
Level of User Satisfaction and Service Quality of Mantalongon Water System Cooperative for Improved Services

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Abstract

The increasing population demands a more effective distribution of potable drinking water to reach the people that results in creating various water supply systems. These water supply system supports the provision of potable water, however, about 844 million people on Earth do still not have access to basic water supplies and 79% of them are rural residents, suffering from water shortages. Water supply systems share the same objective of achieving the highest level of user satisfaction and service quality and provide an effective and efficient service. Good service quality is expected to result in customer satisfaction, therefore will increase customer retention and loyalty. Mantalongon Water Service Cooperative is giving an exemplary service since 1997. The Service Quality is outstanding at a level of 4.05 and the Users are very satisfied with its services at a level of 3.87 however, applying the inferred approach between User's Satisfaction and Service Quality Level to different local areas based on its geographical location with 30 sample size of each area, results show that Uphill Area is deprived of the service with a negative disconfirmation difference of -69.75 compared to Public Market and Plain Area with a difference of 17.5 and -0.75 respectively. Uphill Area is also unsure of the service with a 3.35 satisfaction level. Therefore, it is essential to propose an Improvement Plan for Mantalongon Water Service Cooperative to ensure equal services to all of its consumers regardless of their geographical location especially for residents living in the Uphill.

Keywords: User Satisfaction; Service Quality; Uphill Area; Public Market; Plain Area; Water System.

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1. Introduction

The provision of potable water is perhaps the most vital in sustaining our daily lives. Water is one of the basic requirements to survive. The increasing population demands a more effective distribution of potable drinking water to reach the people. This results in creating various water supply systems [28]. A water supply system delivers water from the source to customers and provides services for homes, commercial establishments, industry, and irrigation. Though the existing water supply system supports the provision of potable water, a huge number of the society is suffering from water shortages. About 844 million people on Earth do still not have access to basic water supplies and 79% of them are rural residents. At the same time, 2.1 billion people have no safely managed drinking water supply system service. This means that 14.9% of the urban and 45.2% of the rural population need improved water services [33]. These water supply systems face challenges to maximize customer satisfaction (CS) for various reasons such as operational failures [11]. As all water supply undertakings share the same objectives: the achievement of the highest level of user satisfaction and service quality, water supply systems must provide a service that is both effective and efficient. Therefore, it is important to support the utilities with the best available tools [1]. To determine whether these goals are achieved, Customer Satisfaction and Service quality are given emphasis. Customer satisfaction and service quality are considered crucial aspects in businesses and organizations. Indeed good service quality is expected to result in customer satisfaction, therefore will increase customer's retention and loyalty. Service quality is defined as a comparison of customer expectations with service performance. Good service quality leads to customer satisfaction and, therefore, makes the organization more effective and competitive in the market. High service quality can be achieved by identifying problems in service and defining measures for service performances and outcomes as well as the level of customer satisfaction [28]. Customer satisfaction and service quality are two of the performance indicators to assess water supply services. In the Philippines, most water supply systems were operated by local authorities. To improve service delivery, the sector has been repeatedly subjected to extensive reforms which created numerous institutions and responsibilities addressing the needs of the customer and meeting their satisfaction however, these reforms were subject to improvements and further researches as quite several users are suffering from the poor water supply system [31] Whilst, Mantalangon Dalaguete residents are enjoying the water provided by springs and valleys, the distribution of these sources is seen unclear as most of them are relying upon an un-motored split water supply system. These systems don't have standard service quality given the operational status, ownership, and maintenance requirements are unorganized. Hence, the system is a government and/or community-based project without proper inspection and other necessary tests and procedures. It is within this context that researchers are driven to assess the level of User Satisfaction and Service Quality of Mantalangon Water System Cooperative, the most established water system in the area, based on the above-mentioned undertakings.

