

SECURITY-FOCUSED IS QUALITY INSTRUMENT A PROPOSED QUALITY INSTRUMENT ON ACADEMIC INFORMATION SYSTEM

¹INO SULISTIANI, ²SYAFRUDDIN SYARIF, ³YUSRAN, ⁴DEWIANI

Department of Electrical Engineering, Engineering Faculty,
Hasanuddin University, Gowa 92119, Indonesia

E-mail: ¹ino_sulistiani@iainpalopo.ac.id, ²syafuruddin.s@eng.unhas.ac.id,
³yusran@unhas.ac.id, ⁴dewiani@unhas.ac.id

ABSTRACT

Currently, academic-based information system software has not overall implemented quality model as an instrument of quality. Academic information system software requires quality instruments as a determinant of its quality. A conceptual model derived from a quality instrument that implements and focuses on standardizing security behavior in web application-based academic information systems is known as the Security Focused IS Quality Instrument. Quality Structure and Quality Factors of IS Quality Instruments Focused on Security and Quality Model Questionnaire Method, which is a research method in the form of questions in the form of choices consisting of Basic Quality Questionnaire Method for AISS, Basic Quality Model Questionnaire Method and Security Questionnaire Method is a quality model structure and method of determining parameters most appropriate as a description of a proposed quality instrument. The academic information system software has quality instruments and their security behavior is known as integrity, privacy, confidentiality, authentication, access control and availability. The proposed Security Focused IS Quality Instrument implements these five quality instruments and security behaviors as quality factors. Security Focused IS Quality Instrument will be provided security quality assurance for academic information system software including control over unauthorized access, personal data classification, access control to Academic Information System Software source code, data integrity compliance, access rights management, access restriction to information, service readiness of academic information system software, and classification from data and users of academic-based information system software.

Keywords: *Security-Focused IS Quality Instrument, Quality Instrument, Quality Model, Academic Information System Software*

1. INTRODUCTION

Academic-based electronic service provider at an educational institution, college, or high school known as academic information system software [1]. AISS helps users manage the operations of an educational institution which includes its activities to have an impact on the marketing of the educational institution.

Based on the purpose of the academic-based information system software, it has differences from e-learning systems. The definition of an e-Learning is an educational system that utilizes information technology, it is using electronics or computers that support the teaching and learning process. AISS is software in electronic form or an integrated computer system that supports learning, teaching, and organizing business processes of a college or school. AISS is important because it can improve the operational efficiency and

effectiveness of an educational institution, especially university and high school.

Academic information system software (AISS) is an academic-based information system software that uses a website application as its platform. The website-based academic information system software has the advantage of being able to manage data centrally. The scope of services for academic information system software (AISS) has similarities with other website-based applications that are used as public service systems like health application services, the government integrated service, and electronic banking service. Some similarities that exist between these systems include the number of users, providing service availability, high accuracy, reliability, and interoperability.

The difference between AISS and other information systems lies in the aspect of content, content type, and the main business of each

information system reliable and real-time is parameters that must be provided by academic information system software so that the purpose of handling academic results is safe and up-to-date like study result card, student attendance, teacher/employee attendance, student graduation, student payments and others can be achieved.

Currently, the quality model is not fully adopted as an instrument system in academic-based information system software [2]. Quality instruments vary from each quality model [2]. Currently, many academic information systems (AIS) are built using website-based applications [3]. Website-based applications can provide security quality standards [4] where the implemented security instruments must be able to provide security quality in the academic-based information system domain.

The IS Quality Model is a conceptual model where the quality model is based on a website application platform and implements and focuses on standardizing reusability and security behavior in academic information systems [5].

An academic information system software will have quality assurance, namely comprehensive quality such as easy to learn, easy to use, the satisfaction when interacting, reliable, secure, and high availability of information implemented by implementing the IS quality model.

2. THE MATERIAL AND METHOD

The novelty aspect of this study is the IS Quality Model, which is a conceptual model consisting of a conceptual structure, namely quality and quality factors. The IS quality model consists of 2 (two) qualities, namely Security Quality and Usability Quality. Security quality is referred to as Security-Focused IS Quality Instrument and usability quality is referred to as Usability-Focused IS Quality Instrument.

