Modeling the relationship of factors that shaped student’s loyalty

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Abstract. Student’s loyalty is the intention and behaviour of students that shows devotion to the institution by contributing to expand it. Having loyal students can increase the reputation and number of applicants because loyal students promote the institution from mouth to mouth. Even when they have graduated, they would still support their institution financially or in the form of collaborations. These contribute to the long-term development and the longevity of the institution. This study is made to find out about the factors that influence the level of student’s loyalty. 233 samples are gathered using complex sampling. Students in their second to third year are chosen, then they are stratified by department and random sampling is done under each stratum. From the result that uses the method Partial least square (PLS) path modelling, it shows factors that influence student’s loyalty respectively from the ones with the greatest influence are student’s satisfaction, student’s affective commitment, social environment quality, image and reputation perception, student’s perceived value, student’s trust, social integration, instructor quality, and administration quality.

Keywords: partial least square, student’s loyalty.

1. Introduction
Student’s loyalty is the key factor that contributes in long term growth of the university by giving financial stability, increasing enrolment, and increasing reputation [1]. Loyal students can increase enrolment and reputation by doing mouth to mouth promotion [2].

2. Model
The proposed model in Taedarungroj [1] is described in figure 1, the circle objects are the variables and the arrows show the direction of the relationship. Figure 1 describes that:

- Student’s loyalty is affected by student’s trust, student’s affective commitment, student’s satisfaction, student’s perceived value, and image & reputation perception.
- Student’s trust is affected by instructor quality and administration quality.
- Student’s perceived value is affected by student’s trust and instructor quality.
- Student’s satisfaction is affected by student’s trust, student’s perceived value, instructor quality, administration quality, physical environment quality, social environment quality, and curriculum quality.
- Student’s affective commitment is affected by student’s satisfaction and student’s trust.
- Image and reputation perception is affected by student’s satisfaction.

Apart from variables and relationships, which included in Taedarungroj [1], there are some variables and relationships that also played a role in shaping student’s loyalty either directly or indirectly through other variables. Activity integration, social integration, and external activity are expected to
Table 1. Definitions of variables used in research.

| Variable                        | Definition                                                                                                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Student’s loyalty               | Student’s intentions and actions that show devotion into the faculty by participating in developing it.                                   |
| Student’s satisfaction          | Overall pleasurable feelings and attitudes of students toward the faculty.                                                                 |
| Student’s trust                 | Confidence toward integrity and reliability of the faculty based on student’s own experiences.                                            |
| Student’s affective commitment | Positive attachment perceived by students toward the faculty caused by their emotions.                                                     |
| Student’s perceived value       | Perception of benefit obtained by students compared to cost to get that benefit.                                                           |
| Image and reputation perception | Student’s perception about image and reputation of the faculty and how it is viewed by the public.                                        |
| Instructor quality              | Overall judgement towards instructor of the faculty.                                                                                     |
| Administration quality          | Overall judgement towards administration of the faculty.                                                                                 |
| Physical environment quality    | Overall judgement towards physical environment of the faculty.                                                                             |
| Social environment quality      | Overall judgement towards social environment of the faculty.                                                                            |
| Curriculum quality              | Overall judgement towards curriculum of the faculty.                                                                                      |
| Social integration              | The level of student’s integration into social system in the faculty viewed from their acquaintance and friendship with fellow students. |
| Activity integration            | The level of student’s integration into the faculty activities viewed from their participation.                                           |
| External commitment             | Student’s commitment into activities outside the faculty.                                                                                  |

Figure 1. Proposed model by Taecharungroj [1].

affect student’s commitment [2], these variables are included in this research to be confirmed. Mazzarol and Brown [3] find that student’s perceived value is affected by image and reputation perception. This relationship is added in this research to be confirmed. The model proposed in Taecharungroj [1] guessed that student’s satisfaction affects image and reputation perception but another study finds that image and reputation perception affects student’s satisfaction [4], the second relationship is used in this research because it makes more sense based on these variables definition. Based on the additional information, the proposed model in Taecharungroj [1] is modified into model in figure 2 which add activity integration, social integration, and external activity. This model is used to study student’s loyalty from one faculty as a research sample. The definitions of variables in figure 2 is shown in table 1.
3. Experimental method

The $\beta$ coefficients in figure 2 shows the strength of the relationship between variables. The relationship between variables in the proposed model in figure 2 is meant to be tested in this research under these hypotheses:

- $H_0: \beta_i = 0$ (There is a relationship between variables) for $i = 1, 2, 3, ..., 22$
- $H_1: \beta_i \neq 0$ (There is no relationship between variables) for $i = 1, 2, 3, ..., 22$.

To test these hypotheses, 233 samples are gathered using complex sampling. Students in their second to third year are chosen, then they are stratified by department and random sampling is done under each stratum.