2. Materials and methods

2.1 Materials

Adapted questionnaires from the paper "Evaluation of the Effectiveness of Water Supply and the Effectiveness of Water Supply Improvement Projects" questionnaires [28], Likert Scale Questionnaire, and SERVQUAL

model, classified into two, are used to collect data from the two types of respondents; Consumers and Water System Employees. The questionnaires are subdivided into 4 different variables namely Accessibility, Affordability, Availability and Equity of Service. These variables are essential to measure the difference between user satisfaction and service quality as stated in SERVQUAL Approach [13].

2.2 Review on Related Literature

Customer Satisfaction Theories: A Critical Review suggested that customer satisfaction is a relative concept, and is always judged to a standard [22]. Expectancy-Disconfirmation Paradigm (EDP) is the most promising theoretical framework for the assessment of customer satisfaction. The EDP implies that consumers purchase goods and services with pre-purchase expectations about anticipated performance. The expectation level then becomes a standard against which the product is judged [37]. That is, once the product or service has been used, outcomes are compared against expectations. If the outcome matches the expectation, confirmation occurs. Disconfirmation occurs where there is a difference between expectations and outcomes [37]. This model uses an Inferred Approach. The inferred approach is one of the two methods of investigating dis/confirmation of expectation, the other is the Direct Approach (Subjective). Inferred Approach is an objective approach that involves the computation of the discrepancy between expectations and evaluations of performance [37].

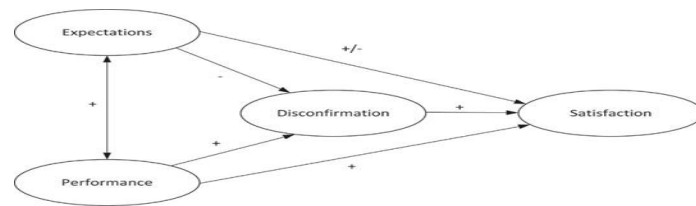


Figure 1: Expectancy-Disconfirmation Paradigm (EDP)

On the other hand, SERVQUAL Theory is used to determine the relationship between customer satisfaction and service quality. Customer satisfaction is often defined as the customers' post-purchase comparison between pre-purchase expectation and performance received [42]. Service quality influences customer satisfaction and vice versa customer satisfaction influences service quality [40]. Service quality, therefore, has become one of the critical factors for satisfying and retaining valued customers in every service provider. SERVQUAL Approach has determined 5 major dimensions to measure the difference between customer satisfaction and the service quality in water supply systems; Accessibility, Affordability, Availability, Equity (Water Service Providers Responses), and water quality. Since the focus of the research is only infrastructural and institutional (ISO 24512), water quality was not emphasized as part of the variable [13]. Water Accessibility [38, 41] states that a lack of accessibility to safe water has always been one of the greatest challenges to the rural developing world. This issue has resulted in the deaths of countless millions of people, as well as the underdevelopment of many nations [38]. Improving access to water will help improve the living conditions of those people currently without [41]. Water Affordability: CAR Analysis states that the affordability of water services is a pressing water policy issue for both developed and developing countries. It is shown that affordability problems quite occur for considerable parts of the households but have to be distinguished depending on the economic causation [39]. Water Availability (Water Service Hour) states that rural water supply services worldwide

consistently fail to deliver full continuity of service and public health impacts as intended due to low service sustainability. This failure is increasingly attributed to weak local systems composed of social, financial, and environmental factors. These suggest that a more intentional focus on factor interactions in systems could lead to more effective strategies for improving service sustainability [44]. Water Service Providers Performance Monitoring (Equity/Provider Responses) states that it is an essential first step to achieving proper regulation of water services, which has a multitude of advantages for water utilities, utility managers, and most importantly the end consumers. The use of performance indicators in assessing the performance of service providers offers a sound and internationally accepted form of measure for the quality of service, efficiency of the provider, and allows transparent, objective comparisons between different providers [43]. On the other hand, in a water supply system, customers are assumed to have pre-determined expectations from the service provider before actually experiencing the services themselves. Determining the expectation variable is based on ISO 24512 "Management & Assessment of Drinking Water Utilities and Drinking Water Services". ISO 24512, [9] one of a series of standards addressing water services, provides guidelines for the management of drinking water utilities and the assessment of drinking water services. The standard recommends that the management and operators of publicly and privately-owned drinking water utilities establish operations that fundamentally embrace all legal requirements and give consideration to recognized best practices. Fundamental to the ISO 24512 approach is a clear understanding of the extent of the water utility operations to be managed. These may include abstraction, treatment, and distribution activities and the treatment, reuse, or disposal of its residues [8]. The researchers are driven to identify the customer's satisfaction level and service quality level as introductory to assess the effectiveness of the water supply system in Mantalongon, Dalaguete using these reviews.

