

EXPERIENCES IN USING IT-BASED SERVICE TOWARD STUDENTS SATISFACTION AT UNIVERSITY (THE STUDY ON PRIVATE UNIVERSITIES IN CENTRAL JAVA INDONESIA)

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ABSTRACT

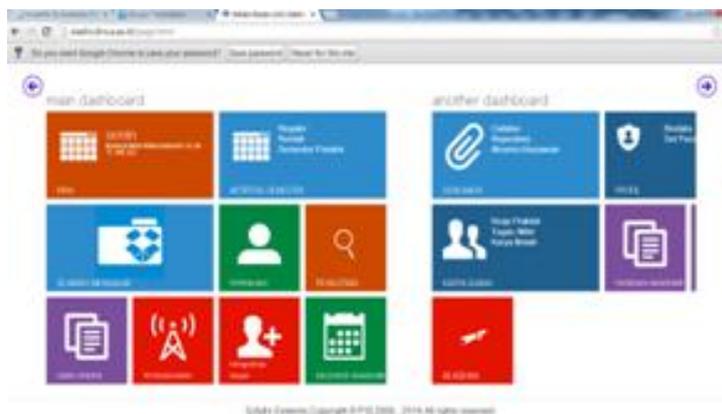
Information technology has become an integral part in the life of a universities. This research explores how the use of IT-based service experiences effect on students' perceptions of IT-based services and traditional services (represented by SERVQUAL) at university as well as perceptions of IT-based services and traditional services effect on student satisfaction. Sample data which is collected from several universities were tested by structural equation modeling approach by means of WarpPLS 3.0. The result shows that students evaluations on the options IT-based services and traditional services at the university is positively influenced by the experience in using information technology services provided by other service providers outside the university, such as ATMs, e-banking and m-banking. This study also identified that IT-based services effect on perception of traditional services. Furthermore, the perception of the IT-based services and traditional services affect student satisfaction.

Keywords: Information technology; Perception; IT-based service; SERVQUAL; Satisfaction.

1. INTRODUCTION

The world economic structure has now shifted towards the so-called digital economy. It is an economy based on knowledge and therefore it is called knowledge based economy. Dealing with the changes, information technology (IT) plays a major role in various aspects of life, such as political, economic, social, cultural and legal. This shift of economic structure has become a global phenomenon where Indonesia also takes active part. In response to this, the government began to pay special attention to the implementation and utilization of IT in Indonesia.

University is known as an institution which is quite familiar with the current use of information technology and the Internet for academic purposes like getting on-line academic information, browsing journals, consulting via e-mail, making teleconference/long distance learning, providing online courses and the likes. Aside from the academic purposes, the use of IT can also help students manage their administrative matters like doing re-registration, checking the course grades and many others. The spearhead of the internet technology is the web page displayed on the Internet sphere. Several previous studies (Comrie, 2011; Singh & Hardaker, 2014); indicate that the future of collaborative learning method is really needed to create a quality of learning and teaching. A number of universities in Central Java have already made use of the web pages to display educational information on history, classical lecture, curriculum and excellent products, academic schedule, research, student activities, scholarship, the use of e-mail and on-line course. Therefore, universities need to understand how to evaluate customer perceptions of IT-based services, which in turn have an impact upon overall satisfaction. There are many approaches that can be used with regard to the technology. IT-based constructs in this study adopted a construct that has been used by some previous researchers (Zhu *et.al*, 2002; Yen and Gwinner, 2003; Wang *et.al*, 2003; Janda *et.al*, 2002) that are expected to bring the perception of customers about the overall quality of services.

Figure 1: IT-based Service at Dian Nuswantoro University (www.dinus.ac.id)

Associated with this phenomenon, this study aims to investigate the relationship between IT-based services and customers' perceptions of service quality on customer satisfaction in the universities. In-depth study and continuous use of information technology and the Internet in learning will be an integral part of the overall effort in utilizing information technology to improve the quality of higher education.

