 4. Diagram Ishikawa Menurunnya Mutu Lulusan

Based on the Ishikawa Diagram of the decline in the quality of graduates above, it can be explained that the decline in school quality is caused by several factors that cause problems, namely human resources, *tools* or infrastructure, learning methods and materials as learning resources.

Based on the summary of the discussion in the brainstorming session in preparing the Ishikawa diagram, SMAN 1 Suruh can find out what causes the low quality of graduates, so that it can be determined what strategies will be used to improve the quality of its graduates (Roni Harsoyo, 2021).

The cause of the problem in the human resource factor is that most teachers do not utilize ICT. The lack of ICT utilization is due to teachers' reluctance to learn ICT, low student interest in learning and students' lack of respect for teachers.

While the cause of the infrastructure factor is the lack of masculinization of the utilization of school library facilities indicated by many students who do not want to visit the library either to study, read books, or borrow books, many damaged props, weak wifi internet network.

The cause of the method factor is that the learning method is less interesting, still monotonous, meaning that the teacher has not used an active and fun learning model. Furthermore, the cause of the materials factor or teaching materials is only sourced from Student Worksheets (LKS), this causes the subject matter to be taught to be incomplete.

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No	Faktor-faktor yang diamati	Masalah yang terjadi	Strategi
1	Sumber Daya Manusia	Guru kurang bisa memanfaatkan TIK	Mengadakan pelatihan pada jam luang yang dipandu oleh guru yang sudah menguasai TIK, mengadakan seminar untuk siswa tentang penerimaan di lapangan pekerjaan (lulusan SMA), dan setiap satu bulan sekali diadakan konsultasi dengan guru BK
		Minat siswa belajar rendah	
		Siswa kurang menghargai guru	
2	Sarana Prasarana	Kurangnya pemanfaatan perpustakaan	Memanfaatkan ruangan perpustakaan untuk pembelajaran, memperbaiki atau membeli alat peraga yang sudah rusak, memfasilitasi sekolah dengan wifi
		Alat peraga banyak yang rusak	
		Fasilitas internet kurang memadai	
3	Metode	Guru menggunakan metode pembelajaran yang kurang menarik	Mengadakan pelatihan-pelatihan guru untuk mengembangkan metode yang bervariasi dalam mengajar
		Guru menggunakan metode yang monoton (tidak bervariasi)	
4	Materials	Guru hanya mengandalkan LKS	Mengadakan pelatihan pembuatan bahan ajar dan evaluasi yang sesuai dengan karakteristik siswa
		Materi pelajaran belum tuntas diajarkan	Pengaturan waktu pembelajaran dengan tepat sesuai dengan program semester

Based on this data, it is necessary to hold training on making teaching materials and evaluations that are in accordance with the characteristics of students. In addition, it is necessary to set the learning time so that it must be right in accordance with the semester program.

D. CONCLUSION

Ishikawa's quality concept can be implemented in education for: 1) Improving the Quality of Educational Output through *Quality Control*; and 2) The basis for developing a *cause and effect-based* education quality improvement strategy. Ishikawa's quality improvement concept motivates educational institutions to carry out good quality management, one of which is inconsistency in conducting *quality control* through the formation of a *QC Circle* (Quality Control Group) and the use of control tools, one of which is the *Cause and Effect Diagram*. Thus, educational institutions can improve their quality by knowing the root causes of problems that occur and determining the right quality improvement strategy.

From the study, it can be seen that the decline in the quality of graduates of SMA Negeri 1 Suruh from 2011 to 2015 comes from two factors, namely internal factors and external factors. Internal factors come from the teachers and students themselves. It can be seen in the low utilization of ICT resources by teachers, causing low student interest in learning and the lack of appreciation for teachers because the behavior of teachers in teaching is not good or arbitrary. This can be seen from the teacher's less interesting and monotonous learning methods.