Security-Focused IS Quality Instrument as a quality model of IS quality also has 5 (five) quality factors, namely Privacy, Confidentiality, Integrity, Authentication, Availability and Access control.

Meanwhile, the Usability-Focused IS Quality Instrument, which is also the quality of the IS quality model, has understandability, learnability, operability, attractiveness and usability compliance as quality factors.

Each quality possessed by the IS quality model determines the behavior of the IS quality model,

which provides quality assurance of a software that has comprehensive quality factors that are easy to learn and use, provide interaction satisfaction, high levels of reliability, security, and availability of information. Therefore, the IS quality model is needed as a quality instrument, which is a determinant of the quality of academic information system software.

2.1. Quality Assurance Of A Software

Software quality assurance by professional software developers expects a match between functionality and requirements that become the quality standard of a software

The IEEE defines software quality assurance as a systematic plan and pattern needed to produce a product that meets the requirements, as well as a series of activities designed to carry out an evaluation process based on the product being built [6].

As a systematic plan and pattern to produce products that meet the requirements, it is necessary to have objectives in software development for software quality assurance, they are:

1. Ensure the reliability of the software based on the requirements
2. Trust in the software that was built was completed on time and the funds that have been determined
3. Efficiency improvement as an initiation process and management activity in software development and software quality assurance is a pattern of software assurance

2.2. IS Quality Model

The quality model is a reference to measure the quality of a product. The quality model is implemented in an academic information system. An administrative system used to display academic data such as student data, education staff, courses, academic activities, and curriculum information is an example of implementing an academic information system.

A quality model is used to measure software. The quality model is also used to audit Information and Communication Technology (ICT) in an educational institution or organization.

Academic information systems become a reference for other information systems due to quality factors. Software engineering is done by adopting the quality factor of a quality model and implementing it, therefore the quality factor plays an important role in software engineering.

IS quality model is a conceptual quality model that is implemented in academic information systems with reference quality factors, namely security quality factors and usability quality factors. Measuring the quality of a product requires a quality model as a measurement reference.

Usability and security factor is the standardization of the proposed quality model in an academic information system based on website applications its name IS quality model.

WBAQM is the main framework of an academic information system because website-based applications have standardization from two sides, namely security quality and usability quality, therefore the idea arose to implement an IS quality model on a website-based academic information system.

An instrument contained in the IS quality model that determines the security factor of the academic-based information system software, this instrument is called The Security-Focused IS Quality Instrument. This instrument has several security behaviors, known as quality factors.

Therefore, Security-Focused IS Quality Instrument is a security instrument for an academic information system that absolutely must be owned by every academic information system, making Security-Focused IS Quality Instrument an important instrument in an academic-based information system software.

2.3 The Is Quality Model Is A Conceptual Quality Instrument

The current academic information system software does not fully apply the quality model as an instrument system. Quality instruments are needed as a determinant of the quality of academic information system software.

The IS quality model is a conceptual quality instrument model that implements and focuses on standardization of reusability and security behavior in an academic information system based on website applications. The IS quality model will provide quality assurance for software that has comprehensive quality factors that are easy to learn and use, provide interaction satisfaction, a high level of reliability, security, and availability of information.

The IS quality model consists of two quality instruments, namely the Usability Focused IS Quality Instrument and the Security Focused IS Quality Instrument. The usability focused IS quality instrument has 5 quality instruments, namely understandability, learnability, operability,

attractiveness and usability compliance, while the Security Focused IS Quality Instrument consists of 6 instruments, namely privacy, confidentiality, integrity, authentication, availability, and access control. The most appropriate method to describe the proposed IS Quality Model is the Quality Structure and Quality Factors of the IS Quality Model and the Quality Model Questionnaire Method.

