

# МЕТОДОЛОГІЯ ТА МЕТОДИ СОЦІОЛОГІЧНИХ ДОСЛІДЖЕНЬ

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## Modified SERVPERF and Normalized SERVQUAL Models in Estimation of Service Quality in Higher Educational Institutes

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The purpose of this paper is to propose and empirically substantiate modification of SERVPERF instrument. We demonstrate difference in practical realization of SERVQUAL (Perceptions-Minus-Expectations) and modified SERVPERF (Performance-Minus-Expectation) based on qualitative and two quantitative methodological studies carried out at the Faculty of Sociology of Taras Shevchenko National University of Kyiv. We used questionnaire adaptation for higher educational institutes (HEI). The sample size of the quantitative studies (10 persons of 2<sup>nd</sup> year of education, 10 persons of 3<sup>rd</sup> year of education, 10 persons of 4<sup>th</sup> year of Bachelor degree program and 5 persons of 2<sup>nd</sup> year of Master degree program; every 4<sup>th</sup> student of each year of education) complies with the used statistical test and the sample size requirements for focus groups. To compare the instruments we used nonparametric Wilcoxon signed rank test implemented in the statistical programming package R. Our finding is that modified SERVPERF is more convenient for students, smaller and more useful for online surveys. So, the difference in mean values of answer's levels is more significant between modified SERVPERF and normalized SERVQUAL than between modified SERVPERF and perceptions in SERVQUAL.

Although the research has limitation – it is reconnaissance one and made as a one of steps for adaptation and validation of models for service quality measuring in Ukrainian HEI based on survey of Taras Shevchenko National University of Kyiv students, however, the results of this methodological study allow other researchers to conduct representative studies using an adapted questionnaire of SERVQUAL at their universities. This result is important for service quality estimation which is needed for universities to monitor and improve the quality of their services and elaborate marketing strategy now.

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**Key words:** HEI, quality of education, sociological research, SERVPERF, SERVQUAL.

**Сидоров Микола, Сальнікова Світлана, Савельєв Юрій, Олійник Оксана. Модифіковані SERVPERF і нормалізовані моделі SERVQUAL в оцінці якості обслуговування у вищому закладі освіти.** Мета роботи – запропонувати та емпірично обґрунтувати модифікацію інструменту SERVPERF. Продемонстровано відмінності в практичній реалізації SERVQUAL і модифікованого SERVPERF на основі якісних та двох кількісних методологічних досліджень, проведених на факультеті соціології Київського національного університету імені Тараса Шевченка. Застосовано адаптацію анкети для вищих закладів освіти (ВЗО). Для порівняння інструментів використано непараметричний тест рангового підписання Вілкоксоном, реалізований у пакеті статистичного програмування R. Висновок полягає в тому, що модифікований SERVPERF є більш зручним для студентів, меншим і кориснішим для онлайн-опитувань. Такий результат важливий для оцінки якості послуг, яка потрібна університетам для моніторингу та покращення якості своїх послуг і розробки маркетингової стратегії.

**Ключові слова:** вищий заклад освіти, якість освіти, соціологічне дослідження, SERVPERF, SERVQUAL.

**Сидоров Николай, Сальникова Светлана, Савельев Юрий, Олейник Оксана. Модифицированные SERVPERF и нормализованные модели SERVQUAL в оценке качества обслуживания в вузе.** Цель работы – подтверждение различий в практической реализации двух подходов SERVQUAL и модифицированного SERVPERF, а также обоснование выбора на основе пилотного исследования студентов вузов. Для этого проводятся два пилотных опроса с использованием SERVQUAL (восприятие–минус–ожидания) и модифицированных подходов SERVPERF (представление–минус–ожидание) среди студентов факультета социологии (по 10 студентов 2–4 годов обучения на бакалаврате и пяти человек 2 курса магистратуры) по адаптированной анкете. Для сравнения средних значений каждого компонента проводился парный t-критерий, а затем – качественное интервью со всеми респондентами об удобстве двух анкет, четкости основных вопросов и т. д. По итогам исследования, модифицированный SERVPERF является более удобным для студентов, и полезнее для онлайн-опросов.

