

# Google analytics of a pilot study to characterize the visitor website statistics and implicate for enrollment strategies in Medical University

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## Research article

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# Abstract

**Background:** Under the lower fertility rate in Taiwan, colleges and universities face the harsh conditions of sourcing students. Therefore, each faculty must determine the strengths and weaknesses of its department, including the factors that students consider when choosing a major area.

**Methods:** This study uses Google Analytics (GA) tools to perform a webpage analysis and conducts qualitative research to understand students' needs. Among the webpage visitors, there were more women than men, with the highest frequency among those aged 18–24 years, followed by those aged 45–54 years.

**Results:** The web information analysis provides information about the core content of the research department, the stay time, and the visitor characteristics.

**Conclusions:** The website can enhance the introduction of the faculty-specific courses and highlight the differences in the characteristics of the curriculum design in competing departments to have clear market segmentation. The findings provide an information for the school's enrollment strategies in each department.

# Background

Institutional research (IR) was developed more than 50 years ago to support the improvement of postsecondary institutions through data-informed decision support and scholarly research in the United States [1]. Today, offices of IR are rapidly growing in collegiate settings in Taiwanese universities because of the importance placed on them by the Taiwan's Ministry of Education (MOE). With the growth of the Association for IR (AIR) and the increasing trends of higher education worldwide, the Taiwan Association for IR (TAIR) was established in 2016 [2].

In recent years, colleges and universities in Taiwan have had difficult enrolling new students, mainly because of the lower fertility rate in the past 10 years. According to the news from Taiwan Business TOPICS, the "falling population squeezes Taiwan's Universities." Taiwan's population is projected to peak at 23.61 million in 2021, and decrease thereafter. The current fertility rate of an average of 1.17 children born to each woman is insufficient to maintain the present population level. Hence, the potential impact of a declining population on the nation's education system is expected to be enormous, particularly at the university level where a large gap already exists between the supply and demand. The MOE estimates that the number of college students will decline by 40% to reach 723,000 by 2028 [3]. Therefore, this study aims to source students in the higher education market and explore the network market intelligence of students to provide early response strategies.

Google Analytics (GA), a free service provided by Google from November 2005, allows webmasters to access the content of webpages recorded by Google [4]. The purpose of GA is to enable web information users with a limited budget, time, and expertise to collect users' data through web analytics.

Organizations can obtain relevant information to analyze users' behavior or traits and obtain useful market intelligence.

In the past, research using GA has been applied to the business performance level of enterprise management [5–9]. Budd [5] claimed that companies can develop marketing strategies that improve their business performance through the collection of website data by, for example, improving the ability of a company's marketing information to reach a wider market [6]. Gunter and Onder [7] studied the tourism website in Vienna and used GA analysis to explore website traffic data to predict travel demand. Plaza [8] claimed that the performance evaluation of travel websites is a key issue for the effectiveness of online marketing. The study analyzed the effectiveness of a website based on traffic, including access behavior and session length, user-used browsers, and search engines. Gordon et al. [9] used GA analysis to explore medical issues, mainly using GA analysis, to assess the effectiveness of campaign call-to-action, measuring visits, visit duration, bounce rate, number of visits, and visits to the most webpages, user features, and usage media.

Several studies have also applied GA application for collecting school information. For example, Fang [10] used GA to analyze the online visitor information of the Rutgers-Newark University Law Library. Librarians used different tools to create the website and found that a web-based learning interaction platform improved the usability of the library's visitors to use the Internet to borrow books, thereby increasing the student usage of school library collections or books. Turner [11] used GA to develop a web-based messaging application that provides users with behavior, demographic variables, and technical information. Internet applications are used in university libraries to improve the efficiency of book use because it makes it easier for readers to receive book resources, which can improve readers' satisfaction with the library. Braender et al. [12] applied web technology to the teaching of the School of Management at New Jersey University of Technology to promote students' social issues and cultivate students' ethics through the online learning community platform. The application makes students multicultural leaders and improves the application of high technology, thus enhancing students' world view. Braender et al. [12] used free GA technology to collect behavioral information about students using a learning platform and analyzed which factors are important for influencing the learning environment. Therefore, this study uses GA to explore the network market intelligence of the case study students and to understand their potential network behavior patterns related to the case study department, such as webpage stay time and webpage interactive information. The peak period of online information and page views is an important reference for the enrollment strategy.

## Methods

### *Research target*

The case school is one of the three major medical universities located in central Taiwan, which currently has five colleges and 20 departments. The gender ratio of males to females is 39:61. The case study departments are affiliated with the School of Health Management; Department A is the Leisure and

Sports Group, and Department B is the Medical Hygiene Group. The annual enrollment quotas approved by the MOE are 40 and 45, respectively.

Three methods of college admission can examine by the MOE, which students planning to continue their education can choose: (1) Stars Program (Stars), (2) Personal Application (PA), and (3) Admission by Examination and Placement (AE&P) [13]. Stars seeks to provide all public and private high school students across the country with an equal opportunity to attend college. The program utilizes the student's grade point average from the first two years of high school as the admission criterion in conjunction with a General Scholastic Ability Test (GSAT) score that has been specified by the college department. All candidates must be recommended by their high schools, and there is a specified quota of students who are able to enter college through this program.

Second, the PA process provides all high school students with an opportunity to apply to their preferred college or department. Students choosing this option first take the GSAT. After receiving their GSAT results, the students determine which colleges to which they are eligible to apply based on the criteria set by the colleges. If a student is qualified, the college will invite the student to participate in the second stage of the screening process. During this stage, students may be asked to take additional tests given by the department, prepare a portfolio, and attend interviews. Third, the AE&P process is for students who did not take part in the Stars or the PA process, or who failed to gain admission through either of these routes or were dissatisfied with the results. Students taking part in the AE&P process must take the Advanced Subjects Test (AST). After receiving their results, the students fill out a preference list indicating their interests in specific colleges and departments.

