

STUDENTS' SATISFACTION INDEX ON CHEMISTRY LEARNING PROCESS

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Submission date: 31-Aug-2018 08:16AM (UTC+0700)

Submission ID: 995190613

File name: I_Wayan_Redhana.docx (76.05K)

Word count: 4086

Character count: 22718

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This study was aimed at describing the index of students' satisfaction in the chemistry learning process in SMAN 4 Singaraja Bali Indonesia and the factors that influenced it. For that, the survey research was conducted. The population was all students of the tenth and eleventh-grade students of groups of mathematics and natural sciences in academic year 2016/2017 in SMAN 4 Singaraja Bali consisting of 478 people. All population members became samples. Data were collected using a questionnaire. The numbers of respondents which returned the questionnaire were 431 people. Data were analyzed by descriptive statistics. The results of the study showed that the index of students' satisfaction viewed from a dimension of tangible, reliability, responsiveness, assurance, and empathy was 86.24%, 85.67%, 87.42%, 88.11%, and 85.18%, respectively, and all dimensions were quite high. Overall the index of students' satisfaction in the chemistry teaching and learning process was 86.19% and it was high.

Keywords: students' satisfaction, chemistry learning, service quality

INTRODUCTION

In today's global era, we need qualified human resources. Qualified in the sense of not only competent in mastering a number of science, technology, and skills but also qualified in the sense of character. Therefore, education is also seen as a process to humanize human beings. Humanizing human beings is a process to change the human character from bad behavior to good one because human beings understand ethics and rules and obey them.

In the education process, many components are involved, such as teachers, students, curriculum, facilities, and teaching materials. One of the important components of education is the learning process. In the learning process, students are transformed from someone who is less competent to someone who is more one. In order for this transformation process to be effective, efficient, and achieve the expected objectives, the government has set the National Education Standard (Government Regulation of Republic of Indonesia Number 19 the Year 2005). National Education Standards include graduate competency standards, content standards, process standards, assessment standards, educator and educational personnel standards, equipment and infrastructure standards, financing standards, and management standards. All educational institutions in the territory of the Republic of Indonesia must implement and achieve this National Education Standard.

Chemistry as one of the subjects studied at the senior high school level should be managed according to the National Education Standards. The chemistry learning process should refer to the process standards. Basically, the process of learning demanded in process standards is student-centered learning. Students must be able to construct knowledge through discovery. In other words, students as a subject of education, not as an object of education that only receive information from the teachers. Alternatively, the

students must act as a producer of ideas, not as a consumer of ideas.

Chemistry is the science of matter. Study of the matter is viewed from three levels, namely macroscopic, submicroscopic, and symbolic levels (Talanquer, 2011). The macroscopic level is related to something that can be seen or visible (tangible). Meanwhile, the submicroscopic level relates to something that cannot be seen but is logical. This microscopic level is related to particulates from the matter. Finally, the symbolic level relates to the use of signs (chemical formulas or reaction equations) to communicate ideas or concepts. Understanding these three levels is very important for the teachers in making a lesson plan. The lesson plan that integrates these three levels of matter can help students to understand the chemical concepts well. One measure of the students' satisfaction toward the learning is the ease with which students learn the concepts learned.

An educational institution is the same as a company. The company will survive and even grow if there are customers (Sapri *et al.*, 2009). Therefore, the customers must be noticed and fulfilled their hopes by the company that the company's sustainability can be maintained. In other words, the customers must obtain satisfaction with what is expected from the performance conducted or the product produced by the company. The customers' satisfaction is the feeling or attitude of the customer to the performance or service received by the customer. The satisfied customers will repeat to use the service and spread the positive message to other customers. Conversely, The dissatisfied customers are more likely to switch to other service providers. Besides, dissatisfaction will be reflected by negative words that will have an adverse impact on the institution or company. The satisfaction is the level of one's feelings after comparing perceived performance (outcome) with expectations (Tjiptono, 2008). This means that service quality can be the customers' perception of what is good and bad, or acceptable or unacceptable.

Likewise, educational institutions are like companies. The sustainability of the educational institutions is highly dependent on students. Students are major customers in the educational institutions (Farahmandian *et al.*, 2013). Therefore, the educational institutions should pay attention to students' satisfaction. Thus, the satisfaction is a function of experience. The satisfaction is also perceived as a deliberate performance to produce one's satisfaction (Malik *et al.*, 2010). If the institution is able to provide services that exceed customer expectations, then its services will be rated as good quality. Sopiati (2010) reveals that the students' satisfaction is a positive attitude of students to learning process implemented by teachers because there is a match between what is expected and the reality experienced.

