Application of Quality Management Tools in Student Retention: A Case Study from International School, Duy Tan University

Huynh Linh Lan*

Student retention is not only holding students until graduation but also helping them succeed at university. Every year, a large percentage of Vietnamese students drop out of schools due to many reasons. Educators can create a clear strategy for retention if they have a good understanding of their students. That understanding is driven by the data available to them within their learning management system and analytics tools. Thus this study utilized the quality management tools combined with group discussion and direct interview of 300 students. The paper also suggests some administrative implications to build the process used in learner motivation and retention.

Introduction

The knowledge and training a student receives at college will prepare for the real world and a student who is turned off from the educational system may not have opportunities to acquire wealth and happiness. Moreover, the negative college experience could make a person shy away from formal learning approach in the future (Astin *et al.,* 2012). Some factors that affect student retention were discovered in many studies such as institutional program, student-faculty relationship, students' capacity, welcoming environment, student support services and learning resources (Berge and Huang, 2004; Styron, 2010; and O'Keeffe, 2013).

To manage the dropout rate, universities have developed many strategies. Ackerman and Schibrowsky (2007) suggested using the customer relationship marketing to implement retention programs. However, this approach meets some difficulties, while not everyone will be comfortable applying the concept from business in the field of education. Others suggest some tools in student retention such as data mining (Lin, 2012) and machine learning (Delen, 2010). Crosling *et al.* (2009) proposed the view

* Instructor at International School, Duy Tan University, Da Nang 550000, Vietnam. E-mail: huynhlinhlan@gmail.com

that student retention through the process of quality assurance is another way because teaching and learning quality impact students' decision to continue with or withdraw from their studies. Quality Management (QM) tools as well as data mining will generate more data about students used in early warning system and student retention process.

Literature Review

Quality Management (QM) in Education

According to Deming (1940s), quality is to find out what customers want, create continuous improvement, and manage the data by using quality tools. And for a long time, QM could help organizations facilitate challenges in the market by improving customer experience and maintaining customer relationship or the so-called survival imperative; however, in the world of education, schools apply QM because of many reasons such as moral imperative, the commitment to students and parents, professional imperative, obligation to meet the students' need by employing the most appropriate pedagogic practices, competitive imperative, the need to differentiate with competitors to avoid the falling enrolments and guarantee the jobs for staffs and accountability imperative to meet the political demands (Sallis, 2012).

However, quality improvement cannot happen without measurements and the measurement tools which can be used for three quality dimensions are design, conformance and performance. Below are seven suggested tools for QM:

- Pareto chart
- Control chart
- Histogram chart
- Checklist
- Flow diagram
- Check-sheet
- Cause-and-effect diagram

Student Retention

Up till now, there are not many types of studies on quality management tools and student retention. PohLean (2018) adopted the 'plan-do-check-act' model at Wawasan Open University to monitor the progression of students and highlight the need for counseling when necessary. Masoumeh (2011) applied Total QM with 'zero defect' and 'continuous improvement' to gain good results in teaching and learning. When applying the Deming model, some of the primary reasons for the student failures were identified as weak students, lack of attention, lack of focus given to performance standards, unmotivated teachers, and ignorance of the student's examination skills.

According to Alan (2012), the more positive experiences and interventions a student has during college, the better her/his chances of completing the degree. Thus educators should identify 'at-risk' students at the earliest possible time and offer developmental courses, extensive freshman orientation programs, and collaborative learning assignments to increase student involvement. This idea fits the QM evolution of Crosby (1992) in which he stressed the need for early prevention to reduce the quality costs.

Retention = Early Identification + (Early + Intensive + Continuous) Intervention

Early identification could be done through academic records such as academic and personal goals, economic level, family structure, parents educational attainment, etc. Besides, colleges could encourage the faculty to identify any behaviors that may indicate a need for intervention, for example, poor attendance, easily distracted, failing tests and quizzes, and so on.

In the intervention phase, a contract is developed with 'at-risk' students, which include restriction of credits, tutorials, etc. On the other hand, teachers also should maintain regular interaction with these students until they make some progress and demonstrate they no longer need any intervention.