#### *Definition of the enrollment stages*

The study divides the individual application period for the university into two parts (before and after PA) and compares the statistical analysis and research results. Before PA refers to the deadline for the candidate registration which occurred on February 26, 2018. During this stage, candidates use the Internet to seek information about the department. After PA refers to the results of the selection committee announcement made on March 23, 2018. This stage includes the test dates of the designated projects of each school, which occurred between April 11 and 29, 2018. After that, it is necessary to prepare the introduction of the department, the teachers, and the future development direction of the department. The definition of this period is based on the schedule of the individual application for admission to the university (Appendix Table 1).

During the designated enrollment period by exam, the study is divided the three parts for comparison (Appendix Table 2). The three phases for admission by AE&P were (1) July 19 to 23, 2018 (announcement of grades for AST); during this period, the students who fill the enrollment quotas, the registered elective stand-alone editions, and the designated subject examinations are announced. (2) July 24 to 28, 2018 (fill out a preference list on website, PLW); Network Registration and Distribution of Electives and (3) July 29 to August 7, 2018 (announce placement results, APR); Admission Notice for University Entrance Examinations" is announced.

## *Google Analytics (GA)*

GA was used in this study to obtain site usage data for five months (from February 1, 2018 to July 30, 2018). Google collects and links actions in webpage javascript by installing javascript code on the webpage. These bits of code are posted back to the GA servers when the webpage is downloaded or accessed, and the user's information is recorded [11]. By analyzing the information collected by GA regarding the visitor behavior information, the information that visitors expect to receive through the faculty page can be summarized, thus providing a reference for the department design webpage and curriculum planning. By understanding the content of the information that is of interest to online visitors, the department can explore the requirements of potential students. GA provides the measurements of the following metrics: the number of page views, duration of visit, pages most often visited, depth of the visit, user demographics (e.g., gender, age range, city, and country), and user media (e.g., devices).

## **Results**

### *Department characteristics*

Figures. 1A and 1C shows the student enrollment and admission options for 2014–2018 in Departments A and B. The results show that the numbers of people in Departments A and B increased from 33 to 45 and from 39 to 53 over five years, respectively. A difference from the annual approved quota exists because this study does not consider independent enrollment, international exchange students, or transfer students, and because the results are analyzed based solely on the data pertaining to national students. Figures. 1B and 1D show the overall percentage of students who were enrolled through Stars, PA, and AE&P in the two departments. The results show that the Stars, PA and AE&P admissions channels contributed 9%, 35%, and 56% of the total enrolled students (for Department A), respectively, and 23%, 33%, and 44% of the total enrolled students (for Department B), respectively. Both departments have thus adopted university assessment as the main enrollment channel.

Figure. 2 presents the geographic distribution of student sources. The results show that the majority of students enrolled in Department A are metropolitan, with 16%–20% of students coming from Taipei city, New Taipei city, and Taichung city, and 11%–15% coming from Taoyuan city. For Department B, 16%–20% of the students come from Taipei city and Taichung city, and 11%–15% of the students come from Taoyuan city and Kaohsiung city.

### *Website profile during PA stage*

Figures. 3 (A, C, E, G) show the time-series page views before (February 26 to March 22, 2018) and after (March 23 to May 17, 2018) PA in the two departments. The average daily browsing times Before PA are slightly higher than those After PA, the page views per day are 39 and 27 times for Departments A and B, respectively. The results of Department B has the similar trend and the page views per day are 87 and 35 times, respectively.

Moreover, it also shown the percentages of students visiting each page subject (Figures. 3B, 3D, 3F and 3H). The results of Department A show that the Withdrawal webpage received the most visitors Before PA and After PA, with 36% and 49%, respectively, followed by “About Us” and “Courses and Credits.” The Withdrawal webpage means that during the data analysis, the department removed the webpage from the website. On the other hand, the results of Department B show that the visitors mostly visited the “About Us” webpage during the two phases of Before PA and After PA, with 44% and 42%, respectively, followed by “Faculty” (26%) and “Programs” (25%). Overall, the timing of the daily page views varied depending on the event; for example, the highest page views were observed on April 14 and 15, 2018, and April 21 and 22, 2018, which were interview dates at the university.

Table 1 shows the depth of the visits at the university’s website. The results for Department A showed that the main website screen received the most initial clicks by visitors to the website, accounting for 81% and 87% of the total number of people Before PA and After PA, respectively. From the main website page, 47% of visitors clicked on “Courses and Credits” and 29% clicked on “About Us.” From there, most of the visitors returned to the main webpage, accounting for 51% and 63% at Before PA and After PA, respectively, before selecting either “Program” (27%) and “About Us” (36%) Before PA and After PA, respectively. We speculate that after the visitors confirm their admission to the school, they want to have a complete understanding of the department. After interacting with three pages, the total number of views by visitors Before PA decreased from 840 to 99 and from 1,408 to 165 After PA, and the remaining number of visitors for both periods dropped to 12%.

The results for Department B show that the main website screen also received the most initial clicks by visitors to the website, accounting for 68% and 63% of the total number of people Before PA and After PA, respectively. The total views Before PA decreased from 1,750 to 248, leaving only 14% of visitors, and the total views After PA decreased from 1,823 to 202, leaving 11% of visitors, which suggests that the users leave after obtaining the necessary information (Table 1).

Figure. 4 shows the average time on the site in seconds. For Department A, the results showed that visitors spent most of their time at the “Faculty” page, while those for Department B spent most time visiting the admission list for graduate students. These findings suggest that some visitors are student of the Institute.