2.3 Determination of the User Satisfaction and Service Quality Level

The gathered data are treated using certain statistical tools such as weighted mean, Average, Percentage, and Chi-Square Test for hypothesis testing. The results were interpreted separately. Consumer's Satisfaction dubbed through Likert Scaling as five (5) being the highest (Extremely Satisfied) and one (1) being the lowest (Not Satisfied). For Service Quality, data were further treated through Multi-Criteria Analysis before having interpreted using another description of Likert Scaling as five (5) being the highest (Outstanding) and one (1) as the lowest (Unsatisfactory). Following the Inferred Approach of Expectancy-Perception-Dis/confirmation Methods, User Satisfaction and Service Quality were subtracted to determine a dis/confirmation interpreted as Positive Disconfirmation for positive (+) difference, Negative Disconfirmation (-) and Confirmation for null (0) difference. Inferred Approach is an objective approach that involves the computation of the discrepancy between expectations and evaluations of performance. This requires researchers to draw separate information relating to customer service expectations and perceived performance [36]. To determine whether the differences are significant, Chi-Square Testing was conducted with 95% accuracy. The results are then used to formulate the conclusion and/or recommendations. This study only focus on user satisfaction and intangible service quality from the members and operators of Mantalongon Water Service Cooperative. Other factors related to the Water system such as infrastructural requirements and specifications, sustainability, water quality, and others are not included in the purpose of the study. The locale that uses different water services other than the mentioned water system is also beyond the study of this paper.

3. Results and Discussion

The local areas of research respondents are subdivided into three locations; Uphill, Public Market, and Plain, based on the location of their houses as proper distribution of service depends on these geographic characteristics.

3.1 Satisfaction Level of Customers to Mantalongon Water Service Cooperative

Table 1: User’s Satisfaction Level through Likert Scale

Satisfaction Criteria	Uphill Areas	Public Market	Plain Areas	Average	Interpretation
Accessibility	3.10	4.07	3.90	3.69	Very Satisfied
Affordability	3.56	4.12	4.22	3.97	Very Satisfied
Availability	3.01	4.44	3.90	3.78	Very Satisfied
Service Provider Responses	3.76	4.24	4.14	4.05	Very Satisfied
Areas Satisfaction Level	3.35	4.22	4.04	3.87	Very Satisfied
Interpretation	Unsure	Extremely Satisfied	Very Satisfied	Very Satisfied	

Mantalongon Water Service Cooperative provides a very satisfactory water accessibility at the level of 3.69 which means users can access the water distribution points at any time without waiting in line and doesn’t always get problems with its pipes and machines. Study shows that most of the residents have individual house connections where water is accessible within the comfort of their homes. However, in Uphill Areas, users are unsure about the service reflecting a 3.10 satisfaction level. They can’t access the distribution points as freely as the other users due to complaints about water leakage due to damaged pipes. These pipes are mostly galvanized steel pipes that get rusted over years. Polyethylene pipes are ideal for potable household distribution and last longer than galvanized pipes if properly cared and positioned. In terms of Affordability, users responded very satisfied at a level of 3.97. Mantalongon Water Service Cooperative water charges and penalties are reasonable to the amount of service they give. However, there is a 13% disconnection rate, highest at Uphill Areas. The uphill area also has the lowest satisfactory level at only 3.56. The unstable income per month causes these water service disconnections to households living on higher grounds. There are also some complaints regarding water bills such as high meter reading due to leakage. Water Availability is also very satisfactory at a level of 3.78. The continuous supply of water is always available to users especially living near the Public Market and Plain Area. However, Uphill Area resident’s satisfaction level is only at 3.01 which means they are unsure to the service which means water is not always available at these areas. Mantalongon Water Service Cooperative is supposed to have only one (1) water service schedule that provides 24/7 service hours but due to insufficient supply of water and gravitational water distribution pressure especially during the dry season, the uphill area could hardly get water during the day. Service Provider responses are also very satisfactory at a rate of 4.05 which is the highest among the four variables. The employees give an excellent customer service to users. There are 6 members/employees of the board that functions as technical support; Collector, Plumber, Meter Reader, and three (3) tank operators. They are under the manager of the cooperative. The available services are well operated however there are very few complaints about these responses especially on the delay of the technicians in cases of technical problems. There is only one qualified plumber while the tank operators are assigned to

