Evaluation of The New Student Candidates admission Information System Using ISO/IEC 25010 Model

Muhamad Ali Kasri ¹⁾, Lutfi Ali Muharom²⁾, Rizqi Claudia Wardani H³⁾

Universitas Pendidikan Muhammadiyah Sorong

Universitas Muhammadiyah Jember

Universitas Pendidikan Muhammadiyah Sorong

e-mail: muhamadalikasri@gmail.com ¹⁾,

lutfi.muharom@unmuhjember.ac.id ²⁾,

rizqiclaudiawardani@gmail.com ³⁾

During the COVID-19 pandemic, it is very important to pay attention to the evaluation of the quality of higher education information systems because most of internet users were only accessed from home. So it is necessary to evaluate to produce a quality system. This study aimed to evaluate the information system for the candidate of new student admissions at the Muhammadiyah University of Education Sorong. This evaluation was conducted to find out that SIPMB Unimuda Sorong was designed according to the wishes, and how high the level of user satisfaction was. This study used five characteristics that exist in ISO/IE 25010. The results showed that the usability characteristic test obtained a percentage value of 77% in the Very Eligible category. Meanwhile, in testing the *functional suitability* characteristics, it obtained a score percentage of 98% in the Very Good category. In testing the performance efficiency characteristics, it has met the standard because the average time used is 3.1 seconds for page load, page size is 866 kb, page speed is in Grade C (72%), and Yslow is in grade A (93%) so that we get very good category. The *maintainability* characteristic test is carried out by taking into account the three test criteria. The test results showed that the system has met the three categories they were *instrumentation, consistency, and simplicity*, so that SIPMB has met the maintainability test. And testing the reliability characteristics obtained a percentage value of 100%, this shows that SIPMB has met the Telcordia standard. Based on the results of testing and analysis, it can be said that SIPM UNIMUDA Sorong has product quality in accordance with ISO/IEC 25010 Software Product Quality standards.

Keyword : ISO/IEC 25010, UNIMUDA Sorong, Information System, New Student Admissions.

INTRODUCTION

Since the beginning of Pandemic covid-19 [2019] Universitas Pendidikan Muhammadiyah (UNIMUDA) Sorong has built students admissions information system. This systems was created to make the candidate of students easy to do administration from everywhere. This also became an instruction from the government to suppress the spread of Covid-19 [(Komunikasi & Informatika, 2020)]. Meanwhile the result of survey on new students' admissions in the year 2021 showed that 42% new students registered their self through *New Students admissions information System*. While, 58% of students registered their self through offline or coming directly to campus. From the survey results, there were still many students who did not use SIPMB in registering. This means that there needs to be an evaluation carried out by UNIMUDA Sorong on the quality of the system. According to [(Al Nawaiseh et al., 2020)] Evaluation of the quality of information systems is one of the keys to the success of higher education. To provide the best service, it is necessary to evaluate the quality of the system at the university [(Puspaningrum et al., 2017)]. Especially the evaluation of the quality of new student admissions services and the quality of users on the information system [(Purnomo et al., 2018)]. To find out a quality system is by measuring and assessing the system [(Morrell, 1987)]. Measurement and assessment can be known by evaluating the quality of the system that has been designed. Evaluation of the quality of the system is carried out as an effort so that the system can be implemented effectively, so that it is able to meet the needs of its users [(Haslinda et al., 2015)]. From the evaluation process, it can be seen what the user's response to the system is [(Nashihuddin & Aulianto, 2016)]. Evaluation is a process of measuring and assessing whether an activity or program is implemented according to the plan and has succeeded in achieving its goals or not [(Mirza et al., 2019)]. There are various evaluations of the quality of information systems that can be carried out, depending on the purpose of evaluating the system, such as to assess the technical capability of a system, operational implementation, and system utilization [(Hakam, 2017)]. There are various models of system or software quality testing, including McCall, Boehm, FURPS, Dromey, ISO/IEC 9126, and ISO/IEC 25010 [(Al-Badareen et al., 2011)]

To support the relevance of research conducted with previous research on the model of measuring the quality of information systems, the authors analyze several studies on measuring the quality of information systems. Research conducted by