2. LITERATURE REVIEW

2.1. Measurement of service quality

Company's ability to provide service to customers is one of the factors that determine the level of success and quality of the company. Therefore, the quality of service is important for the company. Overall quality of services are the characteristics of a product/service in terms of its ability to meet the needs that have been determined (American Society for Quality Control). Research in defining and measuring service quality is strongly influenced by the research conducted by Parasuraman *et.al*(1985, 1988, 1991). According to them, the quality of services is determined by factors like expected service and perceived service. If the services are received or perceived as expected, the perceived service quality is good and vice versa.

Dimensions of service quality in the SERVQUAL are purely built from traditional service delivery channels. Parasuraman conceptualizes service quality as "the relative perceptual distance customers' expectations and evaluations of service experience" and operationalize service quality using SERVQUAL scale commonly called (Parasuraman, 1988). SERVQUAL is a 22 item instrument are summarized in 5 (five) dimensions of services, namely : tangibles, reliability, responsiveness, assurance and empathy.

- a. *Tangibles*, ie the appearance of physical facilities, including equipment, personnel and means of communication.
- b. *Reliability*, the company's ability to keep and fulfill the promises given to customers with confidence.
- c. *Responsiveness*, quick response in reading and serving the desires or needs of consumers.
- d. *Assurance*, namely knowledge, reliability, and courtesy clerks as well as trustworthy and confident.
- e. *Empathy*, the personal care and attention given by the personal/ individual within the company to the consumer.

2.2. Information Technology and Service Quality

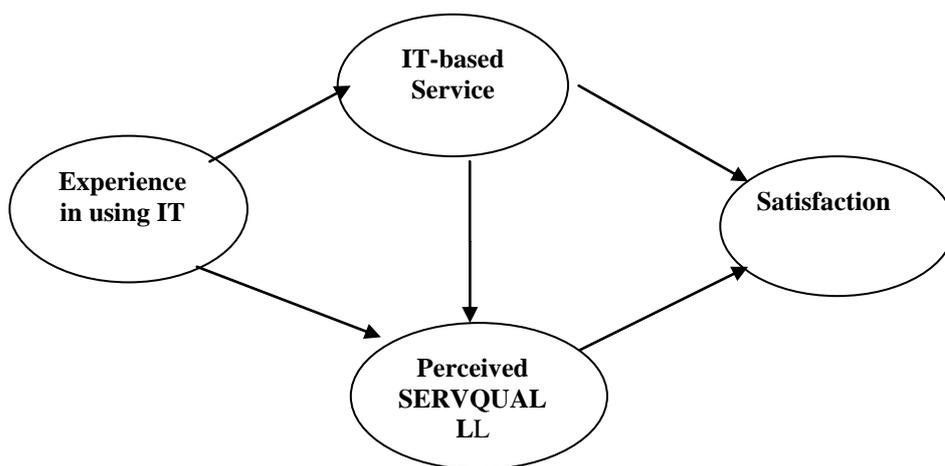
Nowadays, information technology has changed the shape of the services in many ways. Therefore, it is necessary to incorporate attributes of IT-based service delivery system as part of a service quality measurement (Zhu *et.al*, 2002). In an environment where goods and services are available in the form of digital information, customers can serve themselves without having a face-to-face encounter (Internet Self Service Technology). It is very crucial to maintain the continuous use of Self-Service Technology in order to obtain the customer perceptions. Basically, this study refers to the concept of IT-based services suggested by previous studies, such as the Yen and Gwinner (2003), lose a few attributes of Internet Self Service Technology (ISST) ie control, on performance, convenience, and efficiency. Wang *et.al*(2003), Technology Acceptance Model (TAM) found that computer self-efficacy had a significant effect on some of the things that are attached to internet technology, namely perceived usefulness, ease of use and credibility. Janda *et.al*(2002) found the variables of performance, access, security, sensation and information. The study results of Walker *et.al*(2002) include the capacity, desire for control, individual needs fulfillment, perceived accessibility and complexity, perceived risk, perceived relative advantage, and technical reliability. While Zhu *et.al*(2002) in IT-based services proposed variables ease of use, conservation of time, convenience, privacy, accuracy, multifunctional capabilities. Furthermore Moutinho and Smith (2000) in "Modelling bank customer satisfaction through mediation of attitude towards human and automated banking" generate ease of banking factor variable. Jun and Cai (2001) in his research lowering the 6 (six) dimensions of the online system, ie the content, accuracy, ease of use, timeless, aesthetics, and security. Croom and Johnson (2003) with the results of their research suggested ease of use and accessibility variables. In connection with the satisfaction and consumer dissatisfaction, Snellman and Vihkari (2003) found that the growth of a number of technology-based services, such as Internet services, self-service machines will bring customer complaining behavior on technology-based services. It means that the general failure to use technology is a natural thing both in terms of interpersonal services and technology-based services. In conducting an interpersonal communication, unfriendliness can cause dissatisfaction.