Data and Methodology

The secondary data analysis was conducted using data collected from yearly reports. These reports present the number of students dropped out of International School which manages some majors such as Management Information System, Finance and Banking, Accounting, Business Administration, Civil Engineering, and Architecture. Besides these reports, the author also utilized the grade of mid-term tests and final tests to classify and identify students who have poor performance and frequent absenteeism. The study also analyzed the primary data collected through direct interviews with students as well as in-depth interviews with heads of programs and the dean at International School.

These data were then plotted on the quality tools such as control chart, Pareto chart, cause and effect diagram, histogram diagram, checklist, etc., to develop the visual perspectives and focused suggestions.

Results and Discussion

The Drop-Out Rate

The International School functions as a bridge between Duy Tan University (DTU) and international partners such as Carnegie Mellon University, Seattle Pacific University, Pennsylvania State University and California State University, and learners who graduate from the International School are recruited by many top companies. However, undergraduate retention is also a critical issue at this school since there is a very high dropout rate.

As shown in Table 1, some fields have a high rate of dropout which are well above the DTU average of 10% (except finance, banking and accounting). This trend is expected to continue as the learners have more professional choices but lack career orientation programs at high school. This also explains why freshmen tend to leave school more often than at the other levels.

Table 1: Average Dropout Rate at International School				(in %)
	School Year	**2016-2017**	**2017-2018**	**2018-2019**
Major	Software Engineering	7	4	11
	Information Systems	14.5	5.5	12
	Network Security	10	7	24.5
	Business Administration	5.3	9.3	10
	Finance and Banking	8	4.5	3
	Accounting	3	3.8	5
	Civil Engineering	6.6	3	10
	Architecture	11.8	7.4	13

This high rate of abandonment could also be explained by other reasons mentioned below

Firstly, there is insufficient data to assess students before and after enrolment. Instructors could not determine the vulnerable students with very basic information such as gender, program, and contact which were provided during admission time.

Secondly, the official communication channel between the advisor and the instructor does not exist. Filling this gap is crucial because the advisors need comments from the instructors to set up the early prevention schedules.

Thirdly, faculties' perceptions need to change. Helping students grow and succeed is the goal of every teacher and even an 18-year-old college student also needs continuous direction, especially low achievers.

Fourth, the existence of a point-based reward system depicts the focus of teachers on elite students rather than underachievers who become intangible and lose the learning motivation. These students often quit school if institutions do not have any warning and support systems.

Quality Management Tools in Controlling the DropOut Rate

Control Chart

Data and measurement are critical components in QM as well as student retention (Table 2). Table 2 shows the drop-out rate in school year 2018-2019 for each major and academic level. The data has been plotted on Control chart in Figure 1.

Table 2: The Dropout Rate in the School Year 2018-2019					
	First Year Student	Second Year Student	Third Year Student	Fourth Year Student	Fifth Year Student
Software Engineering	20	11	5	8	
Software Engineering	20	11	5	8	
Information Systems	29	14	6	0	
Network Security	33	22	24	19	
Business Administration	14	13	7	6	
Finance and Banking	10	0	0	0	
Accounting	6	5	5	4	
Civil Engineering	28	12	8	4	0
Architecture	27	17	12	8	0

Figure 1 shows:

- The average number of early leaving school at the International School is nearly 10% and is acceptable. Some objective reasons contributing to this rate are studying abroad and changing career orientation (working instead of learning).

- One point which is beyond the control limit (33%) belongs to the first-year students of network security. Sometimes, students' motivation perception is affected by their classmates, and if there are so many students dropping out of the course, the remaining members also get bored and lose hope.

- Three points (29%, 28% and 27%) fall in the region between the average plus two standard deviation and the average plus three standard deviation; hence, the faculty should pay attention to the first-year students of information system, civil engineering and architecture who often find it difficult to grasp the course content taught in English.

