

Level of Student Satisfaction with Laboratory Facilities Using the Importance Performance Analysis (IPA) Method

Rahmadini Darwas, Information System, STMIK Indonesia Padang, Indonesia.

Syukhri, Faculty of Engineering, Universitas Negeri Padang, Indonesia.

Astri Wulandari, Faculty of Applied Science, Telkom University, Indonesia.

Asyraf Afthanorhan, Faculty of Business and Management, University of Sultan Zainal Abidin (UniSZA).

Abstract--- STMIK Indonesia Padang is a high school in the field of computers. To produce quality human resources and be able to compete in their fields, one of the efforts is to provide facilities that support the teaching and learning process, namely the computer laboratory. STMIK Indonesia Padang laboratory facilities are adequate, however there are still complaints felt by students. This study aims to take policy in improving computer laboratory facilities. The study population was students of STMIK Indonesia Padang in 2015 and 2016 from 735 students. Based on this data, the average satisfaction score is lower than the average interest score. This means that students are less satisfied with laboratory facility services. The method used in this research is importance performance analysis (IPA). The results of data processing in the form of attributes that need to be improved quality of service with top priority are internet access in the laboratory, visual facilities as supporting learning processes in the laboratory, and the quality of the hardware used so that this research is very helpful in making future policies

Keywords--- Advertisement, Purchasing Decision, Customer Satisfaction.

I. Introduction

The success of a college is determined by the quality of service and strategy in providing satisfaction for customers (Sugandi & Kurniawan, 2018). Student satisfaction in the learning process can be seen from the quality of education services provided by Higher Education institutions (Palese & Usai, 2018). Quality assessment is an important cross-disciplinary field in information systems, marketing, and operations management (Chan, Yan, Hang, & Jason, 2019). One form of improving the quality of services provided by one of the Higher Education institutions, STMIK Indonesia Padang, is an information system laboratory service. STMIK Indonesia Padang is a College of Information Management with an information system study program. To improve the quality of laboratory services, it requires a knowledge of the attributes that affect student satisfaction with the services they receive. Students will feel satisfied if the service received is as expected (Lodesso, Niekerk, Jansen, & Müller, 2018). The absence of knowledge about service attributes that are considered important but has a performance that is less a problem for the leaders of STMIK Indonesia Padang at this time, so that problems with top priorities are difficult to resolve.

Several studies related to student satisfaction with services such as student satisfaction at Ethiopian Public Higher Educations Institutions (PHEIs) with low service quality. the low service is on the dimensions of reliability and physical evidence. Students consider these two dimensions important, but perform poorly in terms of service quality. In order to increase the satisfaction of the quality of student services, university management efforts are needed that focus on aspects of reliability and physical evidence (Nikolic et al., 2015)

Laboratories have an important role in teaching technical skills. Student satisfaction surveys are conducted in all relevant laboratories every year and data is used for continuous improvement. The improvements made consisted of overall satisfaction, laboratory records, learning experience, computer facilities, technical equipment, and laboratory conditions. Student satisfaction with the laboratory increased 32% between 2007 and 2013. The results showed that laboratory records (activity and clarity) and the quality of the equipment used were the most influential factors on student satisfaction (Afthanorhan, Awang, Rashid, Foziah, & Ghazali, 2019). Academic institutions must continue to increase customer satisfaction in the university library. This study uses LibQual to analyze the gap between customer perceptions and expectations, which are related to services at Sultan Zainal Abidin University Library (UniSZA). There are six dimensions in service quality; namely public services, material searches, library collections, staff, environment and environment. The results show that service quality has a significant impact on

customer satisfaction. Among the dimensions of service quality, the library environment and public services are seen as important and have a strong performance index (Wang, 2018).

Therefore, STMIK Indonesia Padang needs to improve the quality of laboratory facilities. For this reason, a method is needed to analyze the performance or service felt by students towards the desired level of satisfaction. The level of conformity is the comparison between performance scores and interest scores to determine the priority scale used in problem solving(Wang, 2018) . The relevant method in this case is importance performance analysis (IPA). The use of the IPA method is considered to be a simple and effective decision-making method(Mallya & Patwardhan, 2018).