**Ключевые слова:** высшее учебное заведение, качество образования, социологическое исследование, SERVPERF, SERVQUAL.

## Introduction

In the time of competitive relations, one of the components that influence the ranking of service market players is the quality of its provision. One of the approaches to estimate the quality of service is to evaluate the consumer's satisfaction of the quality of services provided, that is much harder than the quality, for example, of goods. The product has certain characteristics and indicators on which its quality is possible to evaluate. With the services, the situation is somewhat more complicated, because the services are immaterial object, and they are much more difficult to measure. An especially vital issue is the assessment of the quality of educational services in HEI, and the research problem is to offer a comparative methodology for research the quality of services in HEI.

## Literature review

Since the early 80's of the XX century, scientists have tried to develop service quality indicators and quality models.

Three scientists from the USA, A. Parasuraman, V. Zeithaml and L. Berry proposed conceptualized model of service quality estimation as a difference between consumer's perceived performance and expectation, and was grounded the fundamental difference between a quality of service and a quality of goods (Parasuraman, et al., 1985).

In 1990 the fundamental paper about estimation of service quality by difference between perception and expectation of service (Zeithaml, et al., 1990) was published. RATER – more compact set of dimensions for service quality estimation was proposed in that paper. It consists of 5 dimensions and 22 questions. The methodological part of research was described in that paper too. As soon as quality satisfaction determines difference between perception and expectation

$$\text{Satisfaction (S)} = \text{Perception (P)} - \text{Expectation (E)}$$

so we have to ask each respondent two sets of similar set of questions with different main questions: first the set for estimation of service level expectation and then the set for estimation of perceived level of service. Thus the core of questionnaire contains 44 questions in base.

For such questions Likert scale from 1 to 7 or from -3 to 3 is used: 1 (-3) means maximum negative evaluation and 7 (+3) – maximum positive evaluation (reversed Likert scale is used too).

Later in 1991 the result of research in different branches was presented in (Parasuraman, et al., 1991) and there was interpretation of a term “tolerance zone” of customer for different dimensions as first-time and recovery service etc.

After that such system of dimensions tried to adapt for quality estimation for evaluation the quality of education in HEI in particular. Sometimes it was made precisely for original set of questions (dimensions), sometimes the distribution of questions in each of 5 dimensions (total 20 questions), sometimes less – 15 (Fogarty, et al., 2000), 19 (de Oliveira & Ferreira, 2009), sometimes more (Tan & Kek, 2004), (Donlagić & Fazlić, 2015).

In 1992 the paper was published (Cronin & Taylor, 1992) with criticism of SERVQUAL (RATER) approach, the conceptualization of the concepts of «quality of service», «customer satisfaction» and «intention of buying», as well as the proposed other approach, SERVPERF, to assess the quality of services. This technique, unlike SERVQUAL, does not compute and compare the assessment of the expected and perceived service, but the analysis of the obtained level of service. On the one hand, it reduces the size of the questionnaire by 22 questions (if using the base questionnaire), on the other – does not violate the structure of dimensions that determine the quality of services.

In 1994 there was made a careful comparison of the SERVQUAL and SERVPERF techniques and demonstrates the disadvantages and advantages of the latter by (Cronin & Taylor, 1994).

O. Polyakova and M. Mirza (Polyakova & Mirza, 2015) analyzed 6 different approaches to evaluation of the service quality, including SERVPERF and SERVQUAL.

Vergara-Schmalbach and Maza-Avila (2015) proposed theoretical model of relationship between students' satisfaction and their future behavioral intentions in HEIs. In that research the authors used original 19 items questionnaire design based on students' perception.

### **Methodology of Research**

**Research Objectives.** The purpose of this paper is to propose and empirically substantiate modification of SERVPERF approach by measuring satisfaction as a difference between expectation for a particular HEI and perceived levels of its service.

