Fuzzy SERVQUAL to Measure the Service Quality of Tutoring Institutions: A Systematic Literature Review Using PRISMA

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Abstract. It is essential to gauge service quality in order to grow the business as the service sector in the field of education, one of which is a tutoring institution, develops. This study aims to conduct a comprehensive investigation of the instruments used to rate the level of service provided by educational institutions utilizing the PRISMA and SLR (Systematic Literature Review) methods. It can be used to improve strategy development, measure customer satisfaction, and develop service standards in the education industry. The nine databases chosen for content analysis were ScienceDirect, Springer Link, EmeraldInsight, Researchgate, IEEE, academia, Sagepub, IEOMSociety, and Taylor & Francis. This review includes only journal publications and English studies. This study covers the years 2018 to 2022. The 21 papers selected relate to the measurement of service quality in educational institutions. The findings from this review indicate that SERVQUAL, along with instruments such as FuzzyAHP, Fuzzy DEA, IPA, and Topdim's Fuzzy Era, are the most frequently used instruments. This study will assist researchers in collecting accurate data regarding various instruments used to evaluate the level of service provided by educational institutions. It will also assist the reader in tutoring about different instruments used in different regions of the world.

1 Introduction

With the construction of several Tutoring Institutions, Indonesia's service industry in the education sector has been growing for a while. This educational institution has the power to raise the standard of instruction in Indonesia. Quality improvement is a business strategy that emphasizes fulfilling consumer desires [1]. Service is an effort to satisfy consumers which is an obligation that must be improved [2] and performance has a direct effect on consumer satisfaction. Therefore, a business unit is expected to improve its performance by knowing consumers' satisfaction levels [3].

These students always expect to get maximum service in things of Tutoring output. The problem, however, is that Tutoring Institution often has difficulties in measuring the quality of the services provided. Especially during the pandemic period, from 2019 to 2021, there was a decrease in the number of students and changes in Tutoring methods in it, there happen several times changes in Tutoring methods from face-to-face, e-Tutoring from March 2020 until June 2021, and blended Tutoring from June 2021 until December 2022, and from January 2022 until now, face to face is returned. Satisfaction assessment will be subjective where the nature of truth is not expressed. In its development until now, Primagama needs an instrument to measure each branch's service quality to find out existing problems to be resolved immediately.

Because this is very important for the continuity of the business establishment of this Tutoring institution.

The research conducted previously only focused on assessing the quality of its services using the servperf method without choosing which priorities were taken to measure problem handling in the Tutoring Institute [2].

The Servperf method can be used to determine the focus of attention on consumer demand, especially for factors that are important but do not yet meet satisfaction [3].

According to [4], service quality is commonly acknowledged as a predictor of overall customer satisfaction and can be characterized as an overall assessment that is similar to attitude toward the service. In the context of education, the demand to assess and execute service quality may come from student perceptions of service levels. SERVQUAL is considered to meet the statistical validity μ requirements because of its high frequency of use [5]. The advantage of using the SERVQUAL method is that it is easier to capture perceptions or views from the results of data collection with questionnaires. And also superior to determine which variables should be paid more attention to improve service [6]. Individuals who are unsure or (vague) about their perceived perceptions and expectations are prevented from having view difficulties by applying this fuzzy SERVQUAL method in combination. SERVQUAL is a method of measuring service quality that is divided into five dimensions, namely tangible, reliability, responsiveness, assurance,

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and empathy [7]. Fuzzy is typically used when we need to assess a person's complex and frequently ambiguous thought processes [8]. In situations like this, the fuzzy theory provides consistent measurement results.

Fuzzy Service Quality is a fuzzy set theory that provides a means to represent uncertainty and is a tool for modeling uncertainty related to ambiguity, uncertainty, and lack of information about certain elements of the problem at hand [9]. In principle, the fuzzy set is an extension of the crisp set, which is a set that divides a group of individuals into two categories, members and non-members [10].