[(Purnomo et al., 2018)] is discussing the evaluation of service quality and student acceptance rates in the Malang State Polytechnic Academic Information System. The testing of this research system uses the Webqual 4.0 model and the Technology Acceptance Model 1.0. Another research conducted by [(Lestari, 2020)] on the assessment of the quality of information systems on the new student selection website. In measuring system quality, this study uses the McCall model. Furthermore, research conducted by [(Sulistiani & Syarif, 2018)]. This study discusses the quality of academic information systems using the ISO/IEC 9126 model. Then the research uses the ISO/IEC 25010 model in providing recommendations on system improvements in the security aspect for the new student admission system development system [(Sekarini et al., 2020)]. Based on the results of studies from previous relevant studies, the researchers used the ISO/IEC 25010 model as a model in evaluating the quality of SIPMB UNIMUDA Sorong. This is also based on the comparison of the quality model conducted by [(Miguel et al., 2014)]. From several quality measurement models, the system concludes that the ISO/IEC 25010 model is the most complete of the base models because it includes 26 of 28 features. The comparison of the existing quality models can be seen in Table 1 below.

Tabel 1 Comparison of quality models

Characteristic	M c C a l	B o e h m	F U R P S	D r o m e y	I S O - 9 1 2 6	I S O - 2 5 0 1 0
Accuracy					X	X
Adaptability			X			X
Analyzability					X	X
Attractiveness					X	X
Changeability					X	X
Correctness	X					X
Efficiency	X	X		X	X	X
Flexibility	X					
Functionality			X	X	X	X
Human Engineering		X				
Installability					X	X

Characteristic	M c C a l	B o e h m	F U R P S	D r o m e y	I S O - 9 1 2 6	I S O - 2 0 1 0
Integrity	X					X
Interoperability	X					X
Maintainability	X			X	X	X
Maturity					X	X
Modifiability						X
Operability					X	X
Performance			X		X	X
Portability	X	X		X	X	X
Reliability	X	X	X	X	X	X
Resource utilization					X	X
Reusability	X			X		X
Stability					X	X
Suitability					X	X
Supportability			X		X	X
Testability	X	X			X	X
Transferability						X
Understandability		X			X	X
Usability	X		X	X	X	X

The ISO 25010 model was a software quality testing and evaluation model and part of the Software Product Quality Requirements and Evaluation (SQuaRE) [(ISO/IEC, 2012)]. This testing technique is related to the software quality model which is a development of the previous model that was 9126 [(Idri et al., 2018)]. Evaluation of system quality with the ISO/IEC 25010 model can be carried out specifically with eight test characteristics on product quality dimensions, they were *functional suitability*, *performance efficiency*, *compatibility*, *usability*, *reliability*, *security*, *maintainability*, and *portability* [(Miguel et al., 2014)].

Gambar 1. *Product quality model of ISO/IEC 25010 [(Wagner, 2013)]*

The purpose of this study was to measure the quality of SIPMB UNIMUDA Sorong in terms of the quality of information system development and also to measure the quality of the system from the user side of the system based on the ISO/IEC 25010 model. In general, system quality standards in the form of web applications or called *Website Quality Evaluation Method* (QEM) can be assessed from five attributes [(Olsina & Rossi, 2002)]. So the researchers used five characteristics of ISO 25010. The characteristics of the tests used were *functional suitability*, *usability*, *performance efficiency*, *maintainability*, and *reliability*.

METHODS

This study used SIPMB UNIMUDA Sorong as the object of research. Data collection techniques used interviews and observation. Literature study is used to enrich the theory related to the evaluation of the quality of relevant information systems. Questionnaires are used to test the characteristics of *usability* and *functional suitability*, while testing the characteristics of *performance efficiency*, *maintainability*, and *reliability* using *software*.

Testing usability characteristics using the *USE questionnaire* [(Lund, 2001)] with a total of 100 respondents. Respondents consisted of SIPMB UNIMUDA Sorong users at the time of new student registration. USE Questionnaire consisted of 30 questions which consisted of 8 questions related to usefulness, 11 questions related to *Ease Of USE*, 4 questions related to *Ease Of Learning*, and 7 questions related to *Satisfaction*. The analysis of instrument data using a four-point *Likert* scale which aims to measure the attitudes, opinions, and perceptions of respondents to the system used. Each answer has a negative and positive gradation [(Sugiono, 2012)]. The data analysis technique used

descriptive analysis. For measurement by calculating the percentage formula as follows.