While dissatisfaction using the mediation of technology is usually associated with the failure of technology, service or process design services.

2.3. Hypothesized Model

Figure 2 shows the hypothesized model for the paper. This research focuses on the causal linkages among experiences in using IT-based services, constructs of traditional services which is represented by SERVQUAL, the perception of the IT-based services and student satisfaction.

Figure 2: Proposed Model



The constructs of experience in using are proposed to address the issue of which key variables would affect customer evaluations of IT-based services and their perceptions toward traditional service dimensions. The construct IT-based services is used to evaluate the service quality of IT-based service options in universities. The construct IT based service is linked to SERVQUAL to test the hypothesis that customer evaluations of IT-based services have a direct influence on the traditional service quality dimensions. Afterward, both perceived IT-based services and the SERVQUAL dimensions are causally linked to the customer satisfaction.

3. DATA COLLECTION AND ANALYSIS

3.1. Sample Data

The population of this study is the Private Universities in Central Java under the Coordinator of Private Universities region VI. There are 234 students selected as respondents by purposive convenience sampling. They are students of Dian Nuswantoro University, AKI University, Stikubank University, Soegijaprata Catholic University and Sultan Agung Islamic University, the 5 outstanding universities that already applied IT or on-line facilities on their daily services such as payment information, announcement of the study, re-registration, and providing information. The 234 students which are selected as respondents have some criteria such as active students, had been studying for a minimum of 5 semesters, never leave the college and IT-based services friendly. Therefore, they were able to tell their experience associated with utilizing IT-based service facilities well. The data were gathered by questionnaire. The questionnaire divided into four sections. Those are SERVQUAL, IT-based services, the experience in using IT and customer satisfaction.

3.2. Structural model evaluation

Goodness of fit measures. The model was tested by structural equation modeling approach by means of WarpPLS 3.0. The output displays 3 fit indicators, that is Average Path Coefficient (APC), Average R Squared (ARS), and Average Variance Inflation Factor (AVIF). The "p" value (Table 1) for a given indicator APC and ARS were calculated by resampling estimates and Bonferroni corrections like. This is necessary because both are calculated as the average of the parameters. The model is said to be fit if the significant rate of the APC and ARS is below 0.05 while the AVIF rate is lower than 5. The achievement of goodness of fit criteria model is made if the APC rate is 0.450 and 0.519 (Abrahams, 2010) is of the ARS and the significant rate is below 0.05. Meanwhile, AVIF rate of 1.924 also meets the criteria.

Table 1: Model fit and P Values

Model Fit	Value	Sign
APC	0,450	<0,001
ARS	0,519	<0,001
AVIF	1,924	

Latent Variable Coefficients. Latent variable coefficients presenting the results of the estimation are reported in the scientific literature, such as the coefficient of determination, instrument reliability, discriminant validity, full collinearity test and predictive validity. The coefficient of determination using R Squared which shows the percentage of the endogenous constructs can be explained by the constructs hypothesized to influence it. The higher the R Squared the better the model figures. Of the output is known that the value of R Squared 0.546 for IT-Based significant variation affects variation in IT-Based Experience by 54.6 % , while the R Squared value of 0.453 which means that SERVQUAL and IT-Based Experience variations affect IT Based value of 45.3 % and the value of R squared SATISF 0.557 which means that the variation in IT-Based and SERVQUAL affect SATISF variation of 55.7 % . Q Squared is used for the assessment of the predictive validity or relevance of a set of latent predictor variable on the criterion variable. Q Squared value must be greater than 0, of the output can be seen that the value of Q Squared has been above zero, so that the model showed good predictive validity. Composite Reliability and Cronbachs Alpha is a measure of the reliability of the instrument. Both should be worth above 0.7 (Fornell & Larcker, 1981); (Nunnaly, 1978). The output shows that the reliability of the instrument has met since it is worth above 0.7. AVE is used for the evaluation of convergent validity. The criteria must be above 0.50 (Fornell and Lacker, 1981). The output shows the criteria have been fulfilled. Full Collinearity VIF is full collinearity test results which include vertical and lateral multicollinearity. Criteria for full collinearity test is its value should be lower than 3.3 (Kock and Lynn, 2012); Kock, 2013). The output shows the full value of collinearity is less than 3.3 so that the model is free from collinearity problems vertical, lateral, and common method bias.