### *Website profile during the AE&P stage*

For Department A, the results show that the number of visitors to “Course Information” and the “Certificate of Subjects” project peaked following the announcement on July 19 (Figure. 5). Before registering for an elective, visitors to the website first get an overview of the course information and subject credits. Online registration and distribution of electives was from July 24 to 28, 2018. In this period, visitors began to navigate to the “Teachers” page. The results show that “Faculty” is the priority item for registering for electives, and the end of the registration day attracts most people’s attention, followed by the “Program” page. It is recommended that the department completes the update of the course information before announcing the assessment results. The planning of the department’s

curriculum may be related to the student's choice of electives (Figures. 5A-D). The results for Department B showed that the average daily number of visits in the three stages of the AE&P period was 89, 102, and 21, respectively. The second stage received the highest number of page views, and "About Us" received the largest number of visitors during the three stages, followed by the "Program" plan (Figures. 5E-H).

Table 2 presents the page views of the visitors at the different subject webpages. The visitors of Department A start on the Main website, before selecting "Courses and Credits," returning to the main website page and visiting the Program pages. The results for Department B are slightly different between the AST PLW and APR stages. After the results are announced, the majority of visitors click on the main website (57%), followed by "About Us" (40%), the main website again (25%), and "Courses and Credits" (32%). At the network registration distribution and release stage, visitors start at the main website page and then click on "Program" and "Faculty." After interacting with three interactive pages, the total views decreased from 410 to 56, leaving only 14% of visitors, while the remaining percentages at the PLW and APR stages were 21% and 10%, respectively.

It also shown the average time spent on the site in seconds (Figure. 6). The results for Department A show that the total browsing time is longest for the Admissions Announcement for the master's class followed by the "HACCP Course Admissions Guide" in the five days before the results of the AST were announced. The overall browsing time during second phase (PLW) showed that visitors spent most time browsing the license information; and in the third phase (APR), the visitors spent most time browsing the Study Program, followed by the Food Technician Exam. In view of Overall, the visitors to the website sought information relating to the selection of electives on the "Review Information" and "Training Qualifications" pages. Therefore, the list of examinations should be kept up to date on the website. The visitors also viewed the teacher's professional backgrounds and items of concern. The results for Department B show that visitors stayed for more than five minutes when viewing the latest news, enrollment message (double major and adjunct), the subject and credits table, and the graduate flow tracking (five-year) survey.

### *User characteristics*

Table 3 describes the user information and characteristics. Visitors were mainly aged between 18 and 24 years during the three visiting date ranges for Department A, and fewer were aged 25–34 years. According to statistics, the visitor groups were mainly freshmen at the university, followed by their parents. In terms of browsing tools, the visitors used desktops followed by smart phones; thus, the design of the webpage should be able to meet the usage requirements of the desktop computer and the smart phone. Among the visitors to Department B, there were slightly more women than men, and they were mainly aged 18–24 years, followed by 45–54 years.

## **Discussion**

This study uses GA to explore the network market intelligence of the case study students and to understand the potential student network behavior patterns of the case study departments. The following

analysis of the variables explores the differences between individual referrals and designated test visitor behavior and recommends possible strategic options.

### *Average daily page views*

The results for Department A show that for each department to include the interview in the scores, students strengthen their understanding of the department before the interview and collect information through the network data. Assessing students' choice of electives will affect the credits and course arrangements. This research suggests that the department may enhance the introduction of its featured courses on the webpage or distinguish it from the characteristics of other competitive departments in the curriculum design to ensure a clear market segmentation. The results of Department B show that the highest level of network traffic is when students check their scores at the end of the registration period and receive their assessment results before the distribution of electives. The department can determine what they need to promote on the website in this period, especially for the descriptions of the "Introduction to the Department" and "Course Planning."

### *Webpage interaction information*

In Department A, the majority of visitors visit "Homepage," "Subject Credits," and "Course Planning." In Department B, the visitors starts at "Homepage" and move to be the "Introduction, Teacher Lineup" before returning to the "Homepage" and then moving to the "Certificate of Subjects." After interacting with three webpages, the page views of Departments A and B is 12% and 13% (Table 1), and 56% and 15% (Table 2), respectively, indicating that the visitor has obtained the required information and left the page.

### *Average page time*

The average time visitors stay on the webpage during Department B's recommendation stage is about twice that of the assessment period, while Department A is completely opposite (Figures. 4 and 6). The two pages where visitors stay the longest are different. Department A is a resting and kinematics group with a focus on five-year follow-up surveys and subject credits. Department B is a medical and health group. The longest stay time is on the "Investigation List, Graduation Topics, and Master's Degrees Credits Tables," indicating that students are seeking information on the university's referral stage and exam entrance. The visitors are likely candidates for the master's class. In the assessment phase, visitors to the "Certificate of Subjects (University)" and "Graduate Flow Tracking" stay the longest.

### *Visitor living area*

The locations of visitors to Department A are highly consistent in the recommendation and assessment stages, coming mainly in Zhongli, Taoyuan, and Changhua. The high-level visitors to Department B mainly come from Taoyuan City and Changhua County. The admissions strategy suggests that GA can instantly capture the potential student source areas of the department after the results are distributed. This is different from the traditional way, which typically requires students to report their location to the school after starting at the school. The School Affairs Research Office has requested the Information

Room to assist the department in installing the GA code. It is recommended that after the results are distributed, each department can observe the information online and identify suitable high schools to visit to source potential students and improve the students' willingness to choose this university.

Other visitor characterizations indicate that the gender of the visitors is mostly female; thus, webpages should be designed with a preference for women. The age of visitors is 18–24 years, followed by 45–54 years, and visitors use mainly desktops and smart phones to browse the webpages. Therefore, the design of the webpage should support both the desktop and the smart phone.

Finally, this study has the following limitations: (1) the variables of the research data are limited to those provided by GA and thus other variables cannot be examined. (2) the same visitor may click many times, which would increase the reading rate. During the data collection period, inquiries were made about the times of the master's class. However, while some of the readers may be candidates for the master's class, this is unlikely to be the case for all potential students to the university department. (3) considering the school administrative unit, the department's processes and operations, and the influence of enrollment or important activities pertaining to other master's programs, it is still necessary to consider how to obtain representative data and determine other factors that cannot be summarized.