Implementing an IS Quality Model focused on standardizing reusability behavior precisely. IS Quality Instruments Focused on Usability in an academic information system using a top down model. Where the quality factors of the IS quality instrument focus on usability, it provides requirements and considerations for obtaining a quality factor. The quality factor obtained becomes the quality of the usability focused IS quality instrument which is none other than the quality of the IS Quality Model itself. The Usability Focused IS Quality Instruments are Understandability, Learnability, Operability, Attractiveness and Usability compliance.

Analyzing an academic information system using a Security Focused IS quality instrument then implementing a top down model. Where the Quality Structure and Quality Factors of the Security Focused IS Quality Instrument are implemented from top to bottom where an academic information system is required to have the quality factors of each quality contained in the Security Focused IS Quality Instrument.

Quality factors of Security-Focused IS Quality Instruments, namely:

1. Privacy quality consists of 2 quality factors, namely Control of people who are not entitled to access and Classification of private data
2. Quality Confidentiality consists of 10 quality factors, namely Access control, access control to AISS source code, protection of log information, protection of AISS test data, control against malicious code, removable media management, session time out, strength of cryptographic algorithms, data encryption accuracy and management cryptographic key
3. Quality Integrity consists of 7 quality factors, namely Data integrity compliance, Prevention of internal data corruption, asset inventory, Back up information, Documented operating procedures, AISS erroneous logging, and AISS security documentation
4. Authentication quality consists of 5 quality factors, namely Authentication protocol compatibility, User registration, User password

management, Access rights management and Information access restrictions

5. Quality Availability consists of 3 quality factors, namely Availability of AISS services, Availability of required information, and Utilization of information by authorized persons.

6. Quality control access consists of 3 quality factors, namely

1. Information access settings,
2. AISS data classification,
3. AISS user classification

Therefore, the proposed IS Quality Model consists of 2 quality instruments, namely Usability-Focused IS Quality Instrument and Security-Focused IS Quality Instrument. Both can be implemented as a Quality Model in an information system, especially academic information systems due to the current academic information system based on website technology where website technology is built from 2 qualities, namely security quality and usability quality.

Each of the qualities possessed by the IS quality model determines the behavior of the IS quality model, which provides quality assurance of a software that has comprehensive quality factors that are easy to learn and use, provide interaction satisfaction, a high level of reliability, security, and availability of information.

In the end, the IS quality model is needed as a quality instrument, which is a determinant of the quality of academic information system software.

2.4 Quality Model ISO/IEC 25010

The ISO/IEC 9126 quality model is enhanced by a security-based quality model by adding security qualities [7]. Therefore, the selection of the ISO/IEC 25010 quality model as the main security structure for academic information system software requires that a security quality model be flexible and generalized, making it easy to adapt to other quality models and measure specific application domains. AIS has different characteristics from other software, therefore the basic aspects of academic information system software security must be considered because it relates to data and information security, the basic aspects of security are known as privacy, confidentiality, authenticity, integrity, and accountability.

1. Confidentiality

How much protection from unauthorized disclosure provided by AISS to the data/information contained in a system is a picture

of a quality model. ISO/IEC 25010 quality model provides an assessment of how much protection from an unauthorized disclosure that AISS provides for data/information contained in a system.

2. Integrity

ISO/IEC 25010 quality model assesses how complete and accurate the assets of an Academic-based Information System can be maintained as integrity.

3. Accountability

ISO/IEC 25010 quality model evaluate the extent to which entity activities are

2.5 Web-Based Application Quality Model (WBAQM)

The primary structure of academic-based information system software is a website application quality model. The quality measurement tool that is specifically implemented in Academic Information System Software (AISS) is the academic information system software quality instrument. Currently, many AISS is built using website technology[8].

Website is known as a web-based application that is used by academic information system software as a standard technology.

Website is built around different programming models, technologies, and languages and it is used to implement highly interactive applications that have very high-quality requirements. Adopt ISO/IEC 25010 and ISO/IEC 9126 as quality standards. ISO/IEC 9126[9] has a quality factor, namely reliability, usability functionality, efficiency, and maintainability.

ISO/IEC 9126 quality model is enhanced by adding security characteristics[10]. Currently, the security quality model is known as ISO/IEC 25010. Due to flexibility and generality reasons, ISO/IEC 25010 quality model was chosen as the website application quality standard.