The objects of our study are two methods SERVQUAL and SERVPERF for measuring the quality of educational services provided in HEI. As a basis, we have taken the research and the text of the questionnaire by Donlagić and Fazlić (Donlagić & Fazlić, 2015), which proposes a version of the SERVQUAL questionnaire to assess the quality of services in the field of higher education. Its adaptation (Annex 1) was conducted on the basis of qualitative and quantitative pilot studies of 35 students of the Faculty of Sociology (10 persons of 2<sup>nd</sup> year of education, 10 persons of 3<sup>rd</sup> year of education, 10 persons of 4<sup>th</sup> year of Bachelor degree program and 5 persons of 2<sup>nd</sup> year of Master degree program; every 4<sup>th</sup> student of each year of education). The sample size of the quantitative studies complies with the Wilcoxon signed rank test and the sample size requirements for focus groups. In this study, we did not use the weighting system for dimensions and units, since the goal was not to calculate the total index, but to compare two methods in terms of achieving the task of assessing the quality of services and the convenience of practical application in online surveys.

**Research Design.** As the first step in order to compare the SERVQUAL and SERVPERF techniques students were asked to fill a questionnaire made within SERVQUAL approach in which the service quality control unit consisted of two parts: at the beginning of the questionnaire, formulated in terms of estimating

the expected level of services (based on their own experience and perceptions about higher education, evaluate how much your expectations correspond to your expectations *of a modern university*), in the end – assess perceived services (based on your own experience, evaluate how the allegations in questionnaire correspond to the level of the received at the University of Services).

After that, the same students, in a few hours during the same day, were offered a questionnaire constructed according to the modified SERVPERF approach.

We chose such a small period of time in order to assume that the attitude towards the quality of educational services in the HEI for each student did not change. To ensure the comparability of the methods, we tried to achieve a repeated test (test-retest), so each respondent put a unique mark on the questionnaires paper with their answers by means of which it was possible to identify the pair of first and second methods, but it was impossible to identify the person of the respondent who stored it anonymously.

After conducting an empirical part of the study with students, focus group interviews were conducted to discuss several aspects of the study: perception of questions, their comprehension, convenience, advantages and disadvantages, the possibility of using these techniques in online surveys. One of the most important aspects in online survey is the size of questionnaire and its design. The smaller number of questions means the lower level of item nonresponse. That is why one of question during discussion was the length of questionnaire.

### Results of Research

**SERVPERF Modification.** The SERVQUAL method involves measuring the level of expected and perceived service. The result is a difference between these indicators for each of the variables. The final Quality Score is considered as an unweighted or weighted sum of these differences. Thus, the basic questionnaire of the method consists of 44 questions.

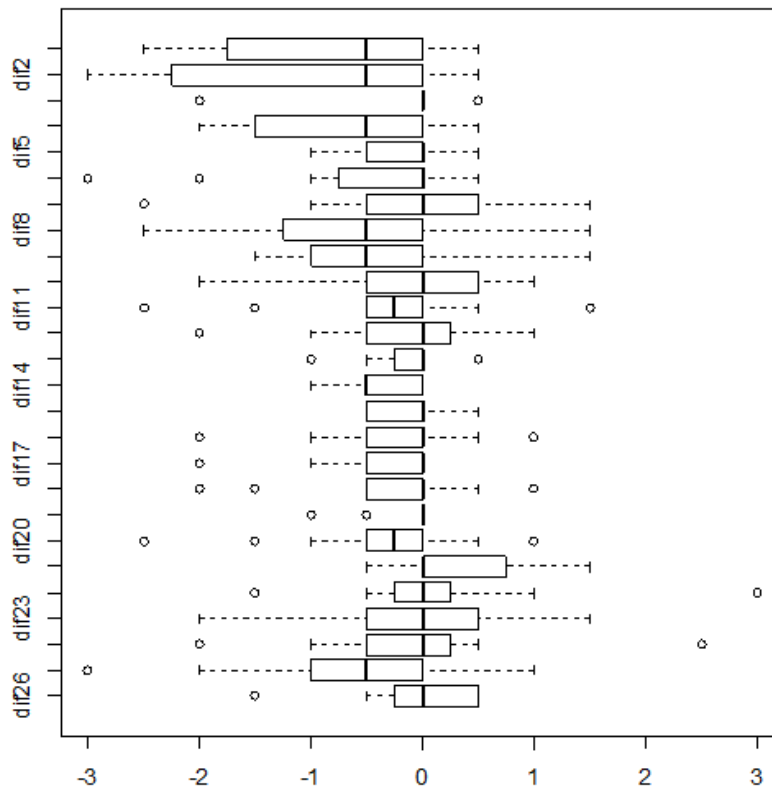
The SERVPERF is performance-only measure of the quality of services. The result is a weighed or unweighted sum of responses to the characteristics of the questionnaire. The basic version of such questionnaire has 22 questions.