SMA Negeri 4 Singaraja is one of the favorite senior high school in Singaraja city. SMA Negeri 4 Singaraja using the Curriculum 2013 is a school with accreditation A. Of course with the school accreditation, there is no doubt about the quality of education and learning process taking place in SMA Negeri 4 Singaraja. However, the evaluation of students' satisfaction toward the learning process, especially the chemistry learning, conducted by teachers in SMA Negeri 4 Singaraja has never been done. Therefore, this study is aimed at describing the students' satisfaction toward the chemistry learning process that takes place in SMA Negeri 4 Singaraja.

METHOD

This study was quantitative research using survey method. The study was conducted at SMA Negeri 4 Singaraja in the even semester of academic year 2016/2017. The population of this study was all students of class X and XI MIPA which amounted to 478 people. The number of students who returned questionnaires in the study was 431 students. Thus, the rate of return of questionnaires was 90.17%, which was classified as very high.

Measurement of student's satisfaction in this study using the Service Quality (ServQual) method. The ServQual method consists of five dimensions, namely tangibility, reliability, responsiveness, assurance, and empathy. Detail of each dimension is described by Yarimoglu (2014). Tangibility is an aspect relating to the physical facilities, equipment, and appearance of personnel. Reliability is an aspect relating to performing the promised service dependably and accurately. Responsiveness relates to help customers and provide prompt service. Assurance is an aspect relating to courtesy knowledge, ability of employees to inspire trust and

confidence. Empathy is concerned with caring, individualized attention the firm provides its customers.

Based on the ServQual method, researchers developed a questionnaire that used dimensions of tangibility, reliability, responsiveness, assurance, and empathy. The total number of items of the questionnaire developed was 45 items. The questionnaire was further validated by three experts, tested for readability by 10 students, and continued with validity and reliability test. Testing the validity and reliability of the questionnaire was performed to 31 students. The validity of the questionnaire is determined by calculating the product moment correlation coefficient of each item. Based on the results of the analysis using the product moment correlation coefficient, it was obtained that 42 items were valid, and the remaining of three items was not valid. All three invalid items were not used to measure the students' satisfaction. The results of the reliability of the questionnaire using the Alpha Cronbach test showed that the value of r -alpha was more than 0.8.

The valid items of the questionnaire for each dimension and attribute can be described as follows. The dimensions of tangibility with attributes of physical facility appearance consist of 14 items and appearance of teachers consist of 2 items. The dimensions of reliability with the attributes of teachers reliability in managing the class consist of 8 items and the reliability of the teachers in mastering the material consist of 3 items. The dimensions of responsiveness with attributes of speed in providing learning services consist of 3 items and the willingness to help learners consist of 2 items. The dimensions of assurance with attributes of students' trust toward teachers consist of 1 item, modesty in giving learning service consist of 1 item, and teachers' accuracy in responding to student's questions consist of 1 item. The dimensions of empathy with attributes of teachers' concern to students consist of 7 items. The entire questionnaire consists of 42 items (Table 1).

Table 1. Items of the questionnaire

SerQual	Items
Tangible	(1) Availability of LCD in the classroom
	(2) Quality of LCD in the classroom
	(3) Availability of classroom equipment (i.e. chairs, table, and board)
	(4) Quality of classroom equipment (i.e. chairs, table, and board)
	(5) Availability of laboratory equipment
	(6) Adequacy of laboratory equipment
	(7) Availability of laboratory materials
	(8) Adequacy of laboratory materials
	(9) Quality of laboratory equipment and materials
	(10) Availability of facilities in the