By looking at the backgrounds and research that have been done previously, it is necessary to develop a method in this research by SLR approach, or Systematic Literature Review, is encouraged because many research factors differ from one study and another. A research process called systematic literature review (SLR) tries to uncover, evaluate, and analyze findings on a study issue to respond to preset research questions. The most important implementation variables for the service sector, particularly for raising the standard of Tutoring institutions at this moment, can be identified using this SLR and PRISMA.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, released in 2009, was created to assist systematic reviewers in reporting the review's motivation, the authors' methods, and their findings in a transparent manner [11].

This study aims to conduct a comprehensive investigation of the instruments used to rate the level of service provided by educational institutions utilizing the PRISMA and SLR (Systematic Literature Review) methods.

This research can be used to improve service quality:

- Improvement Strategy Development: Research using Fuzzy SERVQUAL can provide a deeper understanding of specific aspects that need to be improved in service quality. Based on research findings, educational institutions can develop improvement strategies that focus on identified weaknesses. For example, if research results indicate that the institution's physical facilities do not meet student expectations, the institution may allocate resources to repair or upgrade those facilities [12].

- Measurement of Customer Satisfaction: Fuzzy SERVQUAL can be used to measure the level of customer satisfaction with the services provided by educational institutions. This research can provide insight into the extent to which customers are satisfied with the services received and the factors that influence their satisfaction. This information can be used to identify the strengths and weaknesses of the institution and direct efforts to improve customer satisfaction.

- Development of Service Standards: Based on research using Fuzzy SERVQUAL, educational institutions can develop clear and measurable service standards. This standard can be used as a guide to ensure that all aspects of service quality are consistently met. By having clear service standards, institutions can increase the uniformity of service

quality at various levels and strengthen their reputation.

2 Research Method

Given that typical studies do not specify what is known and what is not known in comparison to a traditional review, this study employs a systematic literature review (SLR).

SLR differs from traditional review in that it uses a scientific methodology that can be replicated and is meant to lower the possibility of error by a thorough search of already published material [13]. Reporting Options The Item Guidelines for Systematic Reviews and Meta-Analysis (PRISMA), developed and modified by [11], were used to choose the sample in this investigation.

This study employs a systematic review of the literature utilizing the PRISMA approach via four steps, including identification, examination, qualification, and results received. This is accomplished by using an online database from Publish or Perish Online [11]. In the initial stages of the database search using the criteria for inclusion, notably publications examining institutes of fuzzy service Tutoring. Utilize the exclusion criteria after that by examining the time publications with a range of 2018 – 2022. An evaluation is done at the very end. Removing the notebook that contains identical text, the same author, and the title incomplete and checks the outcomes study topics like sample size, anticipating bias, using a comparison group, as well as the suitability of statistical tests from the listed literature [14].

Figure 2 shows the flowchart for the current investigation using PRISMA. "("Fuzzy Servqual" AND "Course" OR "Tutoring Institutions") are the search terms used with years of publication from 2017 until 2022. These are the actions taken during the research.

- This search yielded a total of 120 papers and this study comprised 21 papers.

- Language is the key factor considered when choosing articles. The requirement that the article should be peer-reviewed and published in an academic journal with a good reputation was followed by the elimination of all publications in languages other than English and filtered as many as 105 papers.

- And the next step was reading the paper's title. If the heading is both about questions, can be utilized. From the title, they have filtered as many as 86 papers. Whether you conducted research or not, keep reading the abstract. This document will be downloaded if necessary for additional investigation.

- After screening the abstract, filter as many as 45 papers.

- After being selected based on the content of the paper, the final result of the relevant paper is 21 papers.
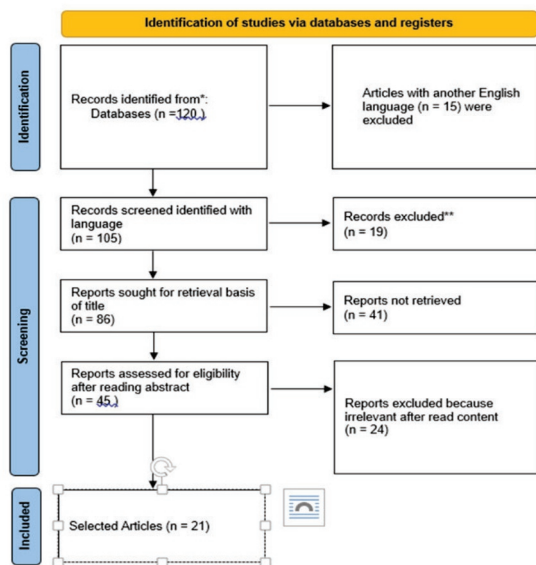
Fig. 1. The PRISMA 2020 Flowchart for The Current Investigation [15]

