Key Influencers of Graduate Students' Satisfaction and Loyalty in Gocheck System

ปัจจัยที่มีอิทธิพลหลักต่อความพึงพอใจ และความภักดีในระบบ Gocheck ของนักศึกษาระดับบัณฑิตศึกษา

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ABSTRACT

The purpose of this study was to explain the factors that influence the satisfaction and loyalty of university graduate students toward Gocheck system. The factors studied include image, perceived values, perceived quality, service quality, satisfaction, trust, and loyalty. In this study, quantitative method was used for data collection from 500 respondents. Multi-stage sampling was applied, consisting of purposive sampling, stratified sampling, and convenient sampling to reach target respondents. The Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were used for data analysis to test model fit, reliability and validity of the constructs. The results explicated that trust had the strongest impact on students' satisfaction, followed by perceived value, image and indirect impact from perceived quality, respectively. Students' loyalty was solely impacted from satisfaction. Therefore, the universities and system developers are advised to strengthen the system reliability and accuracy to build trust, and improve the system features and performance to enhance perceived value and image for students' satisfaction, which can later form long-term commitment or loyalty in Gocheck system.

Keywords: Perceived value; Satisfaction; Loyalty; Graduate Student; Gocheck System

บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่ออธิบายปัจจัยที่มีอิทธิพลหลักต่อความพึงพอใจและความภักดีในระบบ Gocheck ของนักศึกษาระดับบัณฑิตศึกษา ปัจจัยดังกล่าวคือ ภาพลักษณ์ การรับรู้คุณค่า การรับรู้คุณภาพ คุณภาพการบริการ ความพึงพอใจ ความเชื่อมั่น และความภักดี งานวิจัยนี้ได้วิจัย เชิงปริมาณจากตัวอย่าง 500 คนโดยใช้วิธีการสุ่มตัวอย่างแบบหลายขั้นตอนประกอบไปด้วย การสุ่มแบบเจาะจง การสุ่มตัวอย่าง แบบชั้นภูมิ และการสุ่มตามความสะดวกเพื่อให้เข้าถึงกลุ่มเป้าหมาย ข้อมูลที่ได้ถูกวิเคราะห์โดยใช้รูปแบบ การวิเคราะห์องค์ประกอบเชิงยืนยัน และการวิเคราะห์โมเดลสมการโครงสร้าง เพื่อยืนยันความเหมาะสม ของโมเดล และความน่าเชื่อถือของผลวิเคราะห์ ผลการวิจัยพบว่าความเชื่อมั่นส่งผลต่อความพึงพอใจของ นักศึกษามากที่สุด ตามด้วยการรับรู้คุณค่า ภาพลักษณ์ และผลกระทบทางอ้อมจากการรับรู้คุณภาพ ความภักดีของนักศึกษาได้รับอิทธิพลจากความพึงพอใจเท่านั้น ดังนั้นสถาบันศึกษาและนักพัฒนาระบบ ควรให้ความสำคัญต่อการสร้างความน่าเชื่อถือและความถูกต้องของระบบเพื่อเพิ่มความเชื่อมั่นในการใช้ งานต่อนักศึกษา รวมถึงเสริมสร้างคุณค่าและภาพลักษณ์ผ่านการพัฒนาคุณสมบัติและประสิทธิภาพ ของระบบเพื่อความพึงพอใจและการใช้งานระบบ Gocheck ในระยะยาว

คำสำคัญ: การรับรู้คุณค่า; ความพึงพอใจ; ความภักดี; นักศึกษาระดับบัณฑิตศึกษา; ระบบ Gocheck

Introduction

1. Background of the Study

Although academic misconduct has begun in the American academics has begun in the late 1940s, it didn't draw attention until Breuning's fraud incident in 1987. Not only in America, Chinese explanatory research on academic misconduct has also begun to appear in Chinese academia after the incident. Breuning's case has drawn attention and highlighted the importance of breaching academic misconduct as his fraudulent scientific studies have impacted publicly through wrong influence of policy and patients' treatments (Boffey, 1987). The U.S. Bureau of Public Health has then officially defined academic misconduct as falsification, or plagiarism that materially deviates from the rules when conducting or reporting research (Tao & Huang, 2017).