	chemistry laboratory (i.e. water, electricity, fume cupboard, and ventilation)	(37) The teachers' concern about the physical condition of students in the chemistry learning process
	(11) Quality of facilities in the chemistry laboratory (i.e. water, electricity, fume cupboard, and ventilation)	(38) The openness of teachers' attitude to students
	(12) Availability of multimedia learning program	(39) Teachers' concern in knowing the potency of students
	(13) Neatness of clothes of teachers in accordance with school rules	(40) Teachers' appreciation to students who excel
	(14) Cleanliness of the teachers' appearance	(41) The ability of teachers to provide motivation for students to study harder
	(15) Cleanliness and comfort of classrooms	(42) The teacher's positive relationship in interacting with students
	(16) Adequacy of room lighting naturally	
Reliability	(17) Proficiency of the teachers in delivering the subject	
	(18) The ease of the students in an understanding content of subject taught by the teachers	
	(19) Teacher's ability to create a conducive, effective, and efficient classroom atmosphere	
	(20) Compatibility of the learning method to the content of the subject taught	
	(21) Timeliness of the teachers in starting the lesson	
	(22) The ability of teachers to manage time in the learning process	
	(23) Timeliness of teachers in ending the lesson	
	(24) The ability of teachers to master the relevant concepts that support the chemistry subjects	
	(25) The ability of teachers to develop chemistry concepts creatively	
	(26) The ability of teachers to utilize multimedia learning programs in chemistry learning	
	(27) The ability of teachers to conduct learning evaluations	
Respon-	(28) Teachers' speed in answering students' questions	
siveness	(29) Teacher's speed in correcting students' test results and assignments	
	(30) Teachers' responsiveness in overcoming class disturbance	
	(31) The willingness of teachers to respond to students' complaints related to problems in the learning process	
	(32) The readiness of teachers in providing guidance to students who have problems in chemistry learning	
Assurance	(33) Teachers' enthusiasm for learning activities	
	(34) Courtesy of the teachers in behaving in the classroom	
	(35) Teachers' deftness in clarifying students' answers	
Empathy	(36) Teachers' concern about the learning difficulties of students in the chemistry learning process	

Each item of the questionnaire is viewed from the aspects of expectation and satisfaction or reality. There are five scales (1-5) for each aspect of expectation and the satisfaction. The five scales are from very unimportant (score of 1) to very important (score of 5) for aspects of expectation and from very dissatisfied (score of 1) to very satisfied (score of 5) for aspects of satisfaction. In responding to each questionnaire item, students chose one score of expectation (1-5) and one score of satisfaction (1-5), respectively.

The research data were the scores of expectation and satisfaction on chemistry learning process at SMAN 4 Singaraja. The students' satisfaction index is calculated by comparing the scores of satisfaction and the scores of expectation multiplied by 100% for both overall and for each dimension. The average scores of students' satisfaction index were then grouped by using categories in Table 2 below.

Table 2. Classification of the students' satisfaction index

Scores (%)	Categories
90-100	very high
80-89	high
70-79	quite high
60-69	low
<60	very low

Furthermore, the scores of expectation and the scores of satisfaction of students on the chemistry learning process for each item in the questionnaire were distributed into the Cartesian diagram. In the Cartesian diagram, there are two axes, namely X and Y-axis. X-axis was the student's satisfaction score, while Y-axis was the students' expectation score. The Cartesian diagram could be divided into four quadrants, i. e. quadrants I, II, III, and IV (Figure 1).

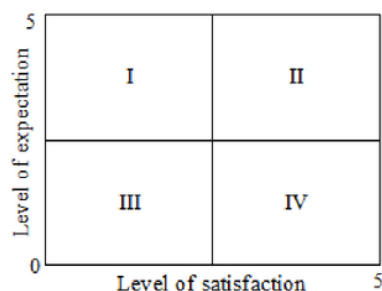


Figure 1. The Cartesian diagram for grouping the expectation and satisfaction scores

Quadrant I was called with the main priority area to be fixed because of the high expectation scores, but the low satisfaction scores. Quadrant II was an area that ought to be maintained because it was an area with the high expectation scores and the high satisfaction scores. Quadrant III was called an area with low priority because in this area it was found that the score of expectation and the scores of satisfaction were low, respectively. Quadrant IV was referred to as an excessive area because in this area it was found that the scores of expectation were low, while the scores of satisfaction were high so it was not a top priority to be improved.

RESULTS AND DISCUSSION

The students' satisfaction on the chemistry learning process is one important factor that must be measured in order to know the services provided by educational institutions, in this case of SMAN 4 Singaraja. The results of the study in the form of students' satisfaction index toward the chemistry learning process at SMAN 4 Singaraja could be described in Table 3.

Table 3. The index of the students' satisfaction to the chemistry learning process

Dimensi	The index of satisfaction	
	Range (%)	Average scores
Tangibility	79.39 – 93.80	86.23
Reliability	77.51 – 91.13	85.61
Responsiveness	85.39 – 89.88	87.42
Assurance	87.41 – 88.54	88.11
Empathy	83.43 – 87.22	85.18
Overall	77.51 – 93.80	86.17

The data above show that the students' satisfaction index toward the chemistry learning process at SMAN 4 Singaraja was high, both for each dimension and for the overall. The highest score of the students' satisfaction index was found in the dimension of assurance, while the lowest score of the students' satisfaction index was found in the dimension of empathy.