3 Result and Discussion

In this section, the results of the article selection process will be explained based on a systematic literature review (SLR) mechanism. The final number of selected articles is 21 relevant and related to fuzzy servqual. The search for relevant articles is categorized into the main groups, namely: fuzzy servqual and Tutoring institute state-of-the-art. Based on categories mentioned earlier, the results can be briefly explained through the year of distribution of publications and recent analysis for the topic.

Table 1 displays the list of journals used in the study. ScienceDirect, Springer Link, EmeraldInsight, Researchgate, IEEE, academia, Sagepub, IEOMSociety, and Taylor & Francis are the sources of this SLR study.

Table 1. The List of Journals Used in The Study

Source of Study	Finding Papers	Papers by Language	Papers by Title	Papers by Abstract	Selected Papers
Source and Direct (Elsevier)	15	15	13	7	2
IEEE	16	16	14	5	0
Researchgate	12	12	10	8	5
EmeraldInsight	12	12	12	4	1
Springer	17	17	14	5	3
Academia	22	8	8	8	7
Sagepub	11	11	7	3	1
Taylor &Francis	10	9	4	2	1
IEOMSociety	5	5	4	3	1
Total	120	105	86	45	21

Figure 2. shows three different types of publications: conceptual (6), qualitative (3), and quantitative (11).
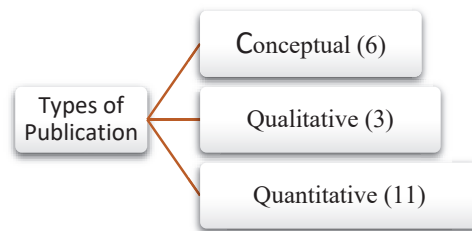

Fig. 2. Types of Publication

3.1 Trends in Publications

According to the research findings, three articles were taken from 2018, two pieces were taken from 2019, eight articles were taken from 2020, seven articles were taken from 2021, and one article was taken from 2022. Data show that research on fuzzy servqual has been one of scholars' focuses and trends, particularly between 2018 and 2021. When other service sectors, in this case, mainly Tutoring institutions, start to emerge, competition starts to increase. In order to study the aspects that affect improving the quality of services in the education sector, the driving force behind this industry needs a tool to measure the quality of its services. The Fuzzy Servqual approach, which has been successfully used to support Tutoring institutions in improving their quality, is one of the research trends that have been triggered by this growth in the number of related studies that have been done on service quality.

Table 2. Trends in Publications by Year

Year	Persentage	Papers
2018	14.29%	3
2019	9.52%	2
2020	38.10%	8
2021	33.33%	7
2022	4.76%	1
Total	100.00%	21

3.2 Publishing Distribution by Year

According to the search results, research on fuzzy servqual was heavily conducted and published in Asian nations. This occurs for a variety of reasons, including the fact that the education service sector is expanding in Asian nations and that this expansion fuels the emergence of the fourth industrial revolution, which facilitates and accelerates the expansion of the education service sector globally.

Table 3. Publishing Distribution by Year

Country	Persentage	Papers
Turkey	47.62%	10
Indonesia	14.29%	3
Mexico	4.76%	1
China	9.52%	2
India	4.76%	1
11	19.05%	4
Total	100.00%	21

According to Table 1 from previously, there were 21 papers found in the search results that were pertinent to the Fuzzy Servqual issue. The study' findings are based on the most recent versions of the chosen articles. Table 4 lists the authors, the purpose of the study, and a summary of the findings for each of the papers examined. It is evident from the review of these studies that there is consistency in research findings, and this is essential in SLR technique research.