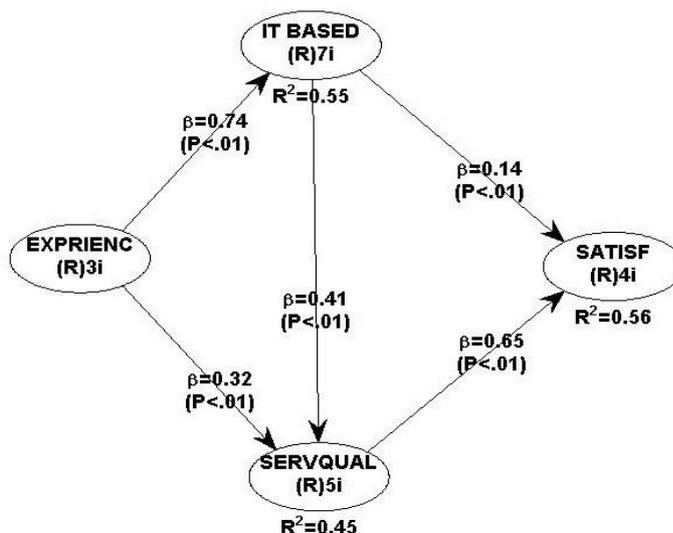
Table 2: Latent variable coefficient

	EXPERIENCE	IT BASED	SERVQUAL	SATISF
R Squared		0.546	0.453	0.557
Composite Reliab.	0.861	0.881	0.913	0.901
Cronbach's Alpha	0.756	0.841	0.879	0.853
Avg. Var. extrac.	0.674	0.516	0.679	0.695
Full collin. VIF	2.414	2.387	2.591	2.365
Q Squared		0.545	0.454	0.557

3.3. The structural equation model

The structural equation model relates the unobserved exogenous and endogenous variables. Experience in using IT as exogenous variables linked to perceived IT-based services and the constructs representing the SERVQUAL dimensions. Both perceived IT-based services and constructs representing the SERVQUAL dimensions are causally linked to the customer satisfaction (Figure 3).

Figure 3: SEM Model



The following tables present the estimated path coefficients (Table 3) and p values (Table 4). Column shows the latent variable predictor and criterion lines indicate latent variables. All of the estimates were significant at the 0.05 level.

Table 3: Path Coefficients

	EXPERIENCE	IT BASED	SERVQUAL	SATISF
EXPERIENCE				
IT BASED	0.739			
SERVQUAL	0.317	0.406		
SATISF		0.143	0.645	

Table 4: p Values

	EXPERIENCE	IT BASED	SERVQUAL	SATISF
EXPERIENCE				
IT BASED	<0.001			
SERVQUAL	<0.001	<0.001		
SATISF		0.007	<0.001	

4. DISCUSSION

4.1. Internet Usage Habits

The inherent nature of the Internet technology is accessible for 24 hours times 7 days a week anywhere and anytime. Regarding to this, the exposure presents an overview of the internet usage regarding the place to get connected to the Internet, the intensity, the variety of academic services and the purpose of accessing the internet.

Based on the place to get connected to the internet access, it is commonly found at campus, at home, or at internet cafes. From a variety of places to get the internet access, the majority of respondents (75.21 percent) accessed to the internet is at internet cafes. The rest amounting to 14.53 percent of the respondents are at campus, 8.12 percent and 2.14 percent at home in other places such as friends or relatives facility. Judging from the intensity of the Internet use shows that the Internet use as medium of interaction is relatively rare or is sometimes done within 1-3 times a week, or in other words it is not done with high intensity.