In our pilot survey we asked the question «Assess, on the basis of your own experience, the level of how the performed services are different from the expected *in your university*» and suggested to indicate the response on the Likert scale from -3 (significantly worse than expected) to 3 (much better than expected).

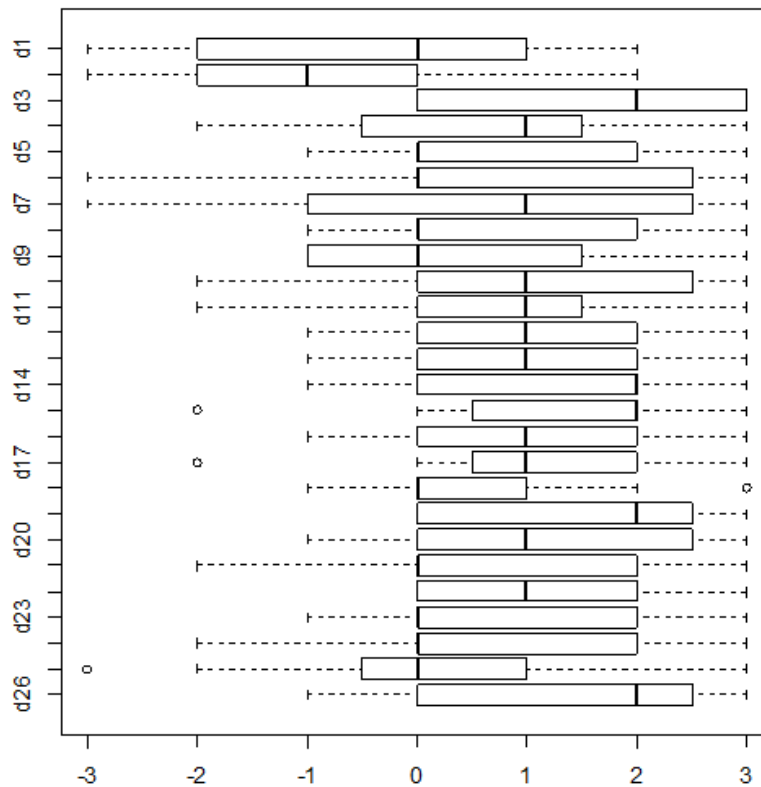
We did not simply ask about the level of services performed, but we tried to determine how much this level meets the expectations regarding a specific HEI, which is mainly shaped by the university rating, students' stereotypes and own experiences. In such a way, we received a questionnaire with one block of questions (a total of 26 questions adapted to the quality assurance test for higher education services) and determined how much the service level corresponds to the expectations of service in it.

The other reason is that this modification compares performed service in current HEI not with expected in virtual but exactly with expected in current.

**SERVQUAL Normalization.** By SERVQUAL, the resulting components of satisfaction characteristics are the differences between the perceived and the expected level of service. The total result is weighted or unweighted sum of those differences. If this sum is less than 0, the consumer is not satisfied, because the obtained level is less than expected. In the case where the difference is positive – the level of services received is higher than the expected level. Figure 1 is a five-point (boxplot) distribution of response frequencies for each of the questions, which includes the minimum and maximum response values and 3 quartiles. Circles indicate outliers that are considered to be at distances greater than 1.5 interquartile distances from the third and less than 1,5 interquartile distances from the first quartile, respectively. Since each of the SERVQUAL components (sentence – question) is defined in the range from -3 to 3, then the difference as a resultant variable is defined in the range from -6 to 6. To compare with the results of the SERVPERF technique, which features are defined in the range from -3 to 3, we normalize the difference by dividing it by 2. Thus, unlike (Cronin & Taylor, 1992), we will not consider the model «perceived – expected», but the normalized (divided by 2) difference in SERVQUAL (fig. 1) for convenience comparison with SERVPERF (fig. 2), in which the scale range is from -3 to 3.