Table 4. Selected Papers Analysis

No	Title	Ref	Summary
1	A fuzzy service quality based approach for performance evaluation of educational units	[7]	Using ratings of service quality, a fuzzy DEA method is used to assess the effectiveness of educational units to evaluate the performance of eight higher education institutions.
2	Evaluating the undergraduate course based on a fuzzy ahp-fis model	[16]	This study takes an original stance by looking at course evaluation as a problem of multiple-criteria decision-making, A fuzzy Analytic Hierarchical Process (AHP) model, which employs fuzzy numbers
3	A scale to measure sustainable campus services in higher education:"Sustainable Service Quality"	[17]	Fuzzy number were used to measure scale of sustainibility
4	SERVQUAL Model in Banks in India	[18]	Fuzzy logic along with the five-dimensional SERVQUAL model for more accurate service quality
5	A model proposal for measuring service quality of eduaction with fuzzy rule-based approach and fuzzy ranking and an application	[19]	Service quality must be assessed by using scientific analyses, and their service quality were measured by with fuzzy rule-based approach and fuzzy ranking and an application
6	Evaluation of Student-Perceived Service Quality in Higher Education for Sustainable Development: A Fuzzy TODIM-ERA Method	[20]	A hybrid fuzzy TODIM-ERA technique is presented to address such a multicriteria decision-making (MCDM) problem catering to uncertainty and bounded rationality in order to acquire the thorough evaluation results of all alternative HEIs using the fuzzy SERVQUAL scale and ESD goals.
7	Applying a Fuzzy Questionnaire in a Peer Review Process	[21]	Based on the first findings, it can be said that the offered fuzzy judgment can assist university employees in
8	Quality assessment for improving healthcare service management	[22]	We employ a strategy that lessens the subjectivity of the client's impression of the service delivered in the health services industry by integrating the fuzzy set theory with the quality instruments QFD and SERVQUAL.
9	Application of fuzzy Servqual method to measure user satisfaction of Mooc service quality	[23]	This study's objective is to gauge participants' perceptions and expectations of MOOC students.The SERVQUAL model, which is the research method used in this study,paired with a fuzzy technique, in order to precisely measure it.
10	Evaluating service quality by fuzzy SERVQUAL: a case study in a physiotherapy and rehabilitation hospital	[24]	A fuzzy SERVQUAL technique is utilized since the evaluation of services is dependent on linguistic characteristics.
11	International students' service quality evaluations towards Turkish universities	[25]	In order to gather information for this paper's investigation on international students' perceptions and satisfaction with Turkish universities' service quality, a modified version of the SERVQUAL questionnaire was utilized for educational purposes.
12	Assessing after-sales services quality: integrated SERVQUAL and fuzzy Kano's model	[26]	The confirmatory factor analysis is used to examine the SERVQUAL dimensions' validity with regard to the caliber of after-sales services.SERVQUAL is used to identify the strengths and weaknesses of the after-sales service quality. The determined strengths and weaknesses are then categorized using the fuzzy Kano model.
13	Quality perception in higher education-using SERVQUAL methodology	[27]	The method (SERVQUAL) showed to be helpful in identifying issues with perceived-felt quality, but this goes beyond simply identifying the data to comprehend the