Distribution of the students' expectation scores and the students' satisfaction scores for each item of the questionnaire were shown in the Cartesian graph in Figure 2. The vertical and horizontal lines were

respectively the lines for the average score of students' expectations and the average score of students' satisfaction.

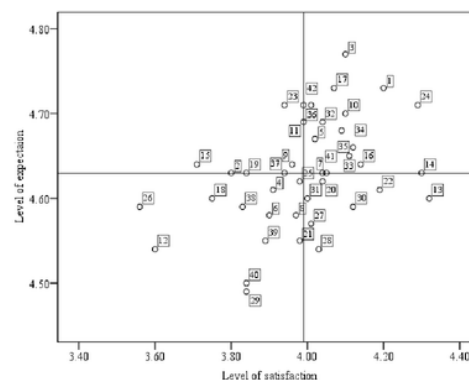


Figure 2. The relationship graph of the level of expectation and level of satisfaction of students toward chemistry learning process

Although the overall students' satisfaction index toward the chemistry learning process was high level, the distribution of expectation scores and satisfaction scores were found in four quadrants of a Cartesian diagram. This was because the dividing limit used was the average scores of the expectation scores and the satisfaction scores, respectively. The average score of expectation was 4.63, while the average score of satisfaction was 3.99. Both the average score of expectation and the average score of satisfaction were high.

Figure 2 showed that very few scores of the interaction between the level of expectation and level of satisfaction were found in the areas of quadrant I and IV, the rest were found in the areas of quadrant II and III. The area of quadrant I is the main priority area where the scores of satisfaction need to be improved, while the scores of expectation are high. The scores of satisfaction within the area of quadrant I that need to be upgraded were item of number 9 (quality of laboratory equipment and materials), 15 (cleanliness and comfort of classrooms), and 23 (timeliness of teachers in ending the lesson). Of the three items, only the item of number 15 whose satisfaction score was slightly different from the expectation score. Nevertheless, all three scores still need to be improved. According to the students, the quality of the laboratory equipment and materials is still not good. Some laboratory equipment were less clean and damaged or broken so students lack equipments at the time of the chemistry lab. In addition, students also stated that the classrooms were unclean because at the time of learning there was the waste so that students felt uncomfortable when they learnt. Likewise, the teachers ended the lessons not on time because they took students' breaks to complete the discussion of the problems.

The scores of satisfaction for the items within the area of quadrant I should be corrected. For the item of number 9, improvements that can be conducted are by providing new tools and chemicals so that the needs of

the students can be met. In the meantime, for the items of number 15 can be fixed by assigning the school cleaner to clean up the classroom or by assigning the students in turns to clean the classroom. For the items of number 23, the principal may encourage the chemistry teachers to make good teaching planning and implement it according to the time allocated. In this way, all the chemistry teachers will be able to finish chemistry lessons on time.

Quadrant II is an area that must be maintained because in this area both scores of expectations and scores of satisfaction are high. The items found in this area include the availability of LCD in the classroom (number 1), the availability of classroom equipment (i.e. chairs, table, and board (number 3), the availability of laboratory equipment (number 5), the availability of facilities in the chemistry laboratory (number 10), the adequacy of room lighting naturally (number 16), the proficiency of the teachers in delivering the subject (number 17), the ability of teachers to master the relevant concepts that support the chemistry subjects (number 24), the readiness of teachers in providing guidance to students who have problems in chemistry learning (number 32), the teachers' enthusiasm for learning activities (number 33), the courtesy of the teachers in behaving in the classroom (number 34), the teachers' deftness in clarifying students' answers (number 35), and the teachers' concern about the learning difficulties of students in the chemistry learning process (number 36).

Quadrant III is a low priority area because in this area the students' expectation scores are low, but the students' satisfaction scores perceived are also low. The quality of classroom equipment (number 4), the adequacy of laboratory equipment (number 6), the adequacy of laboratory materials (number 8), the availability of multimedia learning program (number 12), the ease of the students in an understanding content of subject taught by the teachers (number 18), the timeliness of the teachers in starting the lesson (number 21), the ability of teachers to develop chemistry concepts creatively (number 25), the ability of teachers to utilize multimedia learning programs in chemistry learning (number 26), the teacher's speed in correcting students' test results and assignments (number 29), the openness of teachers' attitude to students (number 38), the teachers' concern in knowing the potency of students (number 39), and the teachers' appreciation to students who excel (number 40).