Besides creating the viewable images for the decision-makers, using this chart brings some advantages such as time-saving and efficiency where the dean and the

Figure 1: The Dropout Rate in the School Year 2018-2019
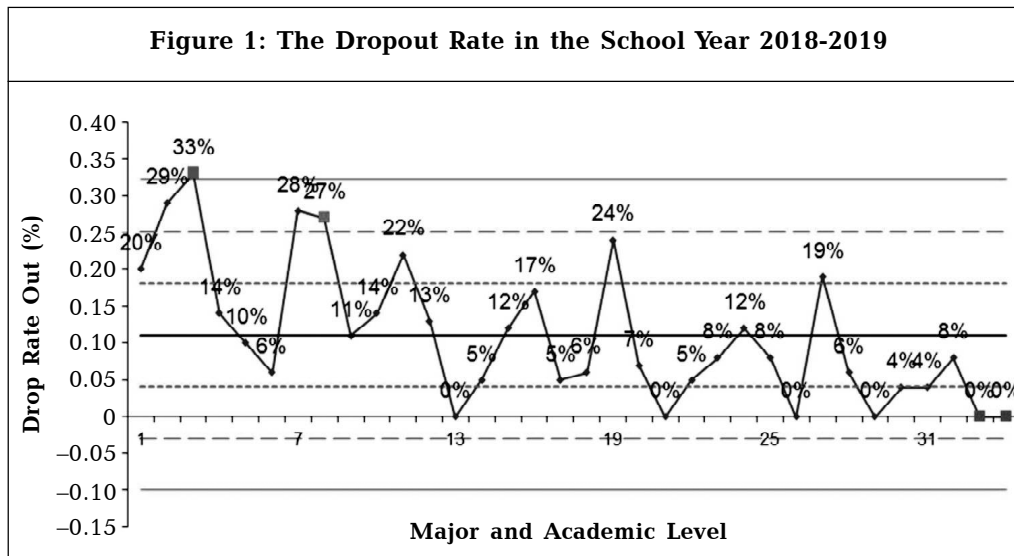
faculty can focus on some problem classes, for example, first-year students of network security class.

Cause and Effect Diagram

After identifying classes with a high dropout rate, QM staff could use the cause and effect diagram to generate the reasons for this problem. For this diagram, the author conducted an in-depth interview with the heads of programs from September to December 2019. During the direct interview, the heads of programs were asked to identify the difficulties of International School students. The results are shown in Figure 2.