			underlying causes of the outcomes.
14	7. Quality Assurance in Programmes	[28]	To show how fuzzy rating scales are used in comparison to traditional course using the available metrics for service quality
15	Measuring the quality of management in education. Review article	[29]	The findings serve as a foundation for further study and can be used to design and build multidimensional models to meet educational institutions' objectives for educational management quality measurement.
16	Proposed Service Quality Improvement With Several and IPA Method at Mitro Coffee Café	[30]	Methods such as IPA and Fishbone can be used to identify the attributes of layanan that should be prioritized for improvement at Kafe Mitro Kopi and to conduct corrective measures based on those attributes at Kafe Mitro Kopi.
17	Likert Scale-Based Evaluations with Flexible Fuzzy Numbers	[31]	These fuzzy numbers' pliability makes them ideal for multi-dimensional Likert scale-based fuzzy evaluations in many management domains.
18	Examining patient perceptions of service quality in Turkish hospitals : The Examining patient perceptions of service quality in Turkish hospitals : The SERVPERF model	[32]	In order to explore how patients perceived the quality of the services provided and to analyze the predictors of service quality in terms of the dimensions and items of the SERVPERF model, the SERVPERF model of measurement for customer perception was used to measure hospital service quality in Turkey.
19	Student performance task assessment using multiple criteria decision making (MCDM) techniques: An application for 9th grade chemistry course	[33]	In this study, multiple criterion decision-making techniques were used to investigate some of the measurement and evaluation issues that were present in the assessment of student performance tasks.
20	Marketing public and private higher education institutions: A total experiential model of international student's satisfaction,	[34]	Additionally, empirical research shows how the overall experience of international students at public and private colleges affects how each person values and values the services they receive.
			performance and continues intention
21	Measuring service quality of halal certification in Indonesia food industry using Fuzzy-SERVQUAL method for service quality improvement	[8]	The fuzzy-SERVQUAL approach was employed in this study to identify key variables influencing service quality.

According to table 4, it can be seen that the measurement of service quality using the fuzzy method has been carried out by several studies. But combined with other methods to get more specific goals.

Fuzzy logic is a mathematical method that allows us to deal with uncertain or ambiguous situations. This is useful in research measuring service quality, because service quality is a subjective concept and cannot be stated with certainty. The SERVQUAL (Service Quality) model is a model used to measure and assess the quality of service provided by an organization to its customers. This model consists of five dimensions of service quality, namely tangibles, reliability, responsiveness, assurance, and empathy. By using fuzzy logic, we can handle situations where the value of service quality cannot be stated with certainty and can only be stated within a certain range. This allows us to calculate our service quality scores more accurately and comprehensively, because we are not limited to a choice of "right" or "wrong" only.

Because of this, many researchers choose to use fuzzy logic in the SERVQUAL model, because this method provides more accurate and comprehensive results compared to other methods.

4 Conclusion

Each study uses a different set of fuzzy measuring techniques as a SERVQUAL instrument. This study employed a systematic literature review utilizing the PRISMA methodology to review the research on how to gauge service quality in educational institutions.

The findings from this review indicate that SERVQUAL, along with instruments such as FuzzyAHP, Fuzzi DEA, IPA, and Topdim's Fuzzy Era, are the most frequently used instruments. This study will assist researchers in collecting accurate data regarding various.

Instruments used to evaluate the level of service provided by educational institutions. It will also assist the reader in Tutoring about different instruments used in different regions of the world. This study aims to conduct a comprehensive investigation of the instruments used to rate the level of service provided by educational institutions utilizing the PRISMA and SLR (Systematic Literature Review) methods and can be used to improve strategy development, measure

customer satisfaction, and develop service standards in education industry.

The study's evaluation led the researcher to the conclusion that this educational institution's business drivers desire a widely used approach for gauging the quality of its services. Due to differences in service kinds between nations and between educational institutions. There must be service standards before it is possible to develop globally relevant instruments to evaluate service quality in educational institutions.

5 Research Potential

Following are some potential further researches on the use of Fuzzy SERVQUAL in the education industry, especially tutoring institutions:

- SERVQUAL Fuzzy Integration with Technology: This research can explore the use of technology such as online learning platforms or mobile applications in the context of tutoring institutions. By integrating Fuzzy SERVQUAL with technology, this research can measure and improve the quality of services provided through this technology, as well as evaluate customer perceptions and expectations related to the use of technology in learning.

- Effect of Demographic Factors on Customer Perceptions: This study was able to analyze how demographic factors such as age, gender, educational level, or cultural background affect customer perceptions of service quality in tutoring institutions. By using the SERVQUAL fuzzy, this research can help in understanding the different preferences and expectations between different customer groups.

- Application of Fuzzy SERVQUAL in Different Periods: This research can see how customer perceptions and expectations of service quality in tutoring institutions change over time. By conducting repeated surveys at different times, this research can identify changing trends and measure improvements or decreases in service quality from a customer perspective.