## Conclusions

GA is a useful tool that provides critical information regarding enrollment and establishing strategies. GA evaluates the website's performance and subsequent online marketing effectiveness for educational purposes. Future research should analyze long-term trends and include all departments of the Medical University.

## Abbreviations

GA: Google Analytics; IR: Institutional Research; PA: Personal Application; AE&P: Admission by Examination and Placement; GSAT: General Scholastic Ability Test score; AST: Advanced Subjects Test; PLW: Preference List on Website; APR: Announce Placement Results

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### **Competing interests**

The authors declare that they have no competing interests.

### **Author contributions**

Dr. YF Tsai designs the work and interprets data. Dr. SC Chen analyzes and writes the manuscript. TCY Tsao and KH Lue reviewed, commented and discussed the manuscript. All authors have read and approved the manuscript.

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## **References**

1. Swing RL, Ross LE. A new vision for institutional research. *Change: The Magazine High Learn.* 2016;48(2):6–13.
2. Taiwan Association for Institutional Research (TAIR) (2019) <http://www.tair.tw/en-US>, accessed 5 May 2019.
3. Taiwan Business TOPIC. Falling population squeezes Taiwan's Universities (2018). <https://topics.amcham.com.tw/2018/11/falling-population-squeezes-taiwans-universities/>,

accessed 5 May 2019.

4. Betty P. Assessing homegrown library collections: using Google Analytics to track use of screencasts and flash-based learning objects. *J Electron Resour Libr.* 2009;21(1):75–92.
5. Budd BQ. Website data and uses for strategic marketing-A commercial experience. *Int J Manag Inform Syst.* 2012;16(3):239–46.
6. Gallagher JM, Auger P, BarNir A. Revenue streams and digital content providers: an empirical investigation. *Inform Manag.* 2001;38(7): 473–85.
7. Gunter U, Onder I. Forecasting city arrivals with Google Analytics, *Annu Tourism Res.* 2016;61:199–212.
8. Plaza B. Google Analytics for measuring website performance. *Tourism Manage.* 2011;32(3):477–81.
9. Gordon EJ, Shand J, Black A. Google Analytics of a pilot mass and social media campaign targeting Hispanics about living kidney donation. *Internet Interventions.* 2016;6:40–9.
10. Fang W. Using Google Analytics for improving library website content and design, a case study. *Libr Philos Pract.* 2007;2007:1–17.
11. Turner SJ. Website statistics 2.0: using Google Analytics to measure library website effectiveness. *Tech Serv Q.* 2010;27(3):261–78.
12. Braender LM, Kapp CM, Years J. Using web technology to teach students about their digital world. *J Inform Syst Edu.* 2009;20(2):145–53.
13. College Entrance Examination Center (2019)  
<http://www.ceec.edu.tw/CeecEnglishWeb/E02CEEC.aspx>, accessed 5 May 2019.

## Tables

**Table 1** The depth of visit is a measure of visit quality. We listed the page views of the different page subjects for the initial, first, second, and third pages visited. Before PA was from February 26 to March 22, 2018; After PA was from March 23 to May 17, 2018

Department A			Department B		
Page subject	Page view (%)		Page subject	Page view (%)	
	Before PA	After PA		Before PA	After PA
<b>Visit depth (initial pages)</b>					
Main website	679 (81%)	1,221 (87%)	Main website	1,185 (68%)	1,155 (63%)
About us	79 (10%)	77 (6%)	About us	350 (20%)	314 (17%)
Courses and credits	31 (4%)	21 (2%)	News and events	116 (7%)	204 (11%)
Program	21 (3%)	18 (1%)	Faculty	99 (6%)	150 (8%)
International conference and exhibition program area	18 (2%)	36 (3%)			
HACCP	12 (1%)	35 (3%)			
<b>Total views</b>	<b>840</b>	<b>1408</b>	<b>Total views</b>	<b>1750</b>	<b>1823</b>
<b>Visit depth (first pages)</b>					
Courses and credits	132 (47%)	80 (26%)	About us	302 (42%)	80 (21%)
Program	64 (23%)	58 (19%)	Program	199 (28%)	58 (15%)
About us	45 (16%)	89 (29%)	Faculty	101 (14%)	89 (24%)
Main website	24 (9%)	28 (9%)	Aim	53 (7%)	28 (7%)
Brief history	18 (6%)	53 (17%)	News and events	34 (5%)	61 (16%)
			Admission	25 (4%)	61 (16%)
<b>Total views</b>	<b>283</b>	<b>308</b>	<b>Total views</b>	<b>714</b>	<b>377</b>
<b>Visit depth (second pages)</b>					
Main website	119 (51%)	192 (63%)	Main website	124 (29%)	134 (37%)
Courses and credits	56 (24%)	25 (8%)	Courses and credits (2017)	81 (19%)	40 (11%)
About us	32 (14%)	35 (12%)	Courses and credits (past)	73 (17%)	43 (12%)
Program	17 (7%)	23 (8%)	Program	62 (15%)	39 (11%)
Brief history	9 (4%)	29 (10%)	About us	52 (12%)	65 (18%)
			Faculty	31 (7%)	44 (12%)
<b>Total views</b>	<b>233</b>	<b>304</b>	<b>Total views</b>	<b>423</b>	<b>365</b>
<b>Visit depth (third pages)</b>					
Program	27 (27%)	30 (18%)	Courses and credits (2017)	86 (35%)	54 (27%)
About us	24 (24%)	60 (36%)	Program	66 (27%)	48 (24%)
Courses and credits	22 (22%)	20 (12%)	About us	36 (15%)	41 (20%)
Main website	21 (21%)	30 (18%)	Courses and credits (past)	34 (14%)	20 (10%)
Features of the department	5 (5%)	25 (15%)	News and events	26 (10%)	39 (19%)
<b>Total views</b>	<b>99</b>	<b>165</b>	<b>Total views</b>	<b>248</b>	<b>202</b>