II. Method

The data collection technique used in this study is a non-test technique in the form of a questionnaire consisting of structured statements to obtain information that has a high level of validity and is relevant to this study. The population in this study were active students at the Indonesian College of Information and Computer Management (STMIK) Padang in the 2015 and 2016. Information system study program. Because the population used had members that were not homogeneous and proportionally structured, the sampling technique used a technique proportionate stratified sampling(Warsi, 2019). The population of 2015 and 2016 active students is presented in Table 1(Darwas & Amalina, 2018)

Table 1: Respondet Population

| No | Force | Number of Active Students |
|------------------|-------|---------------------------|
| 1 | 2015 | 268 |
| 2 | 2016 | 467 |
| Total Population | | 735 |

Sourced: Primary Data processed, 2019

To calculate the number of samples in the study used the Slovin formula, sample size (n) is obtained from a comparison of population size (N) with estimated error rates (e). in this case the estimated error rate is 10%. Based on formula (1), the number of samples used is 88 respondents.

The questionnaire used uses a likert scale to measure important and performance. Each item statement has two Likert scales based on importance and performance. The scale used has 1-5 intervals for important 1 (not very important), 2 (not important), 3 (quite important), 4 (important) and 5 (very important). While for performance 1 (very unsatisfactory), 2 (unsatisfactory), 3 (quite satisfactory), 4 (satisfying), and 5 (very satisfying). 88 students involved filled out the full research questionnaire.

The service quality model consists of 5 dimensions(Rezaei, Kothadiya, Tavasszy, & Kroesen, 2018), namely: tangibility (appearance of physical facilities, appearance and communication of the personnel in the service process and type of equipment provided in the service process), reliability (the ability of an organization to do a task or service as promised is called as reliability), responsiveness (the willingness of service provider to help the customers. Making an effort sincerely to provide prompt service to customers), assurance (ability of service provider to give a sense of trust and security to the customers), empathy (ability of service providers to communicate with customers and provide individualized attention to them).

Dimensions of quality product is related to the level of achievement of productivity in the best way and based on the criteria set according to customer needs (Al-Mhasnah, Salleh, Afthanorhan, & Ghazali, 2018). Service quality and customer satisfaction have a significant effect on increasing customer loyalty so as to provide quality service, can be implemented through the five dimensions of service quality (Afthanorhan, Awang, Salleh, Ghazali, & Rashid, 2018).

IPA has become a standard that provides insight to management to determine the strengths and weaknesses of companies by analyzing customer attitudes towards service attributes(Martín, Mendoza, & Román, 2019). Many prior researches using the IPA method to extend their findings by comparing the performance and importance of each variable underlies in the research framework. Using the techniques, the decision maker able to identify the potential factor for improvement in the future (Sabri & Wan Mohamad Asyraf, 2014).The IPA method produces four quadrants that consider the interests and performance together to identify better function areas that require improvement(Martín et al., 2019). IPA can be described in the four quadrants seen in Figure 1.

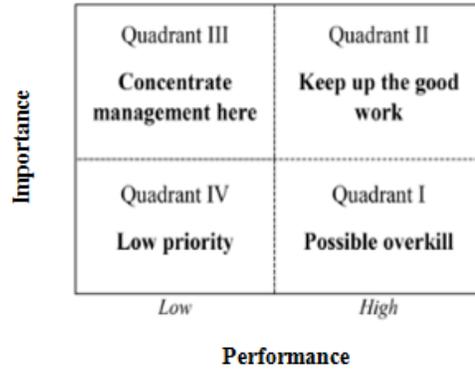


Fig. 1: IPA Quadran

Source: Processed Data by Reseacher, 2019

Figure 1 shows the quadrant of importance performance analysis where quadrant I (possible overkill); performance scores meet or exceed service quality standards, but a low level of importance is set for this particular service, quadrant II (keep up the good work); important and performance ratings meet or exceed service quality standards, quadrant III (concentrate management here); important and performance ratings do not meet service quality standards. Attributes that fall into this quadrant represent the main areas that need to be increased with the highest priority, quadrant IV (low priority); performance scores do not meet service quality standards, but respondents do not place a high level of importance on services.

III. Results

Test the validity and reliability of the designed questionnaire distributed to 88 respondents. Validity test is calculated by calculating moment product correlation (r) on each criteria on statement. The results of the test of the validity of the level of importance and performance are illustrated in Table 2 and Table 3.