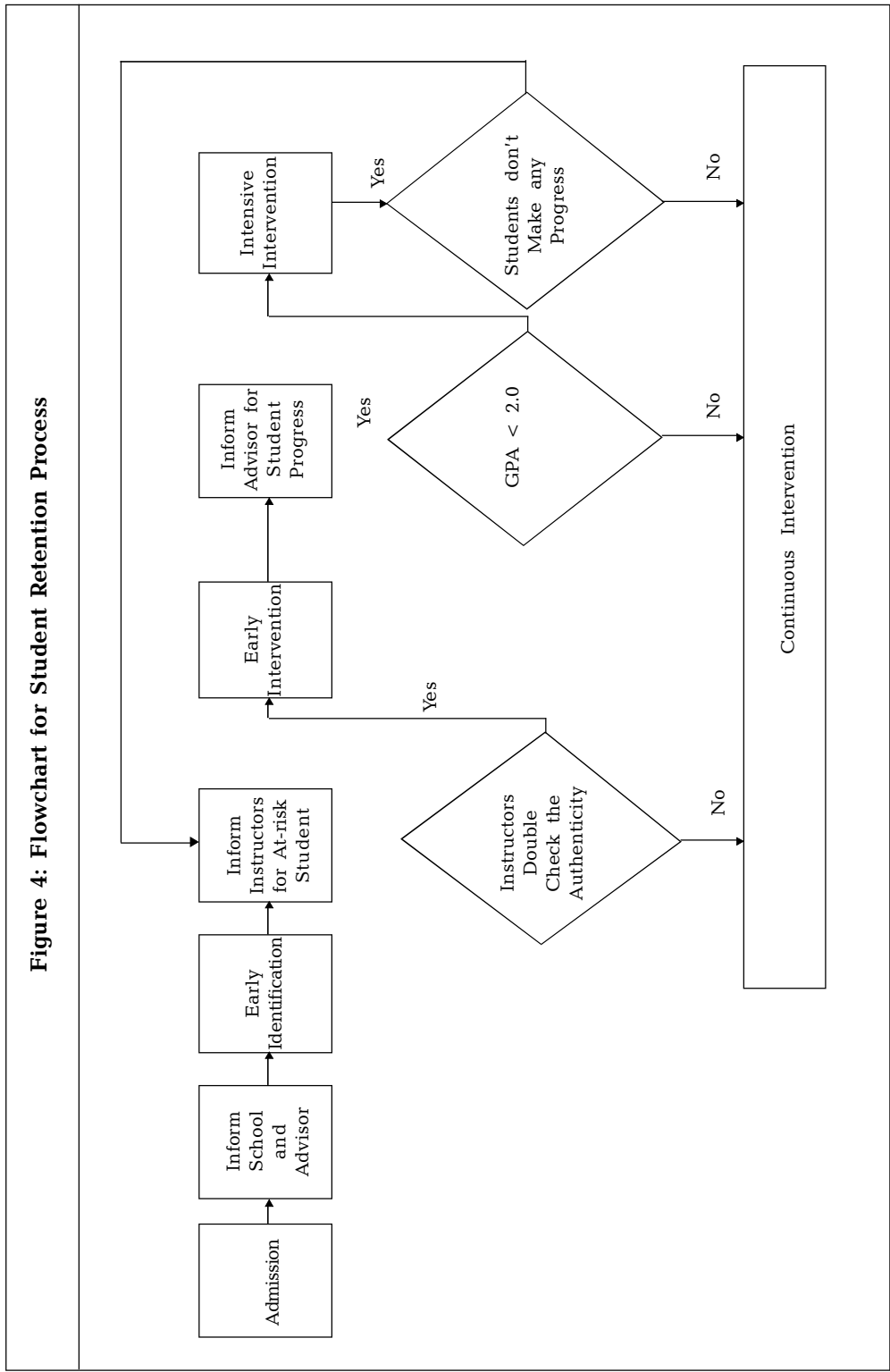**Figure 2: Cause-and-Effect Diagram for Dropout**
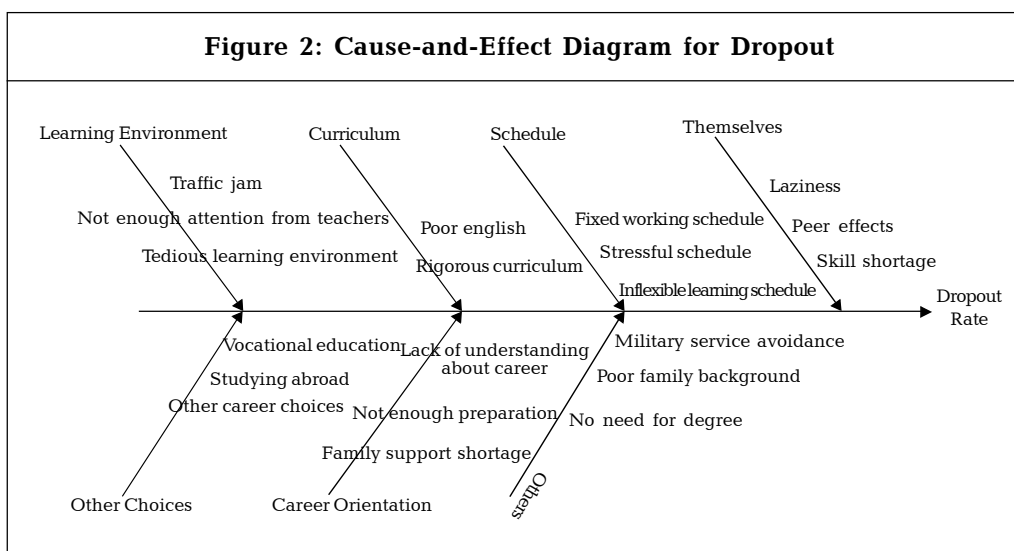
Pareto Chart

In the next step, the data which was generated from Figure 2 was plotted on the Pareto chart to determine the important reasons for early school leaving. To draw this chart, 300 students who were frequently absent (absent more than three times in the specific course) were chosen to answer the question 'Why you often drop out of class?'

As indicated in Figure 3, some reasons like English, curriculum, skill and schedule account for 80% of the problems, so the Pareto chart could be useful in developing focused strategies.