**Table 2** We listed the page views of the different page subjects for initial, first, second, and third pages. The three phases for the duration of the AE&P were July 19 to 23, 2018 (announcement of grades for AST), July 24 to 28, 2018 (fill out a PLW), and July 29 to August 7, 2018 (APR)

Department A				Department B			
Page subject	Page view (%)			Page subject	Page view (%)		
	AST	PLW	APR		AST	PLW	APR
Visit depth (initial pages)							
Main website	27 (44%)	0 (0%)	76 (67%)	Main website	234 (57%)	293 (64%)	208 (58%)
About us	17 (27%)	16 (30%)	7 (6%)	About us	92 (22%)	73 (16%)	65 (18%)
Program	11 (18%)	21 (39%)	10 (9%)	Program	46 (11%)	58 (13%)	11 (3%)
Admission	3 (5%)	0 (0%)	2 (2%)	Courses and credits	13 (3%)	7 (2%)	5 (1%)
Courses and credits	2 (3%)	9 (17%)	4 (4%)	Admission	13 (3%)	16 (4%)	40 (11%)
Faculty	2 (3%)	5 (9%)	7 (6%)	Faculty	12 (3%)	10 (2%)	29 (8%)
Brief history	0 (0%)	3 (6%)	7 (6%)	-	-	-	-
<b>Total views</b>	<b>62</b>	<b>54</b>	<b>113</b>	<b>Total views</b>	<b>410</b>	<b>457</b>	<b>358</b>
Visit depth (first pages)							
Courses and credits	19 (29%)	32 (34%)	20 (20%)	About us	63 (40%)	58 (32%)	17 (16%)
Program	16 (24%)	30 (32%)	26 (26%)	Program	44 (28%)	68 (37%)	18 (17%)
Brief history	16 (24%)	15 (16%)	15 (15%)	Courses and credits	13 (8%)	14 (8%)	2 (2%)
Faculty	10 (15%)	10 (11%)	19 (19%)	Main website	12 (8%)	8 (4%)	6 (6%)
Admission	5 (8%)	6 (7%)	19 (19%)	Faculty	11 (7%)	20 (11%)	52 (48%)
<b>Total views</b>	<b>66</b>	<b>93</b>	<b>99</b>	Career information	6 (4%)	16 (9%)	0 (0%)
				New student	9 (6%)	0 (0%)	14 (13%)
<b>Total views</b>	<b>66</b>	<b>93</b>	<b>99</b>	<b>Total views</b>	<b>158</b>	<b>184</b>	<b>109</b>
Visit depth (second pages)							
Program	25 (38%)	9 (15%)	11 (13%)	Main website	24 (25%)	38 (27%)	31 (53%)
Courses and credits	12 (18%)	16 (27%)	11 (13%)	Program	20 (21%)	27 (19%)	7 (12%)
Brief history	14 (21%)	5 (8%)	9 (10%)	Courses and credits (past)	17 (18%)	29 (21%)	7 (12%)
Faculty	10 (15%)	2 (3%)	11 (13%)	Courses and credits (2017)	16 (17%)	25 (18%)	2 (3%)
Main website	0 (0%)	23 (38%)	41 (47%)	About us	13 (14%)	15 (11%)	6 (10%)
Features of the department	5 (8%)	5 (8%)	5 (6%)	Faculty	5 (5%)	5 (4%)	6 (10%)
<b>Total views</b>	<b>66</b>	<b>60</b>	<b>88</b>	<b>Total views</b>	<b>95</b>	<b>139</b>	<b>59</b>
Visit depth (third pages)							
Program	11 (33%)	10 (37%)	11 (20%)	Courses and credits (2017)	18 (32%)	38 (40%)	7 (20%)
Courses and credits	7 (21%)	3 (11%)	4 (7%)	Program	14 (25%)	21 (22%)	5 (14%)
Main website	4 (12%)	6 (22%)	12 (22%)	Courses and credits (past)	9 (16%)	19 (20%)	6 (17%)
License information	4 (12%)	7 (26%)	6 (11%)	About us	9 (16%)	3 (3%)	3 (9%)
Faculty	4 (12%)	8 (30%)	12 (22%)	Faculty	3 (5%)	9 (10%)	5 (14%)
Brief history	3 (9%)	2 (7%)	10 (18%)	Admission	3 (5%)	4 (4%)	9 (26%)
<b>Total views</b>	<b>33</b>	<b>36</b>	<b>55</b>	<b>Total views</b>	<b>56</b>	<b>94</b>	<b>35</b>

Table 3 User Information and Characteristics for Department A and Department B

Variables	Department A				
	Before PA	After PA	AST	PLW	APR
Gender	ND	ND	Female (65%)	Female (60%)	Female (75%)
Age	ND	ND	18-24 years (28%)	18-24 years (34%)	18-24 years (50%)
			45-54 years (22%)	45-54 years (31%)	25-34 years (47%)
Location	Taoyuan city (44%)	Taoyuan city (28%)	Taoyuan city (37%)	Taoyuan city (36%)	Taoyuan city (37%)
	Changhua county (30%)	Taipei city (13%)	Changhua county (14%)	Changhua county (16%)	Changhua county (11%)
		Changhua county (12%)	Hsinchu county (20%)	Tainan city (10%)	
Devices	Desktop (55%)	Desktop (55%)	Desktop (61%)	Desktop (57%)	Desktop (63%)
	Mobile (43%)	Mobile (43%)	Mobile (38%)	Mobile (40%)	Mobile (44%)
Department B					
Gender	ND	ND	Female (58%)	Female (57%)	Female (54%)
Age	ND	ND	18-24 years (46%)	18-24 years (55%)	18-24 years (49%)
			45-54 years (33%)	45-54 years (28%)	25-34 years (27%)
Location	Taoyuan city (39%)	Taoyuan city (31%)	Taoyuan city (52%)	Taoyuan city (42%)	Taoyuan city (55%)
	Hsinchu county (11%)	Hsinchu county (14%)	Changhua county (6%)	Changhua county (9%)	Changhua county (11%)
		Changhua county (13%)			
Devices	Mobile (50%)	Desktop (53%)	Desktop (50%)	Desktop (56%)	Desktop (53%)
	Desktop (48%)	Mobile (44%)	Mobile (47%)	Mobile (41%)	Mobile (44%)