**Figure 1.** Frequency Distribution of the Normalized Difference between the Level of Expected and Perceived Service of SERVQUAL



**Figure 2.** Distribution of Frequencies for Assessing the Difference between the Expected and the Performed Level of Services SERVPERF

### Comparing Results and Discussion

Figure 2 shows the boxplots of responses to the SERVPERF questionnaire. Even visually it is easy to see the difference between the two sets of boxplots. In fig. 2, the assessment has a more positive average rate of service than in fig. 1, where the majority is negative.

Due to skewness and nonnormality of distributions we used nonparametric Wilcoxon signed rank test for the hypothesis of the statistical significance of the differences between the median values of the relevant components, implemented in the statistical programming package R (R Core, 2019). The results are presented in table 1.

Table 1

**Wilcoxon Signed Rank Test for Modified SERVPERF and Normalized SERVQUAL**

Question	P-Value	Medians of			
		Expected Level in SERVQUAL	Perceived Level in SERVQUAL	Differences between Perceived and Expected in Normalized SERVQUAL	Modified SERVPERF
1	<b>0.003</b>	1	-2	-0.5	0
2	1	2	-1	-0.5	-1
3	<b>0.006</b>	3	3	0	2
4	<b>0.004</b>	2	1	-0.5	1
5	<b>0.009</b>	2	2	0	0
6	<b>0.027</b>	2	2	0	0
7	0.176	1	1	0	1
8	<b>0.011</b>	3	1	-0.5	0
9	<b>0.085</b>	2	1	-0.5	0
10	<b>0.028</b>	2	2	0	1
11	0.149	2	1	-0.25	1
12	<b>0.004</b>	2	2	0	1
13	<b>0.007</b>	2	2	0	1
14	<b>0.003</b>	3	2	-0.5	2
15	<b>0.008</b>	3	2	0	2
16	<b>0.004</b>	2	2	0	1
17	<b>0.003</b>	3	2	0	1
18	0.058	1	1	0	0
19	<b>0.004</b>	3	2	0	2
20	<b>0.006</b>	2	2	-0.25	1
21	0.384	0	1	0	0
22	<b>0.032</b>	2	2	0	1
23	0.064	2	2.5	0	0
24	<b>0.022</b>	2	2	0	0
25	0.078	1	0	-0.5	0
26	<b>0.003</b>	2	3	0	2

More than half of components (variables) have significant differences between median values of normalized SERVQUAL and modified SERVPERF (corresponded p-values marked bold).

In order to understand why these quite big differences are caused, we analyzed the distribution of the expected levels of educational services (fig. 3 and table 1).

The basic formulation for main question of block of expectation is «Based on your experiences as a pupil in a school and as a student in a university, please think about the kind of HEI that would deliver excellent quality of service. Think about the kind of university in which you would like to study. There is no right or wrong answers – all we are interested in is the number that truly reflects your feelings regarding HEI would deliver *excellent quality of service*. For each question, please indicate how much you agree with the statement».

Questionnaire's perception block had a main question «Think about the university in which you study. There is no right or wrong answers – all we are interested in is the number that truly reflects your feelings regarding *your university deliver quality of service*. For each question, please indicate how much you agree with the statement».

All questions (statements) of that 2 blocks have Lickert Scale from -3 (completely disagree) to 3 (fully agree). Table 1 show that more than half of the statements have answers mostly at least 2 in expectation part, which indicates a very high level of anticipation requirements, demanded from HEI. Among the completed questionnaires, there were those in which all values of the expectation block were specified as maximum (fig. 3). It means that there is not a clear unambiguous understanding of what the expected level of service delivery means.

In (Metters, et al., 2006) in part «Definitions of Service Quality» presented description of «what constitutes quality service» and made some typology: Ideal, Should Expectation, Will Expectation (High Expectations), Minimally Acceptable, Will Expectation (Low Expectations), Worst Possible.

When we ask questions to respondents it is difficult to explain, describing what type of expected quality of service we would like to receive from the respondent. This is one of the main causes of the problem of interpreting responses which complicates the analysis of the difference between the expected (fig. 3) and the received (fig. 4) level of service. The same conclusion we got from the analysis of focus group interviews with students after the empirical part of the study.