Figure 3: Pareto Chart for Dropping Out of School
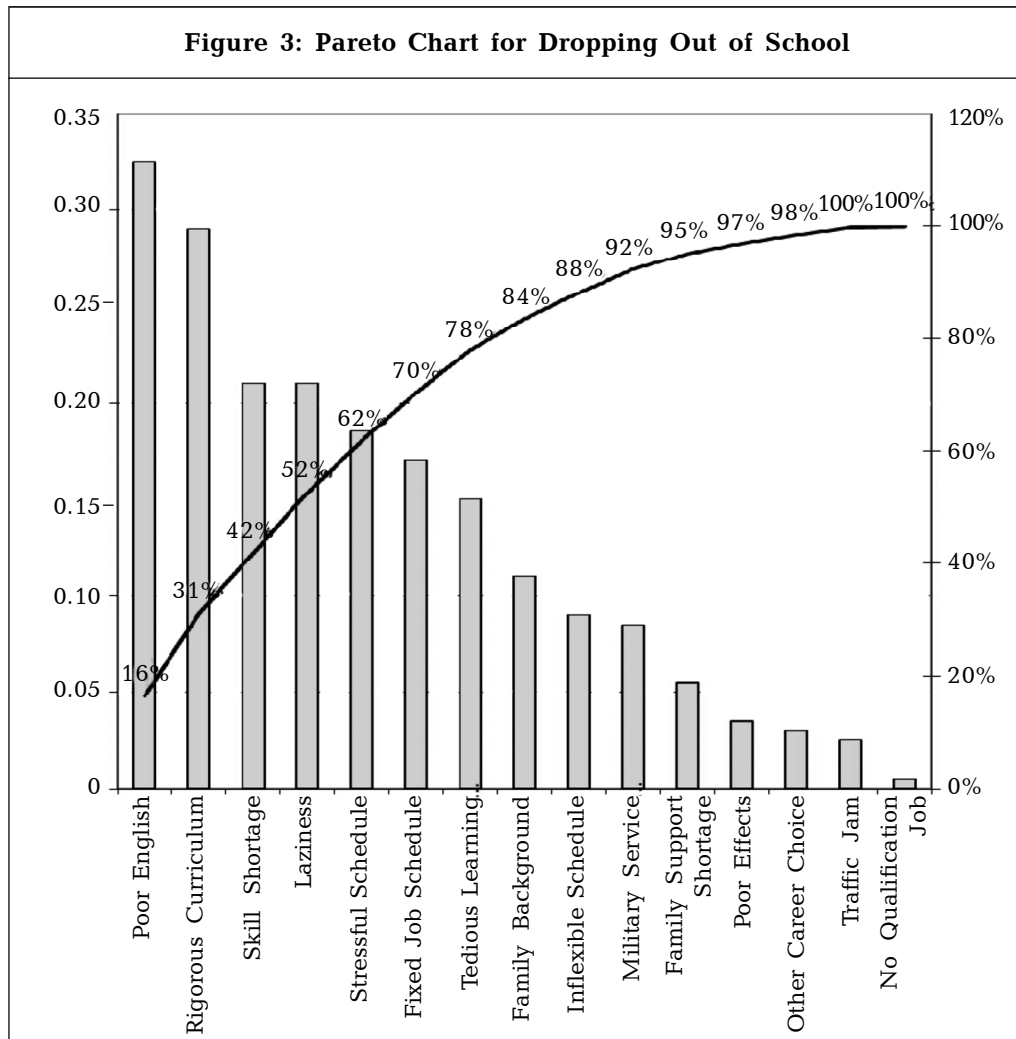
Flowchart

From the data and studies above, the author uses the student retention process (Figure 4) of Alan (2012) to suggest the retention process at International School, Duy Tan University.

Figure 4: Flowchart for Student Retention Process

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Admission → Inform School and Advisor → Early Identification → Inform Instructors for At-risk Student

Inform Instructors for At-risk Student → Instructors Double Check the Authenticity
   Yes → Early Intervention → Inform Advisor for Student Progress
   No → Continuous Intervention

Inform Advisor for Student Progress → GPA < 2.0
   Yes → Intensive Intervention → Students don't Make any Progress
   No → Continuous Intervention

Students don't Make any Progress
   Yes → Inform Instructors for At-risk Student
   No → Continuous Intervention
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Early Identification

The school should add some student information such as English proficiency, family background, hobbies, career goal, and orientation because data is critical in the classification system in English classes, student mentoring, and prompt intervention strategies (Yadav *et al.*, 2012).