## Figures

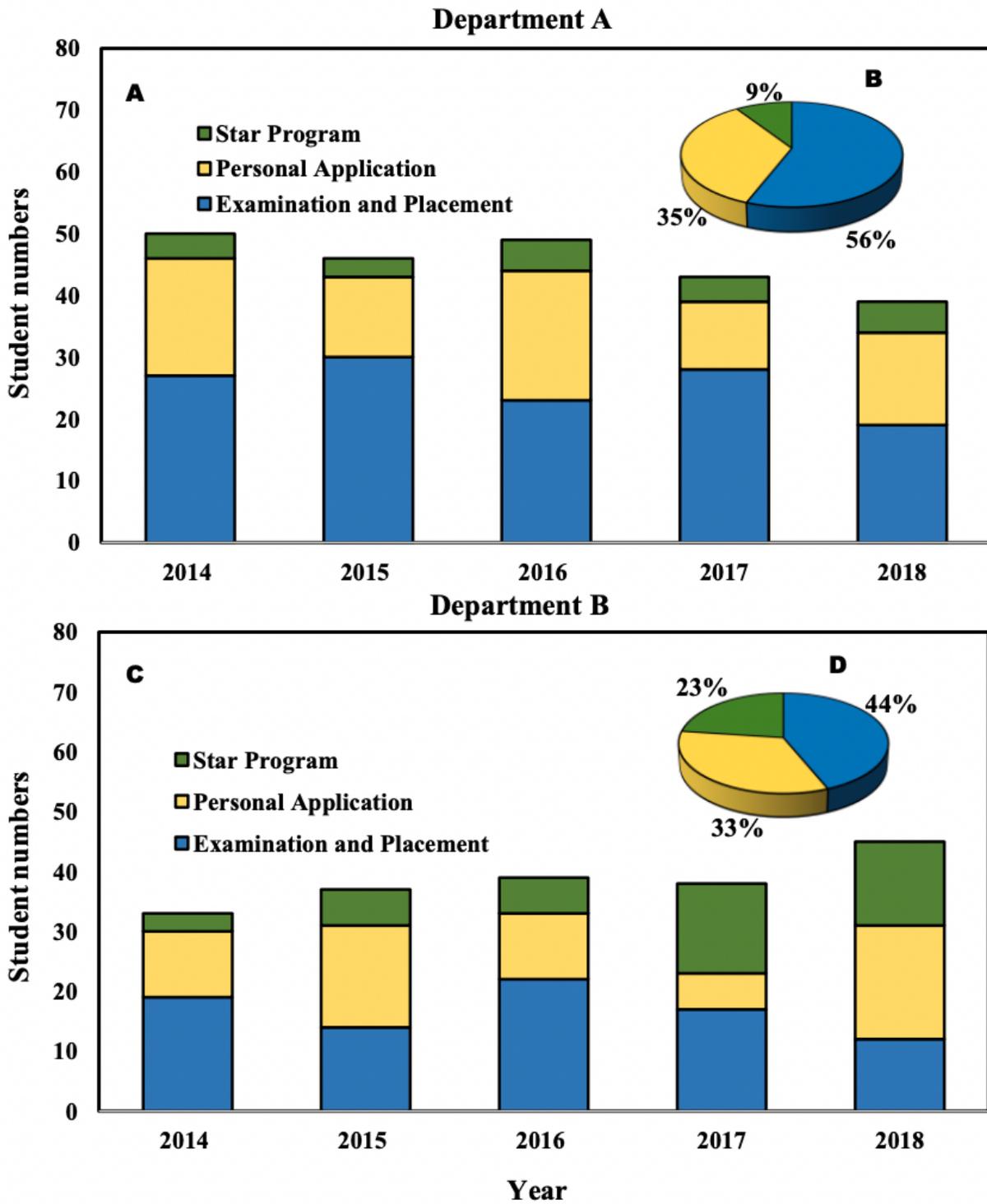


Figure 1

Student enrollment and admission options for 2014–2018 in (A) department A and (B) department B. The percentage of students who were enrolled through Star Program (SP), Personal Application (PA), and Admission by Examination and Placement (AE&P) in (B) department A and (D) department B.