Tong Yuan is a Chinese national high-tech enterprise which has successfully applied the ultra-large scale data mining technology for launching Gocheck to the national graduation thesis review. Sources of Gocheck consist of Chinese literatures, newspapers, foreign literatures such as Emerald, HeinOnline, and published thesis. Gocheck has more than 8 million users and 15 million service time with less than 5 minutes of review time (Gocheck, 2020). Teng et al. (2011) have stated that China's

education pays attention to the cultivation of research but neglects the academic ethics. Hence, Chinese businesses were working on tackling academic misconduct and effectively improve the integrity. Among them, Gocheck system had partnered and a wide market share in provinces of Yunnan Hunan, Hubei, and Henan in China (Gocheck, 2019).

By studying the graduate students behavioral towards the Gocheck system, this research can provide insights to universities, system developers, and other researchers on key influencers of their satisfaction and loyalty in the detection system. It can be used for the effective and efficient system's development, selection, and usage.

Research Objectives

1. To determine whether image, perceived value, perceived quality, and service quality significantly impact the graduate students' satisfaction in Gocheck.

2. To determine whether satisfaction, and trust significantly impact the graduate students' loyalty in Gocheck.

3. To provide suggestions to universities, and system developers to develop and implement effective system that could enhances students' satisfaction and loyalty based on this research findings.

Literature Review

Image (I)

The company image is a kind of intangible asset, which was easy to identify, but difficult to imitate. It refers to the customers' impressions, and thoughts on the company (Minkiewicz et al., 2011). Chang and Yeh (2017), and Jeong and Kim (2020) believe that company image correlates with customer satisfaction. Brand image should be infiltrate to the mind of customers to enhance their satisfaction. So, the following hypothesis was proposed:

H1: Image has significant impact on satisfaction.

Perceived Value (PV)

Perceived value is defined as the cognition of customers on the product in terms of price, time, and convenience gains and sacrifices. (Zameer et al., 2015). Ball et al. (2004), and Chatterjee et al., (2018) stated that the perceived value is a predictor of customer satisfaction. Perceived value has a regulating effect between perceived quality and satisfaction. So, the following hypothesis was proposed:

H2: Perceived value has significant impact on satisfaction.

Perceived Quality (PQ)

The perceived quality was defined as the evaluation of goods or services based on the customers' judgment

(Rowley, 1998). The product quality could improve customers' perceived value (Cobelli et al., 2019; García-Fernández et al., 2018). The perceived quality can influence customers' perceived value and satisfaction towards the product as it shows the brand's advantages (Gonçalves et al., 2020; Murfield et al., 2017; Samudro et al., 2020). So, the hypotheses were proposed:

H3: Perceived quality has significant impact on perceived value.

H4: Perceived quality has significant impact on satisfaction.

Service Quality (SQ)

Parasuraman et al. (1988) refers service quality to customers' evaluations between their expectation and perception of the service under normal circumstances. The higher the service quality, the better the customer satisfaction (Foroudi et al., 2018; Gong & Yi, 2018). Service quality promotes satisfaction, and further generate their loyalty (Ofori et al., 2018). Therefore, the hypothesis was proposed:

H5: Service quality has significant impact on satisfaction.

Trust (T)

Yousafzai et al. (2003) believes that trust is a person's desire for others to act in his best and serve long-term interests. Agarwal and Narayana (2020), Bricci, et al. (2016) and Wahyoedi (2017) proven that trust

and satisfaction were related as confidence in the products can maximized satisfaction. Trust is necessary to sustain long-term relationship as it can stimulate continuance purchase (Esterik-Plasmeijer & Raaij, 2017). So, the hypotheses were proposed:

H6: Trust has significant impact on satisfaction.

H8: Trust has significant impact on loyalty.