$$PERCENTAGE = \frac{Total\ score}{Macimum\ Score} \times 100$$

The Result of *Usability* measure It is conversed can be seen as follow:

Tabel 2 Eligibility Pecentage

Eligibility Percentage %	Qualification
76 % – 100 %	Very eligible
56 % – 75 %	Enough eligible
40 % – 55 %	Less eligble
0 % – 39 %	Not eligible

Testing the characteristics of functional suitability using the black box testing method, black box method focused on defined functional requirements [(Pressman & Maxim., 2015)]. The functional requirements under test are defined in a *set of test cases* [(Bala, A., & Chhillar, 2016)]. *Test cases* identified as success/failure criteria are calculated in the form of *% of test cases passed* [(Jaskiel, P & Rick, 202 C.E.)]. Measurement of instrument results using the Guttman scale where the instrument answers are firm answers such as yes-no, true-false, never-no, positive-negative and others [(Sugiono, 2012)]. In this aspect, using the "yes" option which has a value of 1 and the "no" option means it has a value of 0. The data analysis formula used is as follows:

$$Result = \frac{the\ score\ obtained}{Maximum\ Score} \times 100$$

The results of the eligibility calculation are then converted into a qualitative value on a scale of 5 with a *Likert* scale [(Sugiono, 2012)].

Tabel 3. Eligibility Percentage Functional Suitability

No	Hasil	Keterangan
1	0% - 20%	Very Less
2	21% - 40%	Less
3	41% - 60%	Enough
4	61% - 80%	Good
5	81% - 100%	Very Good

While *Performance efficiency* is used to measure the extent to which the relative performance of the software against the resources used under certain conditions. *Performance efficiency* testing using GTMetrix software with testing standards namely Yslow and PageSpeed [(AlBalushi et al., 2016)].

Maintainability is the ability of software to be modified. These modifications may include correction, improvement or adaptation to environmental changes, requirements, and functional specifications [(Rafa E. Al-Qutash, 2010)]. This maintainability includes error correction and the

possibility of product evolution or changes for the better[(Hass, 2008)]. Maintainability can be tested at the component level [(Hass, 2008)]. The maintainability characteristic was tested by fulfilling the criteria of instrumentation, consistency, and simplicity [(Lund, 2001)].

Reliability aimed to measure *sessions, pages, and hist* from the *source code* of SIPMB. *Reliability* testing used WAPT software version 5.0.0.0 which functions to measure stress testing of a software [(Labrador & Dinawanao, 2016)]. WAPT is used to show the extent to which SIPMB runs well when a certain amount of load is given to the system. The test results are measured by the Telcordia GR 282 standard, which is a minimum score of 95% for the system can be said to have met the *reliability* characteristics.

RESULTS AND DISCUSSION

Testing Result

Quality testing of SIPMB UNIMUDA Sorong was conducted to test and evaluate the quality of the system using the ISO/EAC 25010 model. The test results are as follows.

3.1. The stage of *usability* testing

This *usability* test involved students from the 2019-2021 class who have used SIPMB when registering as new students. The selection of respondents was carried out randomly in each class and each faculty. The results of usability testing can be seen in table 4 below.

Tabel 4 the result of Usability Testing

Ass ess me nt Sca le	Sc or e	Criteria				Total	Total
		usefulness	ease of use	learning	ease of satisfaction		
SS	5	251	327	180	217	975	4875
S	4	263	290	255	230	1038	4152
R	3	324	250	207	303	1084	3252
TS	2	0	0	0	0	0	0
STS	1	0	0	0	0	0	0
Total respondents		100	100	100	100		

Nilai Total	3279	3545	2541	2914	12.279
Maximum Value	4000	4000	4000	4000	16.000
Percentage	$(12.279/16.000) \times 100\% = 77$				

Based on the results of usability testing in table 4, the results obtained are 77%. So if it is converted to table 1 usability aspect testing, then SIPMB UNIMUDA Sorong gets the **Very Eligible category**.

3.2. The stage of *functional suitability* Testing

Functional suitability testing was carried out by 2 system experts using a questionnaire in the form of a check list. The instruments tested met the characteristics of *functional completeness*, *functional correctness*, and *functional appropriateness*. The test results can be seen in the following table.