Based on the explanation of the research results, it can be concluded that the preparation and determination of education quality improvement can be done by using the Ishikawa *Cause and Effect Diagram*. Through this diagram, education organizers will know the factors that cause problems based on the results of brainstorming among all components of education organizers. By knowing the cause, it will be able to determine what appropriate strategies can be applied to overcome these problems, so that the improvement of the quality of education can be achieved to the maximum.

REFERENCES

- 1) Aminatul Zahroh, "Total Quality Management: Achieving Quality Output Through School Quality Control System," *CENDEKIA: Journal of Education and Teaching* 9, no. 1 (2015): 89, <https://doi.org/10.30957/cendekia.v9i1.54>
- 2) Ministry of Education. 2003. National Education System.

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- 3) Edward Sallis, Total Quality Management in Education (Yogyakarta: IRCiSoD, 2008), 202. Elqorni, Ahmad Kurnia, 2012, "Knowing Fishbone Analysis" <https://elqorni.wordpress.com/2012/11/09/knowning-fishbone-analysis>.
- 4) Engkoswara, and Aan Komariah. 2010. Education Administration. Bandung: Alfabeta. Hadith, Abdul and Nurhayati. 2010. Education Quality Management. Bandung: Alfabeta. Hanik, Umi, Hajjah. 2011. Implementation of Total Quality Management in Education Qualit Improvement. Semarang: RaSAIL media Group.
- 5) Kusnadi, Eris. 2011. Fishbone Diagrams and the Steps to Make Them. <http://eriskusnadi.wordpress.com/2011/12/24/fishbone-diagram-dan-langkah-steps-making/>
- 6) Lukman Ali, Big Indonesian Dictionary (Jakarta: Balai Pustaka, 1995), 677.
- 7) Marc Balbirnie, "Professor Kaoru Ishikawa: A Man In Search Of Harmony," IASSC Lean Six Sigma Green Belt, 1989.
- 8) Muhammad Fadhli, "Education Quality Improvement Management," Tadbir: Journal of Education Management Studies 1, no. 2 (2017): 215-40, <https://doi.org/10.46244/visipena.v4i2.218>
- 9) Mulyasa. 2011. Becoming a Professional School Principal. Bandung: PT. Remaja Rosdakarya. Government Regulation. 2013. On National Education Standards.
- 10) Roni Harsoyo, "Education Quality Development Model (Review of Kaoru Ishikawa's Quality Concept)", Southeast Asian Journal of Islamic Education Management Vol. 2 No. 1 (2021), pp 95-112 DOI: <https://doi.org/10.21154/sajiem.v2i1.44>
- 11) Sabur A (1998) Quality Control of Higher Education, Thesis Not Published IKIP Bandung. Sallis, Edward (1993) Total Quality Management, London. Kogan Page.
- 12) Shigeru Mizuno, History of Integrated Quality Control in Japan, Translated: Eko Henriyanto and BN. Marbun (Jakarta: PT. Gramedia, 1993), 13-14.
- 13) Sumiati and Atika Ahmad, "Education Quality Control: Concepts and Applications", IQRA: Journal of Islamic Religious Education ISSN: 2580-5304 Volume 1 Number 1, June 2021Page 43-50.
- 14) Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System" (Jakarta, 2003).
- 15) Wara Hapsari Oktriany, Ria Triastuti, Yusia Sri Prajoko, "Quality Improvement Strategy of Education Improvement Using Isikawa Diagram in SMA Negeri 1 Suruh". Proceedings of the National Semiar of Economics & Business Education Faculty of Teacher Training and Education, Sebelas Maret University Surakarta Saturday, November 07, 2015 ISBN: 978- 602-8580-19-9 <http://snpe.fkip.uns.ac.id>
- 16) Yuhasnil1, Silvia Anggreni2, "Curriculum Management in Efforts to Improve Education Quality", Aligment: Journal of Administration and Educational Management Volume 3, No. 2, December 2020 DOI: <https://doi.org/10.31539/alignment.v3i2.1580>



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