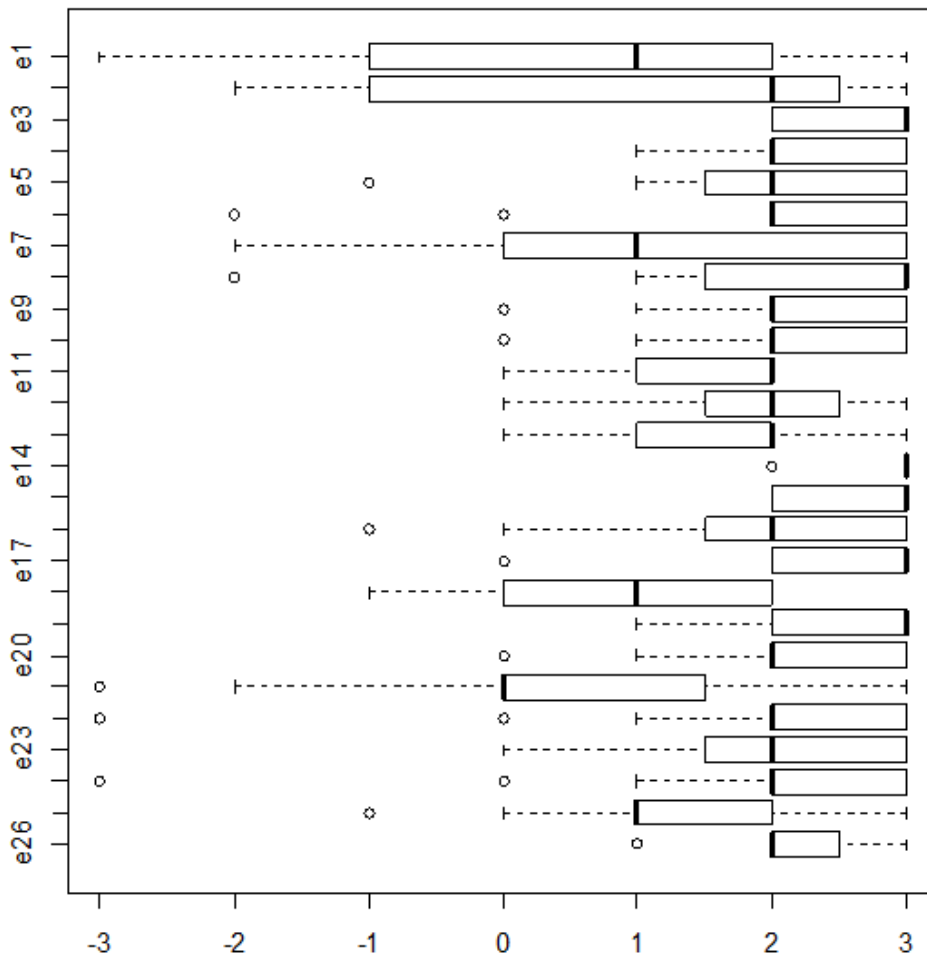
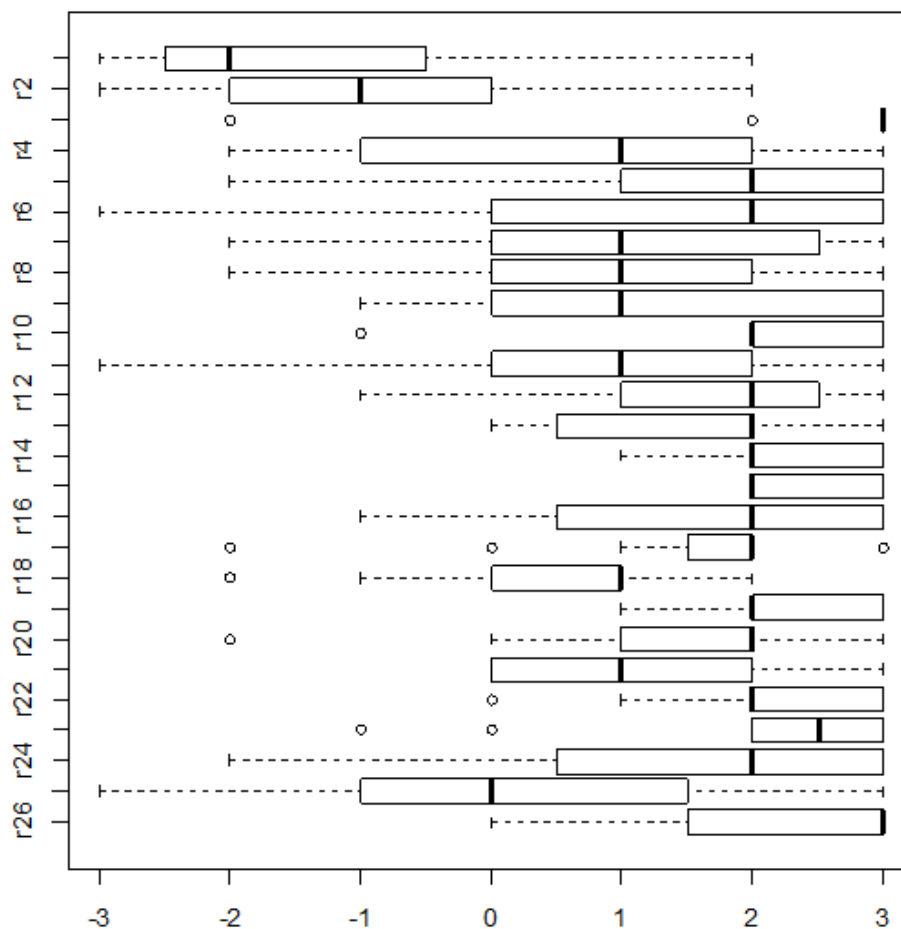