Satisfaction (SA)

Satisfaction is defined as positive emotions that people feel when goods or services met their expectations (Pizam et al., 2016). Jahan et al. (2019), Kotler et al. (2017), and Ofori et al. (2018) agreed that satisfaction was the antecedent of loyalty. The positive feeling on product can help sustain relationship over time. Therefore, the following hypothesis was proposed:

H7: Satisfaction has significant impact on loyalty.

Loyalty (LOA)

Customers' loyalty could be defined as the intense promise and aspiration that they would sustain patronizing the goods or service (Tweneboah-Koduah & Farley, 2015). Customers will continue to buy the same goods and services, regardless of persuasive environment on purchasing behavior (Jacoby & Kyner, 1973).

Conceptual Framework

The conceptual framework in Figure 1 developed based on previous studies. Firstly, the study on significance of image, perceived quality, perceived value, satisfaction, trust and loyalty (Ball et al., 2004). Secondly, the study on significance of image, service quality, and satisfaction of university students (Michael et al., 2013). Lastly, the study on trust, e-service quality, and satisfaction (Kundu & Datta, 2015).
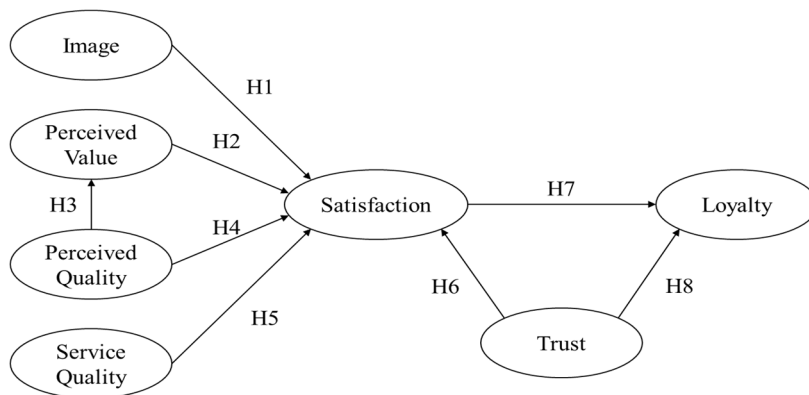
Figure 1 Conceptual Framework

Research Methodology

This study used questionnaires for quantitative data collection by distributing online and offline to the targeted students. The questionnaire consisted of screening questions, variable measurement with five-point Likert scale, and demographic profile. Prior to distribution, reliability of variable items was confirmed by ensuring the three experts rating of index of item–objective congruence over 0.5 (Turner & Carlson, 2003) and Cronbach's Alpha value over 0.7 (Nunnally, 1978) from pilot test of 30 samples. The collected data of 500 samples used Confirmatory Factor Analysis and Structural Equation Model to test the model fit and validity, and hypotheses. The results are outlined in the next section.

1. Population and Sample Size

The target population was graduate students with experience in Gocheck and studying in three majors of Yunnan Normal University, China that are currently employing Gocheck system. The recommended sample size from A-priori Sample Size Calculator for Structural Equation Models (Soper, 2006) was at 425, which 500 data sets were collected.

2. Sampling Technique

The researcher used multi-stage sampling to scope the population to target respondents, includes purposive sampling, stratified sampling, and convenience sampling. As there are numbers of Chinese universities partnered with Gocheck system, purposive sampling was firstly used to select Yunnan Normal University and its three majors that are currently using Gocheck system for academic misconduct detection. Then, to ensure the sample size in each major is representative, stratified sampling was applied to proportionately allocate sample size among three majors (Yunnan Normal University, 2021) per Table 1. Afterwards, the researcher employed convenience sampling to distribute questionnaire to graduate students who are willing and available to participate.

Table 1 Sample Units and Sample Size

Three Majors of Yunnan Normal University	Population Size	Sample Size
Primary education	156	150
Mathematics and Applied Mathematics	186	179
Biological sciences	178	171
Total	**520**	**500**

Research Results

1. Demographic information

The profile of 500 respondents was concluded as females at 72.2% (361) and males at 27.8% (139). Respondents were age at 18-25 years old for 57.2% (286), followed by 26–33 years old for 32.4% (162), and 34–60 years old for 10.4% (52).