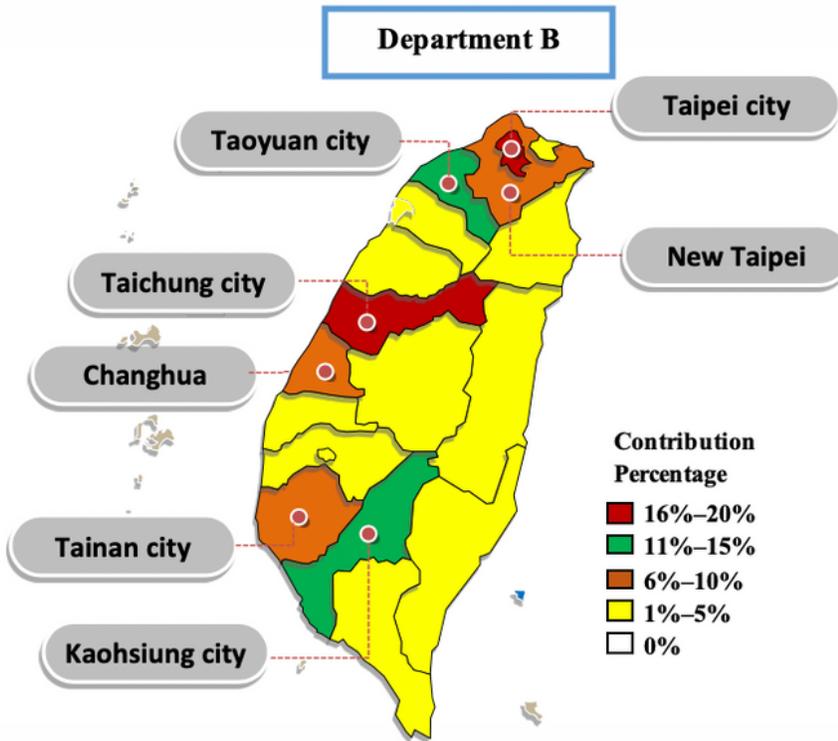
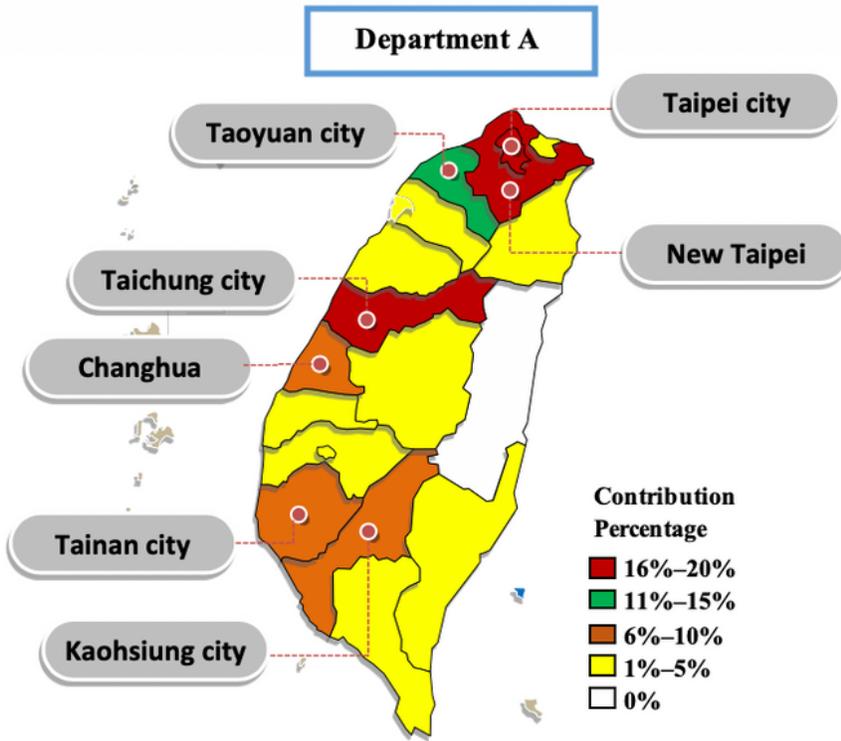


Figure 2

The geographic distribution of student sources.