Figure 3. Distribution of Frequencies of Expected Level of Services SERVQUAL

A slightly different situation can be observed in the case of SERVPERF approach. Here the respondent does not need to assess the expected level of service first (26 questions of modified core of questionnaire), and then performed (another 26 questions). According to the results of the discussion after both

SERVQUAL and SERVPERF surveys, the most discomfort for students was at the stage of evaluation of the expected level of services. This is both due to the ambiguous understanding of the questions of the first part of the SERVQUAL questionnaire, and to the fact that for comparison (to assess the quality of the services perceived), students had to return to their answers at the beginning of the questionnaire, and often change them. Already this does not mean that SERVQUAL is the most comfortable at least during data gathering and later for interpretation. Since a large proportion of surveys are now conducted with online technologies, the compactness of the questionnaire is an extremely significant argument for reducing the percentage of item non-responses. In addition, an absolute majority of students supported the SERVPERF methodology both in terms of the compactness of the questionnaire and the clarity of the questions.



**Figure 4.** *Distribution of Frequencies of Perceived Level of Services SERVQUAL*

If to analyze the results of modified SERVPERF and the normalized SERVQUAL, the statistical difference between the medians of the corresponding answers will be significantly less for SERVQUAL perceived - SERVPERF than for SERVPERF - differences between the perceived and the expected services in normalized SERVQUAL (table 2).

As we can see from Table 2, in the case of checking the hypothesis about the statistical significance of the median differences between the perceived service level of SERVQUAL and the correspond median values of SERVPERF, it is not significant for most of the signs: in 16 out of 26 cases. When comparing medians of normalized SERVQUAL's level of service quality and SERVPERF we received 9 out of 26. In the table 2, we highlighted the bold ones that were the variables where the difference between the medians was significantly different, which leads to different conclusions from the two-sided paired Wilcoxon signed rank test.



*Table 2*

**Two-Sided Paired Wilcoxon Signed Rank Test, P-Value**

	Hypothesis of Median Equality of Normalized SERVQUAL (Normalized Difference of Perceived-Expected) and SERVPERF	Hypothesis of Median Equality of Perceived Service in Normalized SERVQUAL and SERVPERF
1	0.461	<b>0.017</b>
2	1	0.798
3	<b>0.006</b>	0.131
4	<b>0.004</b>	0.672
5	<b>0.009</b>	<b>0.028</b>
6	<b>0.027</b>	0.245
7	0.176	0.341
8	<b>0.011</b>	0.352
9	0.085	0.078
10	<b>0.028</b>	<b>0.007</b>
11	0.149	0.134
12	<b>0.004</b>	0.075
13	<b>0.007</b>	0.13
14	<b>0.003</b>	<b>0.036</b>
15	<b>0.008</b>	<b>0.007</b>
16	<b>0.004</b>	0.25
17	<b>0.003</b>	0.07
18	0.058	0.642
19	<b>0.004</b>	<b>0.036</b>
20	<b>0.006</b>	0.1
21	0.384	0.102
22	<b>0.032</b>	<b>0.016</b>
23	0.064	<b>0.027</b>
24	<b>0.022</b>	<b>0.015</b>
25	0.078	0.798
26	<b>0.003</b>	<b>0.017</b>