Website is a technology based on two quality standards, they are usability quality and security quality. These two qualities are adopted from two quality models, they are ISO/IEC 25010 and ISO/IEC 9126. With this standardization, an academic information system platform is a website technology.

2.6 Academic Information System (AIS) Quality Instrument

Academic Information System (AIS) Quality Instrument is a quality measurement tool

implemented specifically for AIS. The SIA Quality Instrument is a combination of quality factors contained in ISO/IEC 9126 and complemented by ISO/IEC 9126 25010; 2011, WBAQM, and COBIT 4.1[11].

The main quality framework for this model is WBAQM. Academic Information System (AIS) quality instrument is divided based on the WBAQM quality factors, which are broken down into three perspectives.

1. Visitors Perspective

The visitor's perspective emphasizes visitor satisfaction and goal achievement in using the Academic Information System (AIS). In addition to different needs, the perspective takes into account the diversity of visitors which includes nationality, culture, language, and ease of understanding of AIS visitors. This perspective becomes the measurement of the AIS Quality Instrument because the university has a variety of different academic communities and the number is much larger.

Quality factors contained in the visitor's perspective include ease of access, functionality, usability, security, internationalization, and content loaded.

Accessibility

Accessibility is a quality factor because Academic Information System (AIS) is a web-based application with accessibility factors that are not separated even if the visitor does not know AIS's official address on the internet and only knows the password. The sub-factors include the ease with which visitors can access the Academic Information System (AIS). AIS measured by the simplicity of the search, the ability to customize the display with various platforms (compatibility), and speed of access. Ease of search is measured by the ability to search for AIS information in search engines (indexing) and the dissemination of AIS information. The compatibility function consists of the ability to adapt based on various platforms and the adaptability of the design if it is accessible on various platforms. Access speed is measured by the length of time that is tolerated based on the number of users.

Loaded Content

The content contained in the Academic Information System (AIS) has aspects of accuracy, consistency of design rules, and the level of interest and up-to-date information. Content includes quality factors as one of the fundamental functions of WBA quality. Accuracy is measured based on the accuracy of the computational

functions and the accuracy of the Academic Information System (AIS) output level. Consistency is measured by comparing the AIS display design which does not change / matches the theme with all AIS displays. The level of interest in the updating of information as measured from the date of distribution of information compared to the level of information convention and visitor information needs.

Benefits

Usefulness is a quality factor because it can measure the quality of visitors' ability to understand Academic Information System (AIS). This is important because AIS has many functions so it is necessary to better understand the visitor's ability. Benefit consists of the level of understanding of the visitor, the availability of documentation for learning (learnability), the ability to operate the function (operability), and the level of user interest (attractiveness). The level of understanding is measured based on the completeness of each explanation of the existing functions, examples of available function applications compared to all existing functions, the level of understanding of existing visitor functions.

Security

Web-based applications that can be accessed by all Internet users require high data security. Thus, the security factor is included in the quality factor of the Academic Information System (AIS). Security has several sub-factors consisting of confidentiality, ability to resist attacks, integrity, and availability of access time. Confidentiality is measured by calculating the functions that can be accessed by visitors according to authorization and compared with all available functions. Integrity is measured by the potential security gaps found. Availability is measured by the percentage of time that an inactive AIS can access compared to the availability of access time.

Functionality

AIS is composed of several different modules that require the relationship of the functions of the modules to each other. And, functionality can be measured by observing the relationship between functionality and the completeness of the available functions.

Internationalization

Visitors from different backgrounds make the AIS must be understood by all visitors using standard communication systems. Internationalization includes two sub-factors, namely the availability of official and international languages in terms of functions and reports

generated, as well as the ability to access AIS in other countries or regions.

2. Developer Perspective

The developer side concentrates more on the dynamics of the Academic Information System (AIS) in accordance with bureaucratic policies. AIS requires dynamic management of software engineering and sound maintenance, and the development of an AIS that supports the achievement of educational institutions. The quality factors contained in the developer's point of view include ease of maintenance, portability, and reusability.