References

[1] M. Djunaidi, E. Setiawan, T. Hariyanto, *Analisis Kepuasan Pelanggan Dengan Pendekatan Fuzzy Service Quality Dalam Upaya Peningkatan Kualitas Pelayanan*, J. Ilm. Tek. Ind. **4**, 3, pp. 139–146 (2018)

[2] R. O. Putri, S. Martha, Analisis kualitas pelayanan akademik dengan metode servperf dan ipa, Buletin Ilmiah Math. Stat. Dan Terapannya (Bimaster) **8**, 1, pp. 103–110 (2019)

[3] M. Djunaidi, A. K. Alghofari, D. A. Rahayu, *Penilaian Kualitas Jasa Pelayanan Lembaga Bimbingan belajar Primagama Berdasarkan Preferensi Konsumen,* J. Ilm. Tek. Ind. **5**, 1, pp. 25–32 (2018)

[4] M. S. Sohail, M. Hasan, *Students' perceptions of service quality in Saudi universities: the Servperf model* (2020)

[5] A. A. F. Abari, M. H. Yarmohammadian, M. Esteki, *Assessment of quality of education a non-governmental university via ServQual model,* Procedia - Soc. Behav. Sci. **15**, pp. 2299–2304 (2021)

[6] B. Harto, *Analisis Tingkat Kepuasan Pelanggan Dengan Pendekatan Fuzzy Servqual Dalam Upaya Peningkatan Kualitas Pelayanan (Studi Kasus Di Bengkel Resmi BAJAJ Padang)*, J. Teknoif **3**, 1, pp. 20–30 (2018)

[7] M. Nojavan, A. Heidari, D. Mohammaditabar, *A fuzzy service quality based approach for performance evaluation of educational units*, sciencedirect (2021)

[8] H. M. Putri, M. Dachyar, R. Nurcahyo, *Measuring service quality of halal certification in Indonesia food industry using Fuzzy-SERVQUAL method for service quality improvement,* Proc. Int. Conf. Ind. Eng. Oper. Manag., 34, pp. 1782–1791 (2021)

[9] N. F. Kartika, *Implementasi Fuzzy - Service Quality Terhadap Tingkat Kepuasan Layanan Mahasiswa Implementation of Fuzzy – Service Quality for Student Service Level of Satisfaction,* J. Ilm. Sisfotenika **7**, 1, pp. 38–49 (2017)

[10] R. C. Rose, J. Uli, M. Abdul, K. Looi Ng, *Hospital service quality: a managerial challenge*, Int. J. Health Care Qual. Assur. **17**, 3, pp. 146–159 (2018)

[11 T. H. Parker, J. Gurevitch, M. J. Page, *Preferred reporting items for systematic reviews and meta-analyses in ecology and evolutionary biology: a PRISMA extension* (2021)

[12] G. Kaur, R. Arora, R. Yadav, A. Majumder, *A modelling on stream selection of undergraduate students in education sector under fuzzy TOPSIS analysis*, Think India Journal **22**, 37, pp. 688-697 (2019)

[13] D. Tranfield, D. Denyer, P. Smart, *Towards a methodology for developing evidence-informed management knowledge by means of systematic review,* British journal of management **14**, 3, pp, 207-222 (2021)

[14] I. P. S. Almantara, M. Sudarma, I. B. A. Swamardika, *Penilaian Tingkat Kepuasan Layanan Produk/Jasa dengan Metode Service Quality Model,* Maj. Ilm. Teknol. Elektro **20**, 2, p. 223 (2021)

[15] L. Zonaphan, K. Northus, J. Wijaya, S. Achmad, R. Sutoyo, *Metaverse as A Future of Education: A Systematic Review*, 8th International HCI and UX Conference in Indonesia (CHIuXiD) **1**, pp. 77-81 (2022).