Besides, the International School should establish the official communication channel between the instructor and the advisor by adding the instructor information column to the curriculum and advisor information column in the students list of each course. This will help the lecturers inform the advisors about the vulnerable students. Also, the communication function between lecturers and advisors should be added to the elearning system.

The advisor should organize the beginning test about personal goals and career orientation to identify the student turnover intention.

Early Intervention

Early intervention is done by lecturers at the end of the first course. Students were asked questions to determine the difficulties in each course. For this study, the author interviewed 70 respondents from macroeconomics and marketing courses about the reasons for the low examination results, and data was plotted in the Pareto chart (Figure 5):

Figure 5: Pareto Chart for Low Test Results
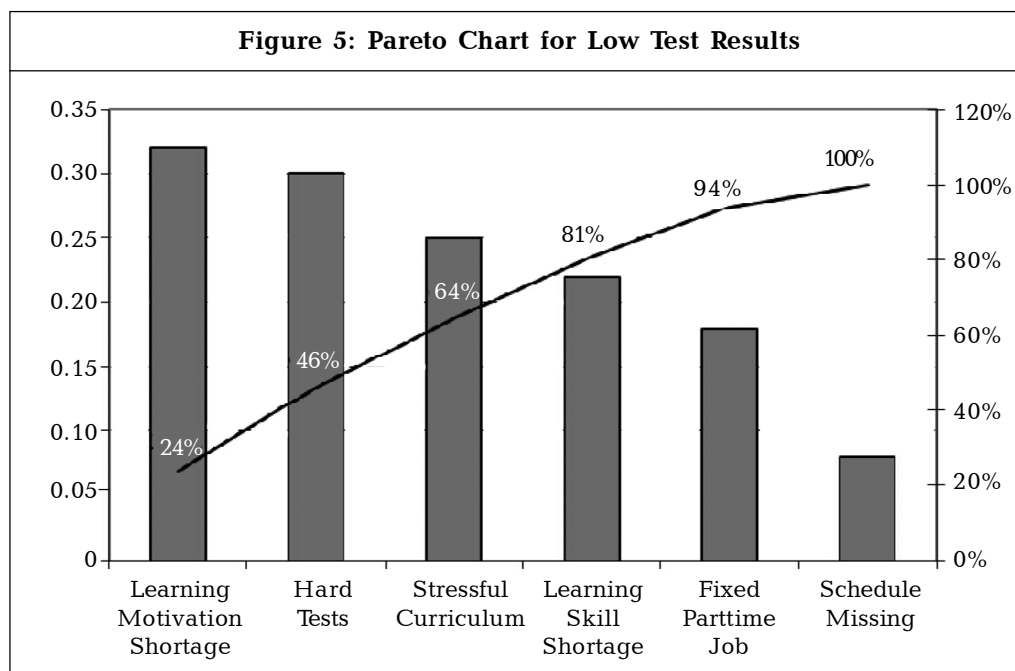
From the Pareto chart, it can be seen that lack of learning motivation and learning skill, hard tests and stressful curriculum account for 80% of causes

for the low test score. These results could be used in changing teaching methods in which instructors should pay more attention to low achievers rather than elite students.

Besides, the advisors could have compulsory intervention programs such as:

- The maximum credit limit per semester should be 18 instead of 21.
- Learning clubs in which learners support each other.
- Campus programs, for example, field trips, internships, seminars and guest speakers.

Continuous Intervention

The advisors should maintain regular guidance until the students make significant progress, for example, the GPA is greater than 2.0. The advisors should also inform students' parents about their progress.

Conclusion

Since the data is not shared and updated among departments, both the lecturers and advisors do not have enough information to predict the learning behavior of students. Once this issue is resolved, the data should be plotted in charts to create the visual images. Besides, the International School should appoint a person in charge of student retention who will follow these charts and warn about the students' situations.

Also, to help students succeed at the university, English skills should be improved; this is the most critical problem at International School because most of the courses are delivered in English, but the English proficiency of Vietnamese students is very low.

Limitation and Future Scope: The current study has certain limitations; for instance, this study only analyzes the dropout rate at International School, not at DTU, which has a large number of students who quit every year. Therefore, future studies should expand the scope of research. Secondly, the relationship between major reason and dropout rate should be examined to suggest a more detailed solution. ❖

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