Table 2: Results of Validity Test of Importance

| No | Attribute | R Count | R Table | Decision |
|----|-----------|---------|---------|----------|
| 1 | T1 | .643** | 0.138 | Valid |
| 2 | T2 | .627** | 0.138 | Valid |
| 3 | T3 | .635** | 0.138 | Valid |
| 4 | T4 | .572** | 0.138 | Valid |
| 5 | T5 | .699** | 0.138 | Valid |
| 6 | T6 | .506** | 0.138 | Valid |
| 7 | R1 | .731** | 0.138 | Valid |
| 8 | R2 | .651** | 0.138 | Valid |
| 9 | R3 | .739** | 0.138 | Valid |
| 10 | R4 | .566** | 0.138 | Valid |
| 11 | R5 | .739** | 0.138 | Valid |
| 12 | R6 | .661** | 0.138 | Valid |
| 13 | RP1 | .730** | 0.138 | Valid |
| 14 | RP2 | .699** | 0.138 | Valid |
| 15 | RP3 | .751** | 0.138 | Valid |
| 16 | A1 | .751** | 0.138 | Valid |
| 17 | A2 | .695** | 0.138 | Valid |
| 18 | A3 | .659** | 0.138 | Valid |
| 19 | E1 | .745** | 0.138 | Valid |
| 20 | E2 | .665** | 0.138 | Valid |
| 21 | E3 | .781** | 0.138 | Valid |

Sourced: Primary Data processed, 2019

Based on Table 2. It can be seen that each item statement or attribute for the level of importance is valid this is indicated by rcount> rtable (0.138).

Table 3: Performance Validity Test

| No | Attribute | R Count | R Table | Decision |
|----|-----------|---------|---------|----------|
| 1 | T1 | .707** | 0.138 | Valid |
| 2 | T2 | .695** | 0.138 | Valid |
| 3 | T3 | .654** | 0.138 | Valid |
| 4 | T4 | .729** | 0.138 | Valid |
| 5 | T5 | .570** | 0.138 | Valid |
| 6 | T6 | .727** | 0.138 | Valid |
| 7 | R1 | .663** | 0.138 | Valid |
| 8 | R2 | .664** | 0.138 | Valid |
| 9 | R3 | .646** | 0.138 | Valid |
| 10 | R4 | .731** | 0.138 | Valid |
| 11 | R5 | .689** | 0.138 | Valid |
| 12 | R6 | .728** | 0.138 | Valid |
| 13 | RP1 | .635** | 0.138 | Valid |
| 14 | RP2 | .731** | 0.138 | Valid |
| 15 | RP3 | .594** | 0.138 | Valid |
| 16 | A1 | .729** | 0.138 | Valid |
| 17 | A2 | .660** | 0.138 | Valid |
| 18 | A3 | .690** | 0.138 | Valid |
| 19 | E1 | .608** | 0.138 | Valid |
| 20 | E2 | .726** | 0.138 | Valid |
| 21 | E3 | .633** | 0.138 | Valid |

Sourced: Primary Data processed, 2019

Based on Table 3. It can be seen that each item statement or attribute for performance is valid this is indicated by rcount> rtable (0.138).

Reliability testing is done using SPSS Statistics 17.0. The reliability test results shown are as follows: Cronbach’s Alpha = 0,971, N of Items = 42

Based on Cronbach's Alpha value of 0.6, it can be concluded that the research instruments used are reliable(Schonhaut, Martinez-nadal, Armijo, & Demestre, 2019).

The dimensions and attributes used in this study can be seen in Table 4

Table 4: Attribute Variables

| No | Aspect | Code | Statement |
|----|--------------------|------|---|
| 1 | <i>Tangibles</i> | T1 | The laboratory room is clean and tidy |
| | | T2 | The laboratory room is cool and comfortable |
| | | T3 | The internet in the laboratory can be accessed properly |
| | | T4 | Visual facilities (LCD and screen) as a process of supporting learning in the laboratory can be used properly |
| | | T5 | The hardware used has good quality |
| | | T6 | Software used according to your needs |
| 2 | <i>Reliability</i> | R1 | The use of laboratories is relevant to scientific needs for students (labor multimedia, labor networks, etc.) |
| | | R2 | Clarity of laboratory rules |
| | | R3 | The presence of laboratory cleaners |
| | | R4 | The level of security for laboratory facilities and infrastructure |
| | | R5 | Implementation of study time in the laboratory in accordance with the provisions |
| | | R6 | Availability of modules / handouts / lecture materials |
| 3 | <i>Responsive</i> | RP1 | Hospitality assistant laboratory |
| | | RP2 | Responsibilities of laboratory assistants |
| | | RP3 | The ease of students in obtaining service |
| 4 | <i>Asurance</i> | A1 | Availability of professional teaching staff in teaching |
| | | A2 | The existence of laboratory guards |
| | | A3 | Computer maintenance (software, viruses) |
| 5 | <i>Emphyaty</i> | E1 | The attitude and behavior of laboratory staff is very good |
| | | E2 | Greetings and words from laboratory staff in communicating |
| | | E3 | The ease of laboratory assistants to contact |