Ease of maintenance

Ease of maintenance is a quality factor because AIS is a complex application that requires high maintenance and is dynamic. New policies in institutions such as curriculum changes, the addition of new departments, the addition of new functions that require the ability to change quickly. The negative effect when AIS does not have a good maintenance factor is that changes are not documented, and new developments take a lot of time to learn about old systems.

Ease of being moved (portability)

Portability is the extent to which the effectiveness and efficiency of an application when moving software or hardware is carried out. The quality factor is needed in the AIS because the AIS must be able to adapt to the new environment when there is a simulation or repair of the simulation system. Some of the quality sub-factors include the ability to adapt (adaptability), ease of installation, the ability of the system to be used directly in a new environment (co-existence).

Reusability

Reusability is a quality factor needed to measure the AIS's ability to reuse the modules contained therein. The sub-quality factor consists of the level of clarity of each part starting from the lowest level and detail/abstraction, the ability to separate Academic Information System (AIS) into several modules and each module measures the ease of updating and function according to activity, and the clarity of the division of Academic Information System (AIS) developer programming structure to facilitate concentration reading of Academic Information System program code

3. Institutional Perspective

The main purpose of educational institutions is generally non-profit. Thus, from the institute's perspective, the Academic Information System Quality (AIS) instrument concentrates more on the

efficiency and availability of services to assist existing business processes. However, the financial factor is also a fixed quality factor that is measured because it is the impact of the efficiency of the performance of educational institutions. Quality factors from an institutional point of view include credibility, innovation, and profitability.

Credibility

This is a quality factor that is more focused on the goals of the user's perspective. The credibility of the quality factor of the Information Quality Academic Information System was chosen to measure the level of usefulness of the AIS with the attraction of visitors and institutions as the organizing subject.

Innovation

The quality factor is more focused on the goals of growth and learning. Innovation is used as a quality factor of the AIS Quality Instrument to measure the maturity level of innovation in the AIS so that further recommendations can be made on aspects of developing and extending the active period of AIS services. Through the innovation of the recommended measurement results, AIS is expected but trusted to support business processes with good institutions by adapting the latest technological developments.

Profitability

The quality factor is more directed to internal goals and profits. Profitability as a quality factor The Academic Information System Quality Instrument is used to measure AIS support in financial and internal institutions. Quality measurement is done by measuring the maturity level of the profitability factor and comparing it with the maturity level after a recommendation.

2.7 Quality Model Questionnaire

Quality Model Questionnaire Method is a research method in the form of questions in the form of choices consisting of Basic Quality Questionnaire Method for AISS, Basic Quality Model Questionnaire Method, and Security Questionnaire Method.

The purpose of this method is to describe a quality model by determining the most appropriate parameters from the available options.

Basic Quality Questionnaire Method for AISS

Attractiveness

1. This system is Annoying or Enjoyable
2. This system is Bad or Good
3. This system is Unlikeable or Pleasing

4. This system is Unattractive or Attractive

5. This system is Unfriendly or Friendly

Efficiency

1. This system is Slow or Fast

2. This system is Inefficient or Efficient

3. This system is Impractical or Practical

4. This system is Cluttered or Organized

Perspicuity

1. This system is Not understandable or Understandable

2. This system is Difficult to learn or Easy to learn

3. This system is Complicated or Easy

4. This system is Confusing or Clear

Dependability

1. This system is Unpredictable or Predictable

2. This system is Obstructive or Supportive

3. This system is Not secure or Secure

4. This system Does not meet expectation or Meet expectation

Stimulation

1. This system is Interior or Valuable

2. This system is Boring or Exiting

3. This system is Not interesting or Interesting

4. This system is Demotivating or Motivating

Novelty

1. This system is Dull or Creative

2. This system is Conventional or Inventive

3. This system is Usual or Leading edge

4. This system is Conservative or Innovative

Security Questionnaire Method

1. The parameter selection below is the parameter that best describes the privacy security-focused IS quality instrument in an AISS

* Efforts to safeguard information from people who are not entitled to access / Privacy is not one aspect of security.