Tabel 5 *functional suitability* Testing

Questions	Answer	
	Yes	NO
The main page access function is working well.	2	
The sign-in function on the Register page has worked well.	2	
The user/new student candidate data input function has been running well.	2	
The user/new student candidate registration function has been running well.	1	1
Login page function has been running well.	2	
Login for sign in to main page has been running well.	2	
Data input for new students candidate has been working well.	2	
Logout system to exit from the main page has been working well.	2	
Save button function has been working well.	2	
Click function for fee page has been working well.	2	
Fee page has been running well.	2	
Study program page has been running well.	2	
Click function for page facilities has been running well.	2	
The function of Facilities page has been working well.	2	
Click function for scholarship page has been working well.	2	

The function of scholarship page has been running well.	2	
The function of click on achievements page has been running well.	2	
The function of achievements has been running well.	2	
The function of click on contact page has been running well.	2	
The function of contact page has been running well.	2	
The function of click on archives page has been running well.	2	
The function of archives page has been running well.	2	
Total	43	1

Tabel 5. It is showed that from 22 questions there were 43 answered for “Yes” and 1 for “No”. The result from measurement of suitability was seen below:

$$\text{Result} = \frac{\text{Score that obtained}}{\text{Maximum Score}} \times 100$$

$$\text{Result} = \frac{43}{44} \times 100$$

$$\text{Result} = 98$$

According to the result above, it is obtained the result of eligibility percentage 98% and if converted with table 3, it is categorized **very good**.

3.3. The Stage of *Performance Efficiency* Testing

Performance Efficiency testing is carried out using the online GTMetrix tool, the assessment standard used is the range of values from A to F. The results of the Performance Efficiency aspect test can be seen in table 6 below.

Tabel 6 The result of *Performance Efficiency* Testing

Halaman Web	PageSpeed Grade	Yslow Grade	Page Load	Page Size
Home/main page	C (66%)	B (86%)	4,2s	2,64 MB
List page	B (80%)	A (93%)	3,4s	776 KB
Login Page	C (77%)	B (81%)	2,5s	437 KB
Sign up info page	C (71%)	A (93%)	2,8s	702 KB
Fee Page	C (72%)	A (93%)	3,0s	716 KB

Studi program page	C (70%)	A (93%)	2,8s	806 KB
Facilities page	C (68%)	A (93%)	3,3s	884 KB
Scholarship page	C (66%)	A (93%)	3,1s	963 KB
Achievement page	C (70%)	A (94%)	2,8s	454 KB
Contact page	C (71%)	A (93%)	2,8s	641 KB
Archives page	B (82%)	A (93%)	3,0s	502 KB

Hasil pengujian menunjukkan bahwa rata-rata skor kualitas SIPM UNIMUDA Sorong dari aspek *performance efficiency* dengan pengukuran *PageSpeed* yaitu berada pada *Grade C* (72%) yang berarti sedang. Sedangkan pengukuran *Yslow* berada pada *Grade A* (93%), yang berarti **Sangat baik**. *Page load* 3,1s per-halaman dan *page size* 866 KB per-halaman. Hasil kualitas dari pengukuran aspek *performance efficiency* tergantung dari kualitas layanan server. Dari hasil pengujian diperoleh bahwa SIPMB telah memenuhi *Performance Efficiency*.

3.4. The stage of *maintainability Testing*

The maintainability test is carried out in accordance with the test instrument mentioned by Land which includes 3 aspects, they were instrumentation, consistency and simplicity. The results of the maintainability test are as follows.

1. Login

If there was an error when *input username* or *password*, the the system will be automatically sent a warning message. The example is showed in picture 2 below.

Picture 2. Login Page

2. Change Profil Picture

If there is an error on picture format, then there will be a warning for users that the format that

used is error. The appearance can be seen in picture 3 below.

Picture 3. Change Photo Profil

3. Successful Data input notification

If the users success to complete input data, then there will be a notification which inform the users that the data success. The appearance can be seen on picture 4 below.

Picture 4. Input Data Successful Input Data

The *maintainability* aspect test is carried out by taking into account the three test criteria. The test results showed that the system has met the three criteria, such as *instrumentation*, *consistency*, and *simplicity*, so that this system can be said to have met the *maintainability* aspect. The analysis for *maintainability* testing can be seen in table 7 below.