**Conclusion**

This paper is the first study in Ukraine that attempted to research the students' satisfaction of services' quality in HEI by modified perceived service quality models. Service quality estimation is needed for universities to monitor and improve the quality of their services and elaborate marketing strategy. It also could facilitate accreditation. The easiest way is to do it by online survey of students as consumers.

In our modification of SERVPERF we measure students' satisfaction of HEI as difference between expected and perceived levels of service in a chosen HEI.

In this study, we used nonparametric Wilcoxon signed rank test for the hypothesis of the statistical significance of the differences between the median values of the relevant components. Comparing the results, the medians of modified SERVPERF characteristics are closer to the SERVQUAL level of received service than to the normalized SERVQUAL difference. In addition, SERVQUAL requires more survey time and more questions, which is a negative factor, especially when conducting online surveys. So, modified SERVPERF is more convenient for students, smaller and more useful for online surveys.

In the future, we plan as further adaptation of the SERVPERF questionnaire, so as validation it and develop this methodology for assessing educational services of HEI in Ukraine. Although the results of this methodological study allow other researchers to conduct representative studies using an adapted questionnaire of SERVQUAL at their universities.

Knowledge of the differences in practical realization of two approaches of SERVQUAL and modified SERVPERF is necessary for online surveys of students from different universities in order to compare the quality of educational services provided in them, as well as to determine the relationship between the quality of educational services and international and national ranking positions of universities.

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**Appendices**

**Annex 1. Adapted Questionnaire of SERVQUAL.** Original was Taken from (Đonlagić & Fazlić, 2015), Adapted, Modified and Translated

Factor	№	Question
1	2	3
Tangibles	1	There are enough modern equipment on the faculty (university) to provide the educational process
	2	The buildings and premises of the universities are in good condition for study
	3	Faculty staff have a neat and decent appearance
	4	Training materials (curricula, training courses, etc.) are available and relevant
Reliability	5	Classes are scheduled and on time
	6	The dean's office is open at certain times and is accessible to students
	7	Auxiliary staff of the faculty (methodologists, laboratory assistants, etc.) supports and provides assistance to students
	8	Teachers have accurate records of the student's marks in the relevant courses
	9	Criteria for assessing student knowledge are honest and transparent
	10	Students are timely informed about the procedure and schedule of examinations, additional events and seminars, etc

*End of the Annex 1*

1	2	3
Responsive-ness	11	Students are familiar with the procedure for timely and prompt resolution of disputed issues
	12	Teachers are making efforts to ensure the best interests of students
	13	Teachers pay enough attention to students and help solve their problems
Assurance	14	Teachers have the necessary knowledge and skills to teach courses
	15	Teachers have sufficient communicative and pedagogical skills
	16	Educational programs are properly described, the content and learning outcomes are clear and clearly defined. Information about educational programs is accessible and understandable for students
	17	The quality of teaching in the educational program is high
	18	Teachers and staff of the faculty help to increase the confidence of students in themselves
	19	The reputation and the status of the university (faculty) among employers are high
	20	Teachers provide competent answers to students' questions
Empathy	21	Teachers have an understanding of the needs of students, paying particular attention to people with disabilities
	22	Teachers are friendly to the students
	23	Teachers treat all students equally and with due respect (equal rights for men and women, national minorities, foreign students, etc)
	24	Students can get a teacher's consultation by appointment at a fixed time or in absentia through the Internet (e-mail, distance education system, etc)
	25	Student feedback is taken into account by the faculty and faculty management to improve the educational process
	26	Faculty members are polite, friendly and professional in communicating with students