* Privacy data on security-focused IS quality instruments are private / Private is not the data settings relating to the regulation of access to information.

* Privacy is one of the basic aspects of security / a basic aspect of security is the effort to protect information from people who have the right to access information.

* Privacy related to how to regulate access to information / Information settings do not require privacy.

* Data classification related to regulating access to information / Private is not data classification.

* Privacy and authentication are mechanisms used to limit system access / Unlimited access for all users.

2. The choice of parameters below is the parameter that best describes the confidentiality of security-focused IS quality instruments in an AISS

* Ability to maintain the confidentiality of data for certain purposes and are only allowed for certain purposes / Confidentiality of data only for certain people.

* Confidentiality is the protection of data and information / Confidentiality is the limitations of data and information

* Data and information only be accessed by authorized people / Data and information cannot be accessed and changed.

* Confidentiality relates to providing data with a specific purpose to other parties and is only permitted for that purpose / Access to information has nothing to do with Confidentiality

3. The choice of parameters below is the parameter that best describes the integrity security-focused IS quality instrument of an AISS

* The owner of the information can change the information without permission / Without the permission of the owner of the information, the information cannot be changed

* The information sent must be the same as the information that arrived at the recipient / The information received does not have to be the same as when the information was sent

* Viruses, Trojan horses, other users are integrity problems / Integrity problems lie in the system.

* Access to change data and information can only be done by the rightful owner of the data and information / Anyone who has access to change data and information is the owner of the data and information.

* Appropriate data integrity is needed to maintain and maintain data and information / Data integrity is not required from people who are not entitled to access information.

* Ability to maintain and maintain data and information / Inability to maintain and maintain data and information.

4. The parameter selection below is the parameter that best describes the safety security-focused IS quality instrument on an AISS

* The password method is used to connect to the server and get service / Connect with server and get service does not require a password.

* Authentication is a way to state that the information is truly authentic / Authentication is a method of obtaining information.

* How to declare the server that we are contacting is the original server by using a password / No need to use a password when cross-checking.

* A character is given by the user to the server and the server recognizes it by the existing policy/ password does not need to be used when wanting to access information on the server.

* Stating that the information is truly genuine using authentication / the method to obtain information is Authentication

* The way a person providing the information by entering the password into the server if the server recognizes that person is the giver of information / Password is an ancient method for connecting to the server and getting service.

5. The parameter options below are the parameters that best describe the availability of security-focused IS quality instruments on an AISS

* Availability of data and information when needed / Absence of data and information when needed.

* Data and information in a computer system are available and can be used by people who are entitled / Data and information can be used by people who are not entitled.

* A server down due to hacking is a matter of system availability / Availability related to the unavailability of information.

* Availability relates to the availability of information when needed / Information does not always exist when needed.

* People who are entitled to can make use of available data and information / Availability of data and information cannot always be utilized.

* DoS attacks cause the unavailability of data and information services on a server/unavailability of data and information services on a server not related to the availability aspect.

6. The choice of parameters below is the parameter that best describes the access control security-focused IS quality instrument on an AISS

* Access control is related to how to manage access to information / Arrangement of access to information is not necessary.

* Classification of data relating to the way arrangements for access to information need to be done so that users are limited according to the level of needs / Access to information is not linear with the level of information needs.

* Access control by using the user ID and Password / Access control not used by user access

* Privacy related to how to regulate access to information / Information settings does not require privacy.

3. RESULTS AND DISCUSSION

The proposed quality structure and quality factor of a security focused IS quality instrument can be seen in Figure 1.