Table 7. Analysis on the *Maintainability* assessment result

Aspect	The aspect that assessed	The obtained result
<i>instrumentation</i>	There is a warning message if there is an error included the error identification	When the error that the users made is found, then the system will be showed a warning message like when the users input wrong username and password.
<i>Consistency</i>	Use of one model interface design on	The system design view has one common interface design. This view

	whole design system	can be seen from the implementation of the system where every page of the system is always consistent with one design such as the layout of the menu which is always consistent and easy to understand by users.
<i>Simpl icity</i>	Ease in management, repair, and development system	Easy to manage, repair and develop. The system can be developed more easily because it uses the CodeIgniter PHP framework based on Model View Controller (MVC) so that to add functions, developers only need to create a controller without having to change other components.

3.5. The stage of *reliability Testing*

The reliability testing characteristics using the WAPT 5.0.0.0 Pro application for *stress* testing by simulating a system that is accessed by 20 users at once for 10 minutes. The test results are shown in the following table.

Table 8 the result of *reliability Testing*

Matrix	Success	Failed	Total	Percentage
Session	174	0	174	100%
Pages	1104	0	1104	100%
Hits	1104	0	1104	100%

According to the results of the reliability test in table 8, all components of the reliability test were 100%. This showed that SIPMB has met the measurement standards in the aspect of reliability compared to the Telcordia minimum standard of 95%.

From the test results of the software aptitude test based on the *Software Product Quality ISO/IEC 25010* standard, it can be said that the developed SIPMB UNIMUDA Sorong has met the quality system standards in terms of *Functional suitability, Usability, Performance efficiency, Maintainability, and reliability*.

CONCLUSION

Based on the results of the testing and discussion above, it can be concluded that the New Student Admission System of the Sorong Muhammadiyah Education University is eligible to use because the system has met the quality standards of the system. In the usability aspect, it is in the Very Eligible category. While testing on the functional suitability aspect, the results obtained in the Very Good category with a percentage value of 98%. In testing the performance efficiency aspect, it has met the requirements with the PageSpeed measurement results of C (72%), Yslow obtained a Grade A value (93%) in the Very Good category. Aspects of maintainability testing with 20 users get results that are very easy to maintain. In the aspect of reliability testing, it has met the standard with a percentage of 100%. Meanwhile, the SIPMB reliability aspect test met the measurement standard with a percentage of 100%.

The results of this study are expected to be input for improving the Information System for New Student Admissions at the Muhammadiyah Sorong Education University, such as (1) to held the socialization to the candidate of new students to use the system when registering at UNIMUDA Sorong; (2) to increase the server capacity on the system, increase access speed and increase the level of system security. The results of this study are also expected to be a reference for developers of web-based information systems in evaluating systems using the ISO/IEC 25010 model.

REFERENCES

- Al-Badareen, A. B., Selamat, M. H., A. Jabar, M., Din, J., & Turaev, S. (2011). Software quality models: A comparative study. *Communications in Computer and Information Science*, 179 CCIS(PART 1), 46–55. https://doi.org/10.1007/978-3-642-22170-5_4
- Al Nawaiseh, A. J., Helmy, Y., & Khalil, E. (2020). A new software quality model for academic information systems “case study e-learning system.” *International Journal of Scientific and Technology Research*, 9(1), 3822–3833.
- AlBalushi, T., Ali, S., Ashrafi, R., & AlBalushi, S. (2016). Accessibility and Performance Evaluation of E-Services in Oman Using Web Diagnostic Tools. *International Journal of U- and e- Service, Science and Technology*, 9(7), 9–24. <https://doi.org/10.14257/ijunesst.2016.9.7.02>
- Bala, A., & Chhillar, R. (2016). Automatic Test Data Generation using Genetic Algorithm using Sequence Diagram. *International Journal of Computer Systems*, 03(4), 131–138.
- Hakam, F. (2017). *Metode Evaluasi Sistem Informasi*.
- Haslinda, H., Fahmy, F., Sukinah, S., Roslina, R., Fariha, F., Suhana, S., Azliza, A., & Shiratuddin, N. (2015). Evaluation of e-Book applications using ISO 25010. *2nd International Symposium on Technology*