maintain and look after the tank. Sufficient number of skilled workers is very significant on providing excellent service. The respondents are very satisfied with the service, however, the level is not the same among the three areas. While Public Market and Plain Areas are very satisfied with 4.22 and 4.04 satisfaction levels, respectively, Uphill areas are unsure of the service, given an average satisfaction level of only 3.35. This implies that there is a discrepancy of the services provided on higher grounds.

3.2 Service Quality Level of Mantalongon Water System Cooperative

Table 2: Service Quality Level through Multi-Criteria Analysis

SITUATIONS	Units	Recommended Level	Actual Level	Normalized (k)	Level
ACCESSIBILITY					
Number of Communal and In-house Connection.	Households	693	520	0.75	3.75
Number of Connections supplied during service hour	Households	520	427	0.82	4.10
Distribution Point-User Ratio and Location	Connections	520	520	1.00	5.00
Accessibility Water-Related Complaints	Times	0	15	0.71	3.55
Accessibility Service Quality Level			(Outstanding)		4.10
AFFORDABILITY					
Disconnection Rates due to unpaid Water-Bill	Times	0	15	0.83	4.15
Metered Connections	Households	520	520	1.00	5.00
No. of Paid Connection/mos.	Households	520	514	0.99	4.90
Water Works Revenue over Water Works Expenditure	Php/mos.	178,500	150,000	0.84	4.20
Affordability Water-Related Complaints	Times	0	4	0.92	4.60
Affordability Service Quality Level			(Outstanding)		4.57
AVAILABILITY					
Reliable Water Schedule	Times	1	4	0.87	4.35
Water Service Hours	hours	24	10	0.42	2.10
Water Quantity (Daily Basis)	cu.m	58.12	48.38	0.83	4.15
Availability Water-Related Complaints	Times	0	17	0.67	3.35
Availability Service Quality Level			(Exceeds Expectation)		3.49
EQUITY OF SERVICE					
Number of Utility Workers	Workers	7	5	0.71	3.55
Redressal to Customer Complaints	Times	51	51	1.00	5.00
Utility Responses Water-Related Complaints	Times	0	15	0.71	3.55
Affordability Service Quality Level			(Outstanding)		4.03
Over-all Service Quality Level			(Outstanding)		4.05

The Service Quality Level of Mantalongon Water Service Cooperative is outstanding with an overall score of

4.03. These scores are calculated through a formula of multi-criteria analysis. Multi-criteria analysis (MCA) is used to calculate the normalized value of the actual measurements as compared to the recommended level. It can be used to identify and compare different policy options by assessing their effects, performance, impacts, and trade-offs. Accessibility of the Service Quality Level is outstanding at a score of 4.10. The water service provider has meet significantly to the recommended level in terms of coverage and connection. MWSC has also the outstanding performance in terms of water affordability at a level of 4.57. With a standard tariff setting, total revenue and low expense, and 98.99% completed payment each month regardless of the frequent delays of payment, MSWC has set the affordability service quality level highest among the variables. MSWC in terms of Availability has exceeded the expectation set forth for availability-related variables with a 3.49 service quality level, the lowest level among the four variables. Though the cooperative aims to provide 24/7 water service, evident that some areas do not receive water throughout the day than expected. These numerous discrepancies in the technical aspect of the service still managed to have an outstanding performance for its equity of service quality level at a score of 4.03. Workers are responsible for providing the best customer service to users. In general, Mantalongon Water Service Cooperative has meet almost all of the requirements at a limited-service coverage, which gives a significant Service Quality Level of 4.03 described as Outstanding. However, for expansion, MWSC needs further improvements.