Although the Universities have provided the academic service-based internet, but the survey results show that the Internet has not been widely used for academic purposes, such as re-registration completion (12.39 percent), academic information (23.50 percent) and online courses (4.70 percent). The Internet is more widely used for non-academic interests such as keeping in touch with friends via social media and browsing for personal interests.

4.2. The Evaluation of IT-based Service

This study focus on the dimensions of IT-based services as mentioned in the previous section. Those are ease of use, convenience, efficiency, performance, credibility, sensation and information. As we seen on table 5, there are some dimensions of IT-based services rated high and some fairly. This could be mean that all respondents have good experiences in using IT-based services. Information is perceived highest dimension in student' evaluation. That's because related to the most basic internet adoption, informational. Internet-based services adoption by the collage enabling the college to provide and update some information any time. Thus, Internet-based services will make consumers get various of information easier. The second highest evaluation is efficiency. As we have known, internet services does not need face-to-face transaction. Therefore, internet service will save time and cost or makes transaction more efficient. This finding is in line with the findings of Yen and Gwiner (2003), which allows access expert system that exists only by e-mail. The lowest evaluation occurs on the dimensions of credibility. There are no personal contact in the IT-based, so there may not directly communicate any complaints to the failure or errors that might be occurred. Therefore, the evaluation of credibility dimension tend to low.

Table 5 IT-Based Service Dimensions Evaluation

IT Based Dimensions Services	Evaluation Score in Average	Remarks
Ease of use	3.51	High
Convenience	3.50	High
Performance	3.13	Fairly
Efficiency	3.63	High
Credibility	3.07	Fairly
Sensation	3.41	Fairly
Information	3.73	High

Source: Primary data

4.3. Evaluation of Traditional Services

This study found that the evaluation of the traditional services tend to be lower than the evaluation of IT-based services. As we seen on Table 6, all of SERVQUAL dimensions are rated fairly. At least, there are two argues related to this phenomenon. First, traditional services is the minimum standard services. Meanwhile, consumers tend to get more. Traditional services will be rated higher if there are quite excellent services. Secondly, this can be related to some limitations in traditional services such as the need of personal contact, queue, the performance of employee and physical evidence. Concerning with the evaluation on traditional services, thus research found that the highest evaluation is given to the assurance dimensions. This raises from presumption that the college's reputation or image also raises the confidence of respondents to the college. The 5 university in which this research conducted is the most popular and the biggest university in the city. Meanwhile, the responsiveness of the staff and employees to help customers and provide services got the lowest evaluation. Further investigation showed the traditional service is less flexible in terms of time (working hours) and distance. It was take a longer time to get manually services. Traditional services also depend on the performance of front office employees such as hospitality, technology literacy, technology efficacy, and emotion.

Table 6 Traditional Service Dimensions Evaluation

Servqual Dimensions	Evaluation Scorein Average	Remarks
Reliability	3.14	Fairly
Responsiveness	2.94	Fairly
Assurance	3.35	Fairly
Empathy	3.12	Fairly
Physical Facility	3.33	Fairly

Source: Primary data.

4.4. The Effect of experience using information technology-based services to the perception of the IT-based services and Traditional Services

The results showed that consumer evaluations on the options IT-based services and traditional services at the universities are positively influenced by the experience of using information technology services provided by other service providers outside the university, such as banking products (ATMs, e-banking, m-banking), and so forth. This study shows that the majority of respondents have a good or pleasant experience on the use of IT in higher education and the perception of good over IT-based services and traditional services at the college. As we have known, good or fun experience inclined to direct a person to perceive something that is related to his experience as a good thing. Conversely, if someone has a bad experience or less pleasant, it will tend to have a poor perception of the other related things. Thus, it could be mean that the more enjoyable consumer experience (in this case are students) in using of IT-based services in the past, the better evaluation of the IT-based services and traditional services provided by the university will be. Conversely, if someone had a bad experience in using IT-based services previously, then he will tend to give a negative evaluation. Person's perception of something is affected by several things, one of which is based on experience. Therefore, one's perception of something or some object or event and how people reacts is based on their experience or what they have learned of something or some object or similar incident in the past.