2. Confirmatory Factor Analysis

Confirmatory Factor Analysis or CFA result has proven convergent validity, and discriminant validity. In table 2, Cronbach's Alpha (CA) values exceeded 0.7 (Nunnally, 1978), Average Variance Extracted (AVE) and factor loading were higher than 0.50 (Fornell & Larcker, 1981), and Composite Reliability (CR) were above 0.7 (Hair et al., 2016).

According to Fornell and Larcker (1981), discriminant validity was measured by computing the square root of AVE and confirmed as all correlations were greater than the corresponding correlation values as shown in table 3.

Table 2 Confirmatory Factor Analysis Result

Variable	Source of Questionnaire	Item	CA	Factor Loading	CR	AVE
I	Michael et al. (2013)	3	0.871	0.782-0.864	0.870	0.690
PV	Chatterjee et al. (2018)	3	0.831	0.743-0.816	0.833	0.625
PQ	Gonçalves et al. (2020)	3	0.815	0.726-0.778	0.804	0.578
SQ	Özkan et al. (2020)	3	0.769	0.595-0.791	0.772	0.535
T	Levy and Hino (2016)	3	0.783	0.607-0.804	0.778	0.543
SA	Dehghan et al. (2014)	2	0.650	0.651-0.857	0.730	0.579
LOA	Martínez (2015)	3	0.862	0.799-0.842	0.863	0.678

Table 3 Discriminant Validity

	I	PV	PQ	SQ	T	SA	LOA
I	**0.830**						
PV	0.732	**0.791**					
PQ	0.660	0.643	**0.760**				
SQ	0.622	0.616	0.698	**0.731**			
T	0.606	0.640	0.695	0.725	**0.737**		
SA	0.652	0.674	0.673	0.625	0.706	**0.761**	
LOA	0.636	0.724	0.654	0.666	0.711	0.748	**0.823**

Note: The diagonally listed value is the AVE square roots of the variables

3. Structural Equation Model

Structural equation model (SEM) is used in the study was to compare models and test hypotheses (Wong et al., 2013). The goodness of fit indices for SEM was measured to test fitness of structural model after modification. The statistical values for each index were greater than acceptable threshold, therefore the structural model was fit as shown in table 4.

Table 4 Goodness of Fit

Index	Acceptable Values	Statistical Value
CMIN/df	<5.0 Al-Mamary and Shamsuddin (2015)	4.070
GFI	>0.85 Sica and Ghisi (2007)	0.901
AGFI	>0.80 Sica and Ghisi (2007)	0.852
CFI	>0.90 Hair et al. (2006)	0.939
TLI	>0.90 Hair et al. (2006)	0.918
NFI	>0.90 Hair et al. (2006)	0.921
RMSEA	< 0.08 Pedroso et. al. (2016)	0.078

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index, and RMSEA = Root mean square error of approximation

4. Hypothesis Testing Result

The significance of each variable was investigated from its standardized path coefficient (β) and t-value. Per Table 5, H1, H2, H3, H6, and H7 were supported, meanwhile H4, H5, and H8 were not supported. Loyalty was only significantly impacted by satisfaction, and satisfaction were significantly impacted by trust, perceived value, and image, respectively. Perceived quality had an indirectly impact on satisfaction through perceived value.

Table 5 Hypothesis Result of the Structural Model

Hypothesis	Path	Standardized path coefficients (β)	S.E.	t-value	Test result
H1	I =>SA	0.256	0.076	2.455*	Supported
H2	PV => SA	0.644	0.095	5.739*	Supported
H3	PQ => PV	0.931	0.051	16.165*	Supported
H4	PQ => SA	-0.288	0.125	-1.739	Not Supported
H5	SQ => SA	-0.328	0.232	-1.496	Not Supported
H6	T => SA	0.779	0.254	3.222*	Supported
H7	SA => LOA	0.872	0.133	8.371*	Supported
H8	T => LOA	0.088	0.125	0.938	Not Supported

Note: *p<0.05

The results from table 5 can be refined as the following:

H1: Image had significant impact on satisfaction. The finding was aligned with studies that the image of the brand can results to the students' positive impression and satisfaction towards the system (Chang & Yeh, 2017; Jeong &Kim, 2020).