Quadrant IV is an excessive area because the satisfaction perceived by the students is higher than the expectation. In other words, no improvement needs to be made to the items in this area. The items included the neatness of clothes of teachers in accordance with school rules (number 13), the compatibility of the learning method to the content of the subject taught (number 20), the ability of teachers to manage time in the learning process (number 22), the ability of teachers to conduct learning evaluations (number 27), teachers' speed in answering students' questions (number 28), the teachers' responsiveness in overcoming class disturbance (number 30), and the willingness of teachers to respond to students'

complaints related to problems in the learning process (number 31).

Measurement of the students' satisfaction, especially on chemistry learning process, is very important because students are the main customers in the educational institutions. The sustainability of the educational institutions is determined by students. If the educational institutions have students, then they will take place, otherwise, if they have no students, then they will close. Therefore, the students' satisfaction is an absolute to be fulfilled. If the chemistry learning process experienced by students in accordance with their expectations, then they tend to feel satisfied, whereas if the chemistry learning process perceived is not in accordance with their expectations, then they tend to feel less satisfied.

The results of this study prove that the quality of chemistry learning process has a positive effect on the students' satisfaction. This is in line with previous research (Fu, 2010; Suarman *et al.*, 2013; El-Hilali *et al.*, 2015). Meanwhile, the quality of the interaction of students and students, as well as students and teachers, has a strong effect on the students' satisfaction (Sher, 2009; Croxton, 2014; Prakash & Muhammed, 2016). On the other hand, the learning facilities can improve the students' satisfaction (Hanaysha, 2012; Hussain *et al.*, 2014; Kara *et al.*, 2016; Napitupulu *et al.*, 2016). The quality of services that includes learning facilities, consulting services, curriculum, tuition fees, and scholarships can improve the students' satisfaction (Farahmandian *et al.*, 2013). According to Butt & ur Rehman (2010), lecturers skills are a major factor affecting the students' satisfaction. Dib & Alnazer (2013) added that the imagery of the educational institutions has a positive effect on the students' satisfaction, and then this satisfaction has a positive effect on the students' loyalty (Antonios, 2011; Odunlami, 2014; Kunanusorn & Puttawong (2015).

Many benefits can be gained from the measurement of students' satisfaction in the learning process. First, these results can be feedback for a school principal as a policymaker at the school level and chemistry teachers at the curriculum implementation level to do continuous improvement (Onditi & Wechuli, 2017). In the concept of quality assurance, this is called continuous quality improvements. Secondly, if students are satisfied with the services received during the learning process, they will preach good things about their school. This will have a positive impact on the school in the future to reach prospective students. Third, the results give benefits for schools in raising funds. That is, if students get satisfaction with the learning process that followed, parents of students did not hesitate poured funds for the education of their children. In addition, the government, graduates, and businesses may also contribute funds for the advancement of education in the schools so that they can plan excellent programs in order to improve the quality of schools. Thus, the school will be a center of excellence in producing the best graduates. Fourth, the satisfaction perceived by students during the learning process can improve students' learning motivation (Mihanovic *et al.*, 2016) and ultimately will have a positive effect on the

students' achievement. The results clarify that the students' satisfaction correlates positively and significantly to the students' achievement (Martirosyan *et al.*, 2014; Afzal & Afsal, 2015).

Other research findings related to students' satisfaction are as follows. Students' satisfaction is influenced by service quality and directly related to behavioral intentions (Dado *et al.*, 2012; Dado *et al.*, 2013; Prakash, & Muhammed, 2016; Mestric, 2017). Seng & Ling (2013) reported that instructors, academic courses, learning resources and students' engagement had positive and statistical significant influenced on students' satisfaction. On the other hand, Saif (2014) clarified that quality service standards affect students' satisfaction levels.

2 CONCLUSION

Based on the results obtained in this study, it can be concluded that the students are satisfied with the chemistry learning process followed, both for whole and for each dimension. The dimensions of students' satisfaction index include tangibility, reliability, responsiveness, assurance, and empathy. The students' satisfaction index on the learning process is an important aspect that needs to be measured as feedback for the school principal and chemistry teachers in order to make improvements to the services provided and to the performance performed.

Based on the results of this study it can be suggested that the school principal and chemistry teachers should utilize the results to make improvements to the deficiencies found. The school principal needs to make a policy to conduct studies on the students' satisfaction toward the learning process in other subjects and also in other aspects of education.

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