- Management and Emerging Technologies, ISTMET 2015 - Proceeding*, 114–118. <https://doi.org/10.1109/ISTMET.2015.7359012>
- Hass, A. M. J. (2008). *Guide to Advanced Software Testing* (Vol. 148).
- Idri, A., Sardi, L., & Fernández-Alemán, J. L. (2018). Quality evaluation of gamified blood donation apps using ISO/IEC 25010 standard. *HEALTHINF 2018 - 11th International Conference on Health Informatics, Proceedings; Part of 11th International Joint Conference on Biomedical Engineering Systems and Technologies, BIOSTEC 2018*, 5(Biostec), 607–614. <https://doi.org/10.5220/0006724806070614>
- ISO/IEC. (2012). *ISO/IEC 25021:2012(en) Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality measure elements*. <https://www.iso.org/obp/ui/#iso:std:iso-iec:25010:ed-1:v1:en>
- Jaskiel, P. S., & Rick, D. C. (202 C.E.). *Systematic Software Testing* (Artech House Computer Library). Artech House.
- Komunikasi, K., & Informatika, D. A. N. (2020). *No Title*. 1–11.
- Labrador, J., & Dinawanao, D. (2016). *WebSurge : A Profile-based Stress Testing Tool with Distributed User Agents for Web Applications*. 1, 28–37.
- Lestari, giftera dwi. (2020). *Evaluasi Kualitas Website Seleksi Masuk Mahasiswa Dengan Metode McCall*. 19(1), 83–87. <https://doi.org/10.36054/jict-ikmi.v19i1.127>
- Lund, M. (2001). *Measuring Usability with the USE Questionnaire*.
- Miguel, J. P., Mauricio, D., & Rodríguez, G. (2014). *A Review of Software Quality Models for the Evaluation of Software Products*. 5(6), 31–53.
- Mirza, A. H., Putra, A., Komputer, F. I., & Darma, U. B. (2019). *EVALUASI SISTEM INFORMASI USAHA KECIL DAN MENENGAH (UKM) EVALUATION OF SMALL AND MEDIUM BUSINESS (SMEs) INFORMATION*. 6(4), 397–406. <https://doi.org/10.25126/jtiik.201961048>
- Morrell, N. E. (1987). Quality function deployment. *SAE Technical Papers*, July. <https://doi.org/10.4271/870272>
- Nashihuddin, W., & Aulianto, D. R. (2016). Evaluasi Kepuasan Pelanggan Pada Jasa Perpustakaan Dan Issn Pdi-Lipi. *Baca: Jurnal Dokumentasi Dan Informasi*, 36(1), 77. <https://doi.org/10.14203/j.baca.v36i1.204>
- Olsina, L., & Rossi, G. (2002). *Application Quality with WebQEM*. 20–29.
- Pressman, R. S., & Maxim., B. R. (2015). *Software Engineering: A Practitioner's Approach*. 8th Ed. McGraw-Hill Education.
- Purnomo, R. D., Herlambang, A. D., & Wardani, N. H. (2018). *Evaluasi Kualitas Layanan dan Tingkat Penerimaan Mahasiswa pada Sistem Informasi Akademik Politeknik Negeri Malang*. 2(11), 4539–4547.
- Puspaningrum, A. S., Rochimah, S., & Akbar, R. J. (2017). Functional Suitability Measurement using Goal-Oriented Approach based on ISO/IEC 25010 for Academics Information System. *Journal of Information Systems Engineering and Business Intelligence*, 3(2), 68. <https://doi.org/10.20473/jisebi.3.2.68-74>
- Rafa E. Al-Qutaish, P. (2010). Quality Models in Software Engineering Literature: An Analytical and Comparative Study. *Journal of American Science*, 6(3), 166–175. http://www.jofamericanscience.org/journals/am-sci/am0603/22_2208_Qutaish_am0603_166_175.pdf
- Sekarini, D., Fadilla Sukma Alfiani, & Rochimah, S. (2020). 2020 12th International Conference on Information Technology and Electrical Engineering (ICITEE), Yogyakarta, Indonesia. *International Conference on Information Technology and Electrical Engineering (ICITEE), Yogyakarta, Indonesia*, 120–124.
- Sugiono. (2012). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*.
- Sulistiani, I., & Syarif, S. (2018). Quality Models Engineering for Evaluation of Academic Information System Quality Instrument (AISQI). *2018 International Conference on Applied Science and Technology (ICAST)*, 30–34. <https://doi.org/10.1109/iCAST1.2018.8751525>
- Wagner, S. (2013). *Software Product Quality Control*.