H2: Perceived value had significant impact on satisfaction. Hence, proven that perceived value or net benefits gained from using system is one of the key predictors of satisfaction, aligned with Ball et al. (2004) and Chatterjee et al., (2018).

H3: There was a significant impact of perceived quality on perceived, which consistent with Murfield et al. (2017). It Implies that perceived value has regulated impact from perceived quality and the higher quality, the higher system value perceived by the students (García-Fernández et al., 2018).

H4: There was a lack of impact from perceived quality on satisfaction. The quality or comprehensive benefits of the system doesn't form students' satisfaction but enhances the system value. This indirect relationship was consistent with previous studies of García-Fernández et al. (2018) and Gonçalves et al. (2020).

H5: Service quality has no impact on satisfaction. The service quality offered by the system was not superior enough to enable students' satisfaction after use. The finding was contradicted that research of Foroudi et al. (2018) and Ofori et al. (2018).

H6: Trust has significant impact on satisfaction. The finding was agreed with the studies of Bricci, et al. (2016) and Wahyoedi (2017) that the students' confidence in the system can maximized their satisfaction.

H7: There was a significant impact of satisfaction on loyalty. It implies that if the students are satisfied with Gocheck, they are likely to continue using the system as satisfaction is the key contribution of loyalty (Jahan et al., 2019; Kotler et al., 2017).

H8: Loyalty was not impacted by trust. The confidence and reliability on Gocheck system does not directly stimulate the continuance usage by the students. It instead creates satisfaction, which can later form loyalty. This lack of direct relationship agreed with Tabrani et al. (2018).

Discussion

This paper focuses on examining the significant influencer of graduate students' satisfaction and loyalty on Gocheck system in Yunnan, China. Eight hypotheses were proposed from conceptual framework. The questionnaires were developed and given to 500 graduate students who have been

using the Gocheck system and studying in three majors from Yunnan Normal University. CFA and SEM were carried out to test for validity and reliability of the model, and test hypotheses.

The research has derived with the findings that five out of eight hypotheses were supported. Satisfaction has positively impacted loyalty, whereas trust has no direct relationship on loyalty. This aligns with Ofori et al. (2018) that students' satisfaction is vital for sustaining loyalty. The antecedents of satisfaction were impacted by trust, followed by perceived value and image. Perceived quality and service quality has no direct impact on satisfaction. As the system promotes academic integrity, system reliability and accuracy are important. The confidence that students have in Gocheck can create satisfaction as it met their expectation (Wahyoedi, 2017). Also, the qualified features of Gocheck can added values to the system and to their satisfaction. The system must fit their needs of effectively detecting any academic misconduct (Chatterjee et al., 2018). Lastly, the brand image is related to the students' satisfaction. The results and experience using Gocheck system then should portray the promises and positioning of the system (Chang & Yeh, 2017).

Recommendation

Through investigation and research, the key influencers of graduate students' satisfaction and loyalty in Gocheck system were trust, perceived value, image, and perceived quality. For policy recommendation, encouraging the usage of academic misconduct detection system can help promotes the accuracy and transparency of papers review. To ensure an effective use, the system performance, reliability, consistency, and data privacy should be well defined, secured, and demonstrated to build trustworthiness for users or students. Secondly, on managerial recommendation, the system developers, universities, and lecturers should be able to present the net benefits gained from using Gocheck, e.g., features, results accuracy, academic integrity versus time spent on reviewing, and convenience in using. Also, the system should be able to operate, and deliver results as intended to fulfil its promises. On academic recommendation, academic integrity, moral and training on system should be emphasized to students to cultivate and deliver key messages on objectives and benefits for their understanding and expectation.

For further study, the target group can be extended to other schools, universities or other geographical region

that uses Gocheck which may derive with different finding and suggestions. Also, other research theory can be integrated for instance DeLone and McLean successful model to gain insights on system attributes that significantly impact graduate students' satisfaction and loyalty.

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