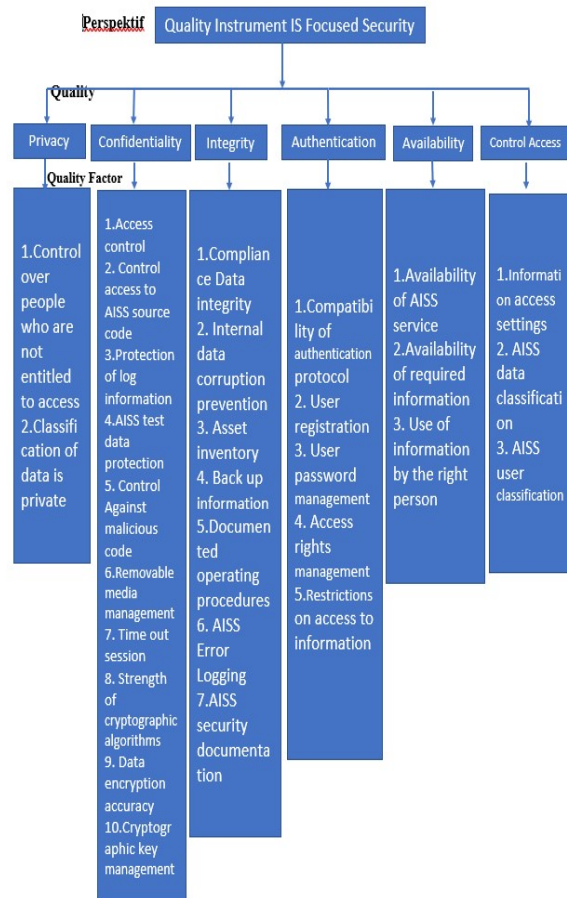


Figure 1. Quality Structure and Quality Factors of Security-Focused

A concept of a quality instrument that implements and focuses on standardizing security behavior in an academic information system based on a website application is Security Focused IS Quality Instrument.

The proposed structure of the Security-Focused IS Quality Instrument consists of 3 levels, they are :
 Level 1: Identify the instrument quality perspective of the model
 Level 2: Quality categorization of the perspective of the instrument quality model

Level 3: Mapping of quality factors against the perspective of a model quality instrument. The perspective of the instrument quality model is the first level of quality structure and quality factors. Where IS quality instruments focus on security is a perspective that contains quality. The second level of security-focused IS quality instrument structure is quality. Access control, integrity, privacy, confidentiality, authentication, and availability are the 6 qualities contained in security-focused IS quality instrument. The third level is the mapping of quality factors to the perspective of the model quality instrument, where the quality factors are the requirements, considerations, and the nature of each quality instrument.

Authentication, availability, privacy, confidentiality, integrity, and access control are basic aspects of academic-based information system software security where the basic security aspects are implemented in The Security Focused IS Quality Instrument. In other words, the basic aspect of security for an academic information system software is The Security-Focused IS Quality Instrument. Privacy security behavior or privacy security aspects are used for private data. while the security aspect of confidentiality implements security behavior on data given to other parties for certain purposes. The aspect of security integrity is the security behavior of the information received must be appropriate and the same as when the information was sent.

Many security behaviors can describe authentication as a basic aspect of security, namely the way or method of stating that information is truly genuine. Like the server being contacted is the real server, the person accessing or providing the information is the person in question. The basic aspect of security in academic information systems related to the availability of data and information that can be utilized by authorized parties is availability. The last basic security aspect is access control, the security behavior related to how to regulate access to information.

1. Privacy, is an effort to safeguard information from people who are not entitled to access and lead to AISS data that is private.

Table 1. Privacy as Security-Focused IS Quality Instrument in Academic Information System Software (AISS)

	Factor Quality	Description
	Control over people who have no right to access	Efforts are made to safeguard

Privacy		information from people who are not entitled to access.
	Data classification is private.	Classifying towards private data.

2. Confidentiality, is an effort to safeguard information by providing AISS data to other parties for certain purposes and is only allowed for that particular purpose.