How experience of using IT influences IT based services perception can also be explained by the fact that technical factors such as what is seen and what is heard, the availability of information, the needs of perception is also influenced by past experiences. In other words, past experience is one important determinant in the formation of perceptions. Past experience can be regarded as a learning process. Even, there a proverb that says the experience is the best teacher. In this research, there are three indicators concerning with experience of using IT based service. Those are self-control in using IT, comfort in using IT and personal interaction. Generally, respondents have a good experience of using IT. However, the indicator of personal interaction is just quite well. It shows that personal interaction is still an important factor in service delivery. That is why, the experience of using IT-based services not only positively affects the IT-based services, but also positively affects the traditional services that need personal contact.

How experiences in using IT-based services effects the perception on IT-based service also figured by Zhu et al (2002). They found that customer experiences with IT-based services had a significant impact on perceived IT-based services. Customer evaluations of IT-based service options appeared to be affected by their experiences in using such services and perceived IT policies from service providers. This finding is also supported by several previous studies such as Walgito (2002) that stated perception is not only about the individual reaction to stimuli but also about the relevant individual experiences, motivations, and attitudes. Muchlas (2008), also explained that the experiences of the individual is different, then the stimulus may be perceiving something different and produce different perceptions and Putri (2009) and Puspitasari (2009) who disclosed that experience influences perception.

4.5. The Effects IT-based services on Traditional Service

There are advantages from IT based services. Students may obtain academic material beyond what local college provided. Therefore, many colleges in some of developed countries and developing countries implement technology-based learning process to improve the quality of teaching and learning (Comrie, 2011; Sing & Hardaker, 2014). They also develop Learning Pedagogies method, a method that involves or synthesis between traditional teaching/lecture that is still relying on talk and chalk (class room

activities) and group case study approach (the use of case studies and project based group work) so that students able to gather information online independently and continuously.

By IT-based services students also have the opportunity to access the information interactively and share to others. Assignments can be done through existing online media, which can be accessed with a web browser, thereby creating motivation and incentive for students to learn (eg. case studies) are offered online that assist students in applying theory into practice. Students may have a challenge to create their own case studies and benchmarking with other student groups. Thus, it can be said that there are several advantages of Internet technology-based teaching methods that students perceived, such as the interaction of adaptation, simulation, demonstration and integration. Universities can offer students an *interactive assignment* and provides an opportunity to hold the benchmark with other online assignment. The lecturers at universities also have the opportunity to review assignments online and offer guidance to students the task group and other tasks in an online college.

It can be said that the IT-Based services supporting learning process. IT-based services provide various facilities, both for students, faculty and other stakeholders. Therefore, this study hypothesized that IT-based services affect the traditional service which is reflected in SERVQUAL positively. The results of SEM analysis showed that the seven attributes of information technology-based services (ease of use, convenience, efficiency, performance, sensation, information and credibility) has a positive impact directly on the quality of the overall traditional services which include reliability, responsiveness, assurance, empathy and facilities. It means, the better experience in using the technology-based services, the better perception of traditional services will be. It also shows that in the conventional or classical universities IT-based services and traditional services are complementary, not a substitution. It is apart of campus facilities to facilitate services delivery. Some added values to the IT-based services will reinforce a positive perception over traditional services.

This study indicates that the use of IT-based services is relatively low. It also indicates that IT based services is not fully used for the benefit of such on-line academic administration, academic informations, online lectures, and other online services. Therefore, universities need to promote activity based IT services to students, so that the IT based services that provided by the universities give them more advantages. Universities need to promote that IT based services enabling students to interact, communicate and search for information in an effective, efficient, easy and comfortable. By applying IT-based services the college will gain more advantages, both for lectures and students. Students have the opportunity to accept the keynote seminars and complete the subject matter, rather than just relying on traditional material "chalk and talk". For lecturers, IT based services facilitates them to deliver course material, assignments, syllabi and other tasks. As we have known, there are some techno-logical benefits of IT. As mentioned by Abrahams (2010), the potential benefits are most evident in the technological benefits cluster. By Technology the collage able to enhance instruction, provide study guides and to simplify the registration process; to access of research articles, course material assignments and syllabi from anywhere at any time "and enables the collage to reach a variety of students...especially those with special needs".