The model is built using partial least square (PLS) path modeling and bootstrap validation with $\alpha = 0.05$ to test significance of $\beta$. Given the value of the indicator variables $X$ as the input, PLS algorithm generates the weight of indicator $w$ in shaping latent variable $\xi$, the score of the latent variable, and the relationship of each latent variable $\beta$ as the output. PLS algorithm used in this research follows Löhmoller’s algorithm [5] but this research use path scheme instead of centroid scheme because it considers the direction of the relationship. Path scheme takes the regression coefficient between $v_q$ and the $v_q'$ if $v_q$ plays the role of dependent, or takes the correlation coefficient in case it is a predictor [5]. Following PLS algorithm are used in this research:
Input: \( X = [X_1, \ldots, X_q, \ldots, X_Q] \), i.e. \( Q \) blocks of centered indicator variables;

Output: \( w_q, \xi_q, \beta_j \);

1. for all \( q = 1, \ldots, Q \) do
2. initialize arbitrary \( w_q \)
3. \( v_q \propto \pm \sum_{p=1}^Q w_{pq} X_{pq} = \pm X_q w_q \)
4. \( e_{qqr} = \) regression coefficient between \( v_q \) and the \( v_q' \) if \( v_q \) plays the role of dependent, or takes the correlation coefficient in case it is a predictor.
5. \( \vartheta_q \propto \pm \sum_{q=1}^Q e_{qqr} v_q \)
6. update \( w_q: w_{pq} = cov(x_{pq}, \vartheta_q) \)
7. end for
8. Steps 1-7 are repeated until convergence on the outer weights is achieved, i.e. until:
   \[ \max \{w_{pq, \text{current iteration}} - w_{pq, \text{previous iteration}}\} < 0.00001 \]
9. Upon convergence:
   for each block the standardized latent variable scores are computed as weighted aggregates of indicator variables:
   \[ \xi_q \propto X_q w_q, \]
   for each endogenous latent variable \( \xi_j \) (\( j = 1, \ldots, J \)), the vector of path coefficient is estimated by means of OLS regression as:
   \[ \beta_j = (\xi' \xi)^{-1} \xi' \xi_j, \]
   where \( \xi \) includes the score of the latent variables that explain the \( j \)-th endogenous latent variable \( \xi_j \).

4. Results and discussion

The final model produced by PLS algorithm is shown in Figure 3. All variables included in final model are affecting student’s loyalty directly, indirectly, or both. The effect given by each variable to student’s loyalty is described in Table 2 which means variables that have the greatest effect on student’s loyalty is student’s satisfaction followed by student’s affective commitment, social environment quality, image and reputation perception, student’s perceived value, student’s trust, social integration, instructor quality, and administration quality respectively. All of the variables in final model of [1] are confirmed in this research. Furthermore, this research also finds that students’
Table 2. Effect of variables towards student’s loyalty.

| Variables                        | direct       | indirect     | total         |
|----------------------------------|--------------|--------------|---------------|
| student’s satisfaction           | 0.3856055    | 0.22306904   | 0.60867456    |
| student’s affective commitment   | 0.3049596    | 0.24605802   | 0.55011664    |
| social environment quality       | 0.1414960    | 0.06419634   | 0.20569238    |
| image and reputation perception  | 0.0000000    | 0.18100115   | 0.18100115    |
| student’s perceived value        | 0.0000000    | 0.04145038   | 0.04145038    |
| student’s trust                  | 0.0000000    | 0.05543384   | 0.05543384    |
| social integration               | 0.0000000    | 0.04511457   | 0.04511457    |
| instructor quality               | 0.0000000    | 0.04145038   | 0.04145038    |
| administration quality           | 0.0000000    | 0.02563980   | 0.02563980    |

Affective commitment and social integration affect student’s loyalty, this result is different with Taearungroj [1]. Even though Taearungroj [1] included student’s affective commitment in the proposed model, it has no significant effect on student’s loyalty to the faculty that becomes a research sample. It has second greatest effect on student’s loyalty after student’s satisfaction. It turns out that affective commitment of the students has significant role towards loyalty in the faculty research sample.

5. Conclusions
Factors that affect student’s loyalty from the ones that have greater effect are student’s satisfaction, student’s affective commitment, social environment quality, image and reputation perception, student’s perceived value, student’s trust, social integration, instructor quality, and administration quality respectively. Student’s satisfaction is the most effective variable towards student’s loyalty while social environment quality is the most effective variable towards student’s satisfaction. So the faculty is advised to focus on improving the quality of social environment in the faculty’s campus. Improvement on social environment quality will affect student’s satisfaction. Improvement on student’s satisfaction will greatly affect student’s affective commitment. And improvement in student’s satisfaction and affective commitment will affect student’s loyalty.

References
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