Table 2. Confidentiality as Security-Focused IS Quality Instrument in Academic Information System Software (AISS)

	Quality Factor	Description
	Access control	AISS access control is under user control
	Control access to AISS source code	Restrict users to access information using the AISS
	Log information protection	Protect information against unauthorized access from an attacker.
	AISS test data protection	Protect AISS test results
	Control of malicious code	Limiting codes of unknown functions and benefits which can be active at any time and cause harm to AISS.
	Removeable media	The process of setting up

Confidentiality	management	removeable media is computer storage media designed to be inserted and removed from AISS	3. Without the permission of the owner of the information, the information may not be changed. This explains the quality factor of integrity. The information received must be the same as when the information was uploaded into AISS.		
			Table 3. Integrity as Security-Focused IS Quality Instrument in Academic Information System Software (AISS)		
	Time out session	The time taken by the user is logged in but with no activity at all, as a result the user is logged out automatically.	Integrity	Quality Factor	Description
				Conformity of data integrity	The information or data received must be as exact and the same as when the information or data was sent.
				Prevention of internal data corruption	Actions that prevent damage or loss of data
				Asset inventory	Management of data and information to avoid damage or loss caused by viruses, Trojans, or other users who change information without permission.
		Back up informasi		The process of backing up data by copying or Archiving computer data so that the data can be reused if there is damage or loss.	
		Documented operating procedures		AISS operating procedures are created, documented, implemented and maintained	
	Cryptographic key management	The process of regulating data security by private key and public key when doing encryption and decryption.		Logging is wrong AISS	Incorrect reports or records that occur on AISS are caused by viruses, Trojan

		horses and hackers.		access to information	control procedures for those entitled to access information.
	AISS safety documentation	The process of collecting, selecting, processing and storing information and data from AISS as a security procedure.			

5. *Availability*, This quality instrument is related to conditions where data and information are ready to be used when needed. AISS data and information are stored on the server so that they are ready to be used and utilized by people entitled to it.

Table 5. Availability as Security-Focused IS Quality Instrument in Academic Information System Software (AISS)

4. *Authentication*, this instrument uses the password method to connect to the server and get Academic Information System Software services. This service is known as the basic aspect of authentication security.

Table 4. Quality Authentication as a Quality Instrument IS Focused on Security in Academic Information System Software (AISS)

	Quality Factor	Description
Authentication	Authentication protocol compliance	The process of confirmation of identity as a procedure for approval of accessing or providing information to those who are entitled.
	User registration	User registration before AISS
	User password management	User password managed after user registration
	Access rights management	The process of managing rights connected to the server and get AISS services
	Restricted	Access

	Quality Factor	Description
Availability	AISS service availability	Conditions where AISS services are ready to be used when needed
	Availability of information needed	Conditions where information is ready to be used when needed
	Utilization of information by eligible people	Conditions where information is only ready to be used and utilized by people entitled to it

6. *Control access*, is a way to manage information access, every data and user who is in AISS is classified. The access mechanism for this quality instrument uses the user id/password method for each AISS.

Table 6. Control Access as Security-Focused IS Quality Instrument in Academic Information System Software (AISS)

	Quality Factor	Description
Control access	Information access settings	The method used to limit access to information as needed
	AISS data classification	Data settings from the right to access
	AISS user classification	User settings based on the level of needs.

Control access, confidentiality, integrity, authentication, availability, confidentiality are the basic aspects of security that must be owned by an academic information system.

Each of these six qualities has different quality factors such as those contained in the Quality Structure and Quality Factors of the Security-Focused IS Quality Instrument, especially at the third level. To analyze an academic information system using a Security Focused IS quality instrument, we implement a top-down model [10]. Where Quality Structure and Quality Factors Security-Focused IS Quality Instruments are implemented from the top down, where an academic information system must have quality factors of each quality contained in the Security-Focused IS Quality Instrument

4. CONCLUSION

This study proposes a conceptual structure of quality and quality factors, namely Security-Focused IS Quality Instrument. The Security-Focused IS Quality Instrument is an instrument to determine the security behavior of an academic information system software consisting of availability, access control privacy, confidentiality, integrity, and authentication. The idea of implementing Security-Focused IS Quality Instruments on web-based applications is because web-based applications must be standardized on security quality. The prime framework structure for academic information systems is website technology or Web-Based Application Quality Model (WBAQM). Security Focused IS Quality Instruments will provide security quality assurance for an academic information system software

including control over unauthorized access, private data classification, access control to Academic Information System Software source code, data integrity compliance, access rights management, restrictions access to information, availability of academic-based information system software services, data classification and, academic information system software user.

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