[16] D. Zhang, Y. Li, Y. Li, Z. Shen, *Service*

Failure Risk Assessment and Service Improvement of Self-Service Electric Vehicle, Sustainability **14**, 7, pp. 3723(2022)

[17] M. Bakır, E. Özdemir, Ş. Akan, and Ö. Atalık, *A bibliometric analysis of airport service quality*, Journal of Air Transport Management **104**, 102273 (2022)

[18] M. Perule, N. Shetty, D. K. Naik, N. Maddodi, B. S. Malarout, N. Jain, *A systematic review for the use of the SERVQUAL model in banks in India* (2020)

[19] U. Altinsoy, A. Aktepe, S. Ersoz, *A model proposal for measuring service quality of eduaction with fuzzy rule-based approach and fuzzy ranking and an application,* Journal of Intelligent & Fuzzy Systems, (Preprint), pp. 1-14 (2022)

[20] L. Wu, G. Wei, J. Wu, C. Wei, *Some interval-valued intuitionistic fuzzy dombi heronian mean operators and their application for evaluating the ecological value of forest ecological tourism* (2020)

[21] T. Jónás, Z. E. Tóth, G. Árva, *Applying a fuzzy questionnaire in a peer review process*, Total Quality Management & Business Excellence **29**, 9-10, pp. 1228-1245 (2018)

[22] J. B. de Freitas, J. C. Martin, C. Román, *Service quality evaluation in the perception of the wine tourist with Fuzzy Logic and Ideal Solutions*, Revista de Turismo y Patrimonio Cultural **15***, 2, pp. 341-358 (2017)

[23] T. Andriyani, Y. Firdaus, *Dampak Revolusi Industri 4.0 Pada Dunia Pendidikan di Politeknik Negeri Sriwijaya*, J. Apl. Manaj. dan Bisnis **1**, 2, pp. 78–86 (2021)

[24] S. Behdioğlu, E. Acar, H. A. Burhan, *Evaluating service quality by fuzzy SERVQUAL: a case study in a physiotherapy and rehabilitation hospital*, Total Quality Management & Business Excellence **30**, 3-4, pp. 301-319 (2019)

[25] Z. Bozbay, F. Baghirov, Y. Zhang, A. Rasli, M. Karakasoglu, *International students' service quality evaluations towards Turkish universities*, Quality Assurance in Education, **28**, 3, pp. 151-164 (2020)

[26] S. Golrizgashti, A. R. Hejaz, *Assessing after-sales services quality: integrated SERVQUAL and fuzzy Kano's model*, International Journal of Services, Economics and Management **11**, 2, pp. 137-166 (2020)

[27] I. Margolis, B. Providência, *Quality perception in higher education-using SERVQUAL methodology*, Acta Scientific Agriculture **5**, 6 (2019)

[28] B. H. Karim, *7 Quality Assurance in Programmes*, In 2nd Danube Conference for Higher Education Management, pp. 26 (2018)

[29] T. J. Crissien-Borrero, *Measuring the quality of management in education* (2019)

[30] A. Sigalingging, *Proposed Service Quality Improvement Using Servqual and IPA Methods at Mitro Kopi Cafes*, Thesis, Universitas Atma Jaya Yogyakarta (2020)

[31] J. Dombi, T. Jónás, *Likert Scale-Based Evaluations with Flexible Fuzzy Numbers*, Adv. Advances in the Theory of Probabilistic and Fuzzy Data Scientific Methods with Applications, pp. 167-187 (2021)

[32] M. Akdere, M. Top, S. Tekingündüz, *Examining patient perceptions of service quality in Turkish hospitals : The Examining patient perceptions of service quality in Turkish hospitals : The Servperf model*, Total Qual. Manag. Bus. Excell (2018)

[33] H. Dinçer, S. Yüksel, Z. N. Canbolat, *Data mining-based evaluating the customer satisfaction for the mobile applications: An analysis on Turkish banking sector by using IT2 fuzzy dematel,* In Tools and techniques for implementing international E-trading tactics for competitive advantage, pp. 320-339 (2020)

[34] M. K. Shahijan, S. Rezaei, V. P. Guptan, *Marketing public and private higher education institutions: A total experiential model of international student's satisfaction, performance and continues intention*, International Review on Public and Nonprofit Marketing **15**, pp. 205-234 (2018)