Sourced: Primary Data processed, 2019

The IPA method is used to rank the interests and performance of various attributes of a collection of services and identify actions that need improvement. Table 5 illustrates the importance of performance and performance analysis.

Table 5: Analysis of Suitability Level and Performance

| Code | Criteria | Importance | | Performance | | Suitability |
|------|---|------------|---------|-------------|---------|-------------|
| | | Total | Average | Total | average | |
| T1 | The laboratory room is clean and tidy | 466 | 4,66 | 357 | 3,57 | 76,61 |
| T2 | The laboratory room is cool and comfortable | 475 | 4,75 | 370 | 3,7 | 77,89 |
| T3 | The internet in the laboratory can be accessed properly | 474 | 4,74 | 253 | 2,53 | 53,38 |
| T4 | Visual facilities (LCD and screen) as a process of supporting learning in the laboratory can be used properly | 462 | 4,62 | 332 | 3,32 | 71,86 |
| T5 | The hardware used has good quality | 464 | 4,64 | 331 | 3,31 | 71,34 |
| T6 | Software used according to your needs | 461 | 4,61 | 357 | 3,57 | 77,44 |
| R1 | The use of laboratories is relevant to scientific needs for students (labor multimedia, labor networks, etc.) | 472 | 4,72 | 351 | 3,51 | 74,36 |
| R2 | Clarity of laboratory rules | 471 | 4,71 | 378 | 3,78 | 80,25 |
| R3 | The presence of laboratory cleaners | 451 | 4,51 | 350 | 3,5 | 77,61 |
| R4 | The level of security for laboratory facilities and infrastructure | 466 | 4,66 | 359 | 3,59 | 77,04 |
| R5 | Implementation of study time in the laboratory in accordance with the provisions | 464 | 4,64 | 340 | 3,4 | 73,28 |
| R6 | Availability of modules / handouts / lecture materials | 450 | 4,5 | 287 | 2,87 | 63,78 |
| RP1 | Hospitality assistant laboratory | 428 | 4,28 | 307 | 3,07 | 71,73 |
| RP2 | Responsibilities of laboratory assistants | 443 | 4,43 | 340 | 3,4 | 76,75 |
| RP3 | The ease of students in obtaining service | 449 | 4,49 | 309 | 3,09 | 68,82 |
| A1 | Availability of professional teaching staff in teaching | 454 | 4,54 | 341 | 3,41 | 75,11 |
| A2 | The existence of laboratory guards | 440 | 4,4 | 323 | 3,23 | 73,41 |
| A3 | Computer maintenance (software, viruses) | 451 | 4,51 | 305 | 3,05 | 67,63 |
| E1 | The attitude and behavior of laboratory staff is very good | 437 | 4,37 | 329 | 3,29 | 75,29 |
| E2 | Greetings and words from laboratory staff in communicating | 436 | 4,36 | 310 | 3,1 | 71,1 |
| E3 | The ease of laboratory assistants to contact | 434 | 4,34 | 315 | 3,15 | 72,58 |

Sourced: Primary Data processed, 2019

Based on Table 5, an IPA analysis was carried out which resulted in four quadrants where the quadrant described the attributes that needed improvement. The IPA analysis is presented in Figure 2