3.3 Dis/confirmation of User Satisfaction Level and Service Quality Level And Chi Square Test of the Variables

Table 3: Inferred Approach-Variables Dis/confirmation

Variables	Customer Satisfaction (P)	Service Quality Level (E)	Gap Score (Q)	Dimension Weight	Weighted Gap Score
Accessibility	3.69	4.10	-0.41	25	-10.25
Affordability	3.97	4.57	-0.60	25	-15
Availability	3.78	3.49	0.29	25	7.25
Equity of Service	4.05	4.03	0.02	25	0.5
OVER-ALL	3.87	4.0475	-0.18	100	-17.75

The overall inferred approach of Service Quality Level and User’s Satisfaction Level shows a negative disconfirmation at a weighted gap score of -17.75. Mantalongon Water Service Cooperative has not fully met the expectation of the consumers. Though complying almost all of the recommended level in order to give the best service, users does not perceived the level of service quality of MWSC resulting to lower satisfaction level. The negative disconfirmation is greatly contributed by its affordability of service at a score of -15 which is the lowest and in Accessibility at -10.25. Affordability shows a huge difference because of its high service quality level, MSWC highly meets the requirements to determine that the service is affordable however the users are not as satisfied as what the system offers. However, the data also shows a positive disconfirmation in Equity of Responses at 0.5 and Availability at 7.25.

Table 4: Inferred Approach- Local Area Dis/confirmation Table

Area	Customer Satisfaction (P)	Service Quality Level (E)	Gap Score (Q)	Dimens-ion Weight	Weighted Gap Score	Priority
Uphill Area	3.35	4.0475	-0.70	100	-69.75	I
Public Market	4.22	4.0475	0.17	100	17.25	III
Plain Area	4.04	4.0475	-0.01	100	-0.75	II
Total:	3.87	4.0475	-0.18	100	-17.75	

Looking into each of the dis/confirmation in local areas, it is seen that Uphill Area is the priority of the improvements as it has the lowest negative disconfirmation at -69.75. Uphill Areas is largely deprived of the service resulting to a very low satisfaction level compared to MWSC Service Quality Level. Public Market has a positive disconfirmation at 17.25 and Plain Area almost a confirmation at -0.75. Public Market and Palin Areas are contended since the geographical location enable them to receive a reasonable amount of service.

Table 5: Variables’ Chi Square Test Result

Variables	Observed (a)	Expected (b)	Chi-Test
Accessibility	3.69	4.1	0.0410
Affordability	3.97	4.69	0.1105
Availability	3.78	3.49	0.0241
Equity/ Utility Responses	4.05	4.03	0.0001

	P-value > Alpha (α)		
Chi-Test Result	0.98 > 0.05		
P-value	\therefore <u>Accept H_0</u>		
Alpha (α)			
Score	0.18	0.98	0.05

Running a Chi-square Test with 95% accuracy, the results show that the null hypothesis of no significant difference between User’s Satisfaction Level and Service Quality Level should be accepted. The difference between the two variables is not too large to strongly conclude a huge discrepancy between the service quality and customer satisfaction. However, the data implies that there is an unequal water service especially to the uphill area that needs further action and improvement.

4. Conclusions

The Mantalongon Water Service Cooperative though meeting the standards more than halfway needs to improve its services in terms of Accessibility, Affordability, Availability, and Equity of Service especially to residents

living in the Uphill Area to meet the expected Satisfaction Level and Service Quality Level. It is essential to give equal services regardless of the location that the users reside.

5. Conflict of interest

All the authors don't have any conflict of interest regarding this article.

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