4.6. The Effects of IT-based services and traditional services on Satisfaction.

This research didn't explore how IT-based and traditional services influence satisfaction simultaneously. However, partially the estimated model indicates that both the use of IT-based services and service quality perception have positive and significant on satisfaction. As mentioned previously, in a classical university/college IT-based services is part of campus facilities to more easily provide and receive services. IT-based and traditional services can be independently accessed. Therefore, IT-based service has positive and significant on traditional service.

As we have known, elements of services quality as conceptualized in the literature and measured by SERVQUAL involve quality accepted (perceived quality). Quality accepted is consumers' assessment of superiority or perfection of the whole entity (Zeithaml, 1988). Perceived quality is different from objective quality. Perceived quality is a form of attitude. It is related to but not the same as satisfaction. Perceived quality comes from a comparison between expectations and perceptions of performance.

Many studies have shown that perceived service quality is an antecedent of customer satisfaction (Lee, Lee, & Yoo, 2000). Other researchers, for example Spreng and Mackoy (1996) showed that there is a positive and significant relationship between perceived service quality and customer satisfaction. The literature regarding the perceived service quality and customer satisfaction emphasis on the idea that consumers will make a comparison between the performance of the product or service. The literature regarding the quality of service also explains the difference between perceived service quality and customer satisfaction is both a standard comparison of different uses (Bitner *et al.*, 1990; Zeithaml, 1993). Experts have suggested that the standard of comparison in the formation of satisfaction is predictive expectation (or what the consumer believes will happen).

Meanwhile, perceived service quality is the result of performance comparison of what customers feel about something that should be given by the service providers. Even though cause many conflicts of the constructs (Spreng & MacKoy, 1996; Oliver, 1993) states ".....verification of the use of the ideal expectation for quality and predictive expectation for satisfaction is needed".

The analysis of relationship perceived service quality on satisfaction variables showed that there is a positive and significant relationship. The results of this study can be used as a basis for explaining the relationship between the perceived service quality on satisfaction variables which is a positive and significant. The results of this study showed that satisfaction with the attributive service performance of an internet portal is a very important factor in generating overall satisfaction. Attributive service satisfaction has a high coefficient loading on overall satisfaction. Therefore, it is very important that an internet portal company frequently evaluate consumers' perceived satisfaction with its individual service performance, to know whether their performance is competitive in the market. Portal site performance is the key for securing consumers' overall satisfaction, and thus loyalty intention (Chiou & Shen, 2006).

The results of this study have implications that universities as service providers should think of some principles on perceived service quality mentioned by Cleland and Bruno (1996) as follows : a. The source of quality of products, non-product or whole needs (non-price needs) should sought to satisfy consumer needs. b. Quality exists only as is perceived by the customer. c. Perceived Quality assessed relative to competitors. Aaker (1991) also supported this finding. If "A" product is

simple but competing product is simpler than “A”, then the product “A” has quality. Conversely, if B offers a good product but the competitors’ product is better than “B”, then product “B” does not have a quality.

5. CONCLUSION

Using Structural Equation Modeling Approach with Warp PLS, this study shows that the experience of using IT based services provided by other service providers outside the university influences perception of the IT-based services and traditional services positively. It also shows that the perception of the IT-based services has positive impact to the traditional services and consumer satisfaction of overall services provided by the universities. Meanwhile, the perception of traditional services influences consumer satisfaction of overall services provided by the universities positively. It means the better experience of using IT based services provided by other service providers outside the universities, the better perception of the IT-based services and traditional services will be, and higher perceived the consumer satisfaction at the universities.

In conclusion, the findings of this study provide in-depth information for decision-making in higher education, especially regarding the use of IT for learning. By developing IT based services, higher education or universities may achieve higher levels of customer service. However, while developing IT-based service channels to their customers, higher education need to understand better where technology will or will not enhance customer service. Therefore, understanding how students evaluate IT-based service options and which factors affect their evaluations is needed. The universities will be in a better position to develop and promote IT-based services for the sake of achieving a higher level of service quality and students satisfaction. The satisfied students will be good marketer, effective and inexpensive for the college concerned. Finally, the finding of this research also can be implemented by other services providers. Nowadays, IT based services research topic tend to apply in service industries such as banking, education and many areas. Therefore, for further research, this research may be applied in manufacturing industries.

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