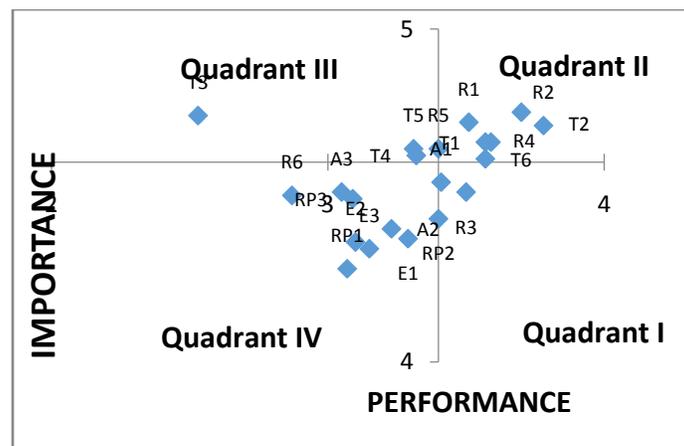


Fig. 2: IPA Analysis

Source: Processed Data by Reseacher, 2019

The results of the IPA analysis in Figure 2 are as follows:

Quadrant I (possible overkill); Performance scores meet or exceed service quality standards, but a low level of importance is set for this particular service. This shows the attributes that are too emphasized by the organization. Therefore, STMIK Indonesia Padang must reflect this attribute rather than continuing to focus on this quadrant. STMIK Indonesia Padang must allocate more resources to handle attributes in quadrant B. The attribute is the presence of laboratory cleaners.

Quadrant II (keep up the good work); important and performance ratings meet or exceed service quality standards. All attributes that enter this quadrant are the strength of STMIK Indonesia Padang. The attribute is a clean and neat laboratory room, cool and comfortable laboratory space, software used in accordance with needs, laboratory use is relevant to scientific needs, clarity of laboratory rules, level of security of laboratory facilities and infrastructure, implementation of study time in the laboratory according to criteria

Quadrant III (management concentrate here); important and performance ratings do not meet service quality standards. Attributes that enter into this quadrant represent the main areas that need to be improved with top priority. These attributes are internet access in the laboratory, visual facilities (LCD and screen) as a process of supporting learning in the laboratory, the quality of the hardware used.

Quadrant IV (low priority); performance scores do not meet service quality standards, but respondents do not place a high level of importance on services. Thus, every attribute in this quadrant is not important and does not pose a threat to the organization. These attributes are module availability / handout / lecture materials, friendliness of laboratory assistants, laboratory assistant responsibilities, convenience of students in obtaining services, presence of laboratory guards, maintenance of computers (software, viruses), attitudes and behavior of laboratory staff very well, greeting and speaking said laboratory officials in communication, the ease of laboratory assistants to contact.

IV. Discussion

According to Wahyuni, et al. (2017) analyzed that the need for laboratory facilities and infrastructure as a supporting learning process program in the university. The results showed as the need for laboratory facilities and infrastructure as a support learning process that is important in efforts to improve competence students. Laboratory requires a good planning in service quality, so that it can make an ideal laboratory in order to meet the needs of current students.

Meanwhile Syukhri (2018) analyzed that student satisfaction with network laboratory services using the Importance-Performance Analysis Approach. The analysis shows that the quality of service received by students has not as expected as is the condition of a comfortable laboratory space, good internet access, good quality hardware, friendliness of laboratory technicians, ease of students in obtaining services, the presence of technicians laboratories, convenience for laboratory technicians to contact. The strategies that can be applied to students satisfaction with facilities are in line with the IPA diagram below.

Quadrant I Top Priority (low importance and high performance). To improve the performance, STMIK Indonesia Padang must make continuous improvements so that the level of entrepreneurial marketing in this quadrant will increase.

Quadrant II Maintain Performance (high importance and high performance). The strategy set in this quadrant is to maintain it continuously so that the performance is noted proved because the entrepreneurial marketing included in this quadrant excels at STMIK Indonesia Padang.

Quadrant III Low Priority (low importance and low performance). The strategy in this quadrant can reconsider its increase. However, entrepreneurial marketing is not eliminated, so this quadrant should be managed thoroughly because the decline in of STMIK Indonesia Padang usually starts from this quadrant.

Quadrant Exaggerated IV (high importance and low performance). The strategy that must be applied is evaluating all excessive activities in order to find which parts which must be maintained and which parts must be reduced to save the costs in STMIK Indonesia Padang.

V. Conclusions and Suggestions

Based on the discussions above, STMIK Indonesia Padang should to improve and develop the performance. Based on the IPA method the attributes that need to be improved with the highest priority are internet access in the laboratory, visual facilities as a process of supporting learning in the laboratory, the quality of the hardware used.

With the knowledge of the attributes that need to be improved the quality of service with the highest priority, it can help leaders in taking policy in the future. Meanwhile for further study, the next researcher can add more other variables to find out an effective way to as one of ways for quality of service in a company. Furthermore, it is also recommended to expand the object of study.

References

- [1] Afthanorhan, A., Awang, Z., Rashid, N., Foziah, H., & Ghazali, P. L. (2019). Assessing the effects of service quality on customer satisfaction. *Management Science Letters*, 9, 13–24.
- [2] Afthanorhan, A., Awang, Z., Salleh, F., Ghazali, P. L., & Rashid, N. (2018). The effect of product quality, medical price and staff skills on patient loyalty via cultural impact in medical tourism. *Management Science Letters*, 8(12), 1421–1428.
- [3] Al-Mhasnah, A. M., Salleh, F., Afthanorhan, A., & Ghazali, P. L. (2018). The relationship between services quality and customer satisfaction among Jordanian healthcare sector. *Management Science Letters*, 8(12), 1413–1420.
- [4] Chan, Z. C. Y., Yan, C. H., Hang, C., & Jason, C. (2019). Academic advising in undergraduate education: A systematic review. *Nurse Education Today*, #pagerange#.
- [5] Darwas, R., & Amalina. (2018). Sistem Pendukung Keputusan Analisis Kepuasan Mahasiswa Terhadap Penggunaan Sarana Laboratorium Sistem Informasi. *Jurnal Sains Dan Informatika*, 2, 150–162.
- [6] Lodesso, S. L., Niekerk, E. J. Van, Jansen, C. A., & Müller, H. (2018). Student Satisfaction Regarding Service Quality at Ethiopian Public Higher Education Institutions : A Case Study. *Journal of Student Affairs in Africa*, 6(2), 51–64.
- [7] Mallya, J., & Patwardhan, V. (2018). Hospitality Students ' Perception of College Library Service Quality : Importance- Performance Analysis. *Journal of Library & Information Technology*, 38(2), 125–131.
- [8] Martín, J. C., Mendoza, C., & Román, C. (2019). REVISING IMPORTANCE – PERFORMANCE ANALYSIS : A NEW SYNTHETIC SERVICE QUALITY INDICATOR APPLIED TO THE TOURIST APARTMENT INDUSTRY. *Tourism Analysis*, 23, 337–350.
- [9] Nikolic, S., Ritz, C., Member, S., Vial, P. J., Member, S., Stirling, D., & Member, S. (2015). Decoding Student Satisfaction How to Manage and.pdf. *IEEE Transactions on Education*, 58(3), 151–158.
- [10] Palese, B., & Usai, A. (2018). The relative importance of service quality dimensions in E-commerce experiences. *International Journal of Information Management*, 40(August 2017), 132–140.
- [11] Rezaei, J., Kothadiya, O., Tavasszy, L., & Kroesen, M. (2018). Quality assessment of airline baggage handling systems using SERVQUAL and BWM. *Tourism Management*, 66, 85–93.
- [12] Sabri, A., & Wan Mohamad Asyraf, W. A. (2014). The importance-performance matrix analysis in partial least square structural equation modeling (PLS-SEM). *International Journal of Mathematical Research*, 3(1), 1–14.
- [13] Schonhaut, L., Martinez-nadal, S., Armijo, I., & Demestre, X. (2019). Early Human Development Reliability and agreement of ages and stages questionnaires ® : Results in late preterm and term-born infants at 24 and 48 months. *Early Human Development*, 128(November 2018), 55–61.
- [14] Sugandi, L., & Kurniawan, Y. (2018). The Influence of Information Technology on the Information and Service Quality for the Teaching and Learning. *International Journal of Emerging Technologies in Learning*, 13(12), 230–237.
- [15] Wang, D. (2018). Tourists satisfaction analysis of Sanya Dadonghai Tourist Attraction- Based on IPA Method. *International Conference on Economic, Business, Management and Corporate Social Responsibility*, 67(Ebmcsr), 228–233.
- [16] Warsi, D. A. S. (2019). Pengaruh Rotasi Kerja Terhadap Kepuasan Kerja Dalam Mempengaruhi Kinerja Tenaga Kependidikan. *Jurnal Ilmiah Akuntansi Dan Keuangan*, 08(01), 17–30.