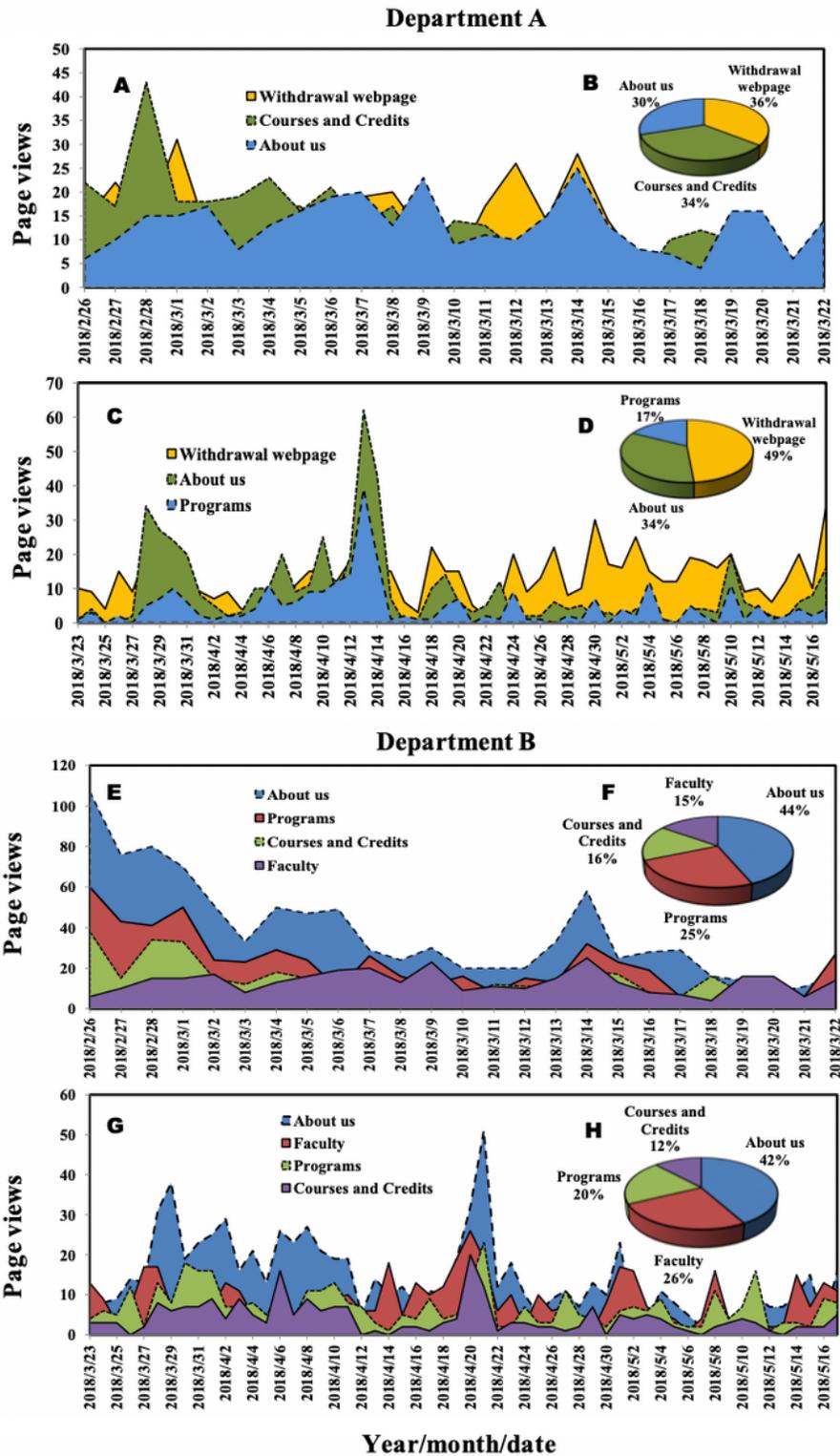
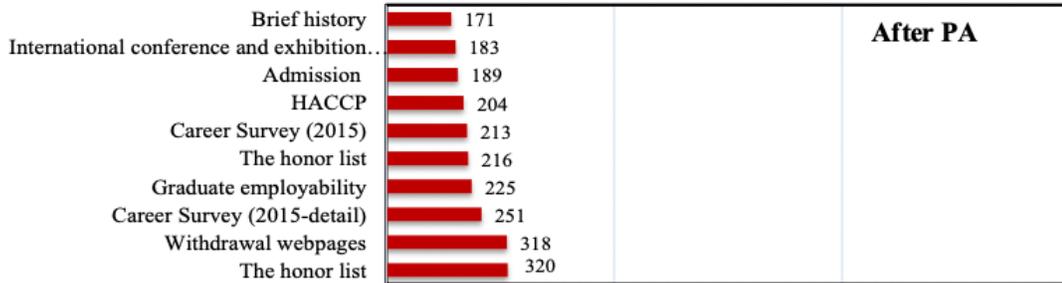
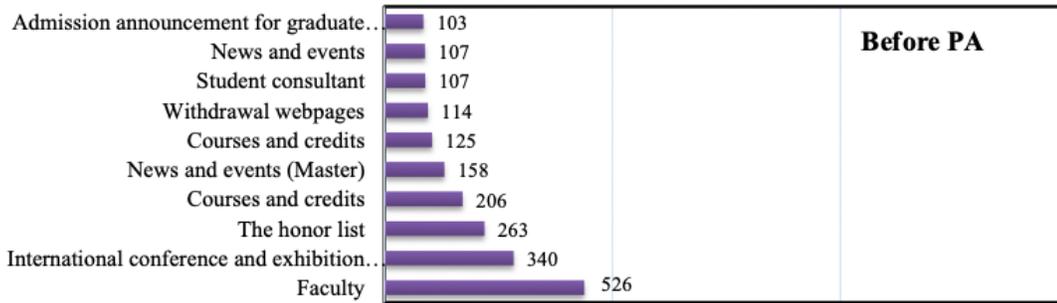


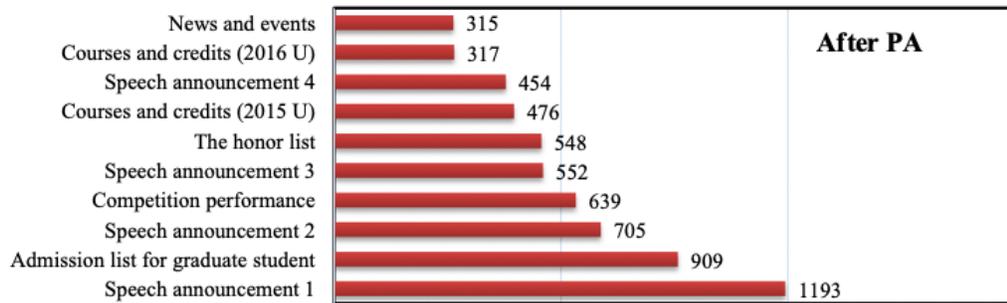
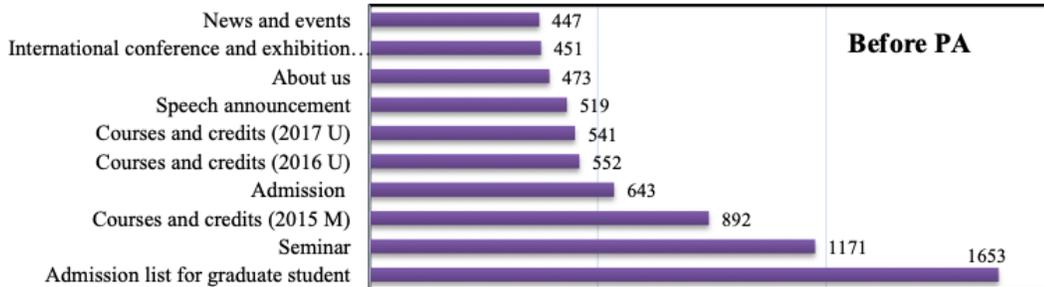
Figure 3

(A, C, E and G) show the time-series page views before (February 26 to March 22, 2018) and after (March 23 to May 17, 2018) PA in the two departments. (B, D, F and H) show the percentage of students visiting each page subject.

## Department A



## Department B



**Average time on site (in seconds)**

**Figure 4**

The average time spent on the site (in seconds) before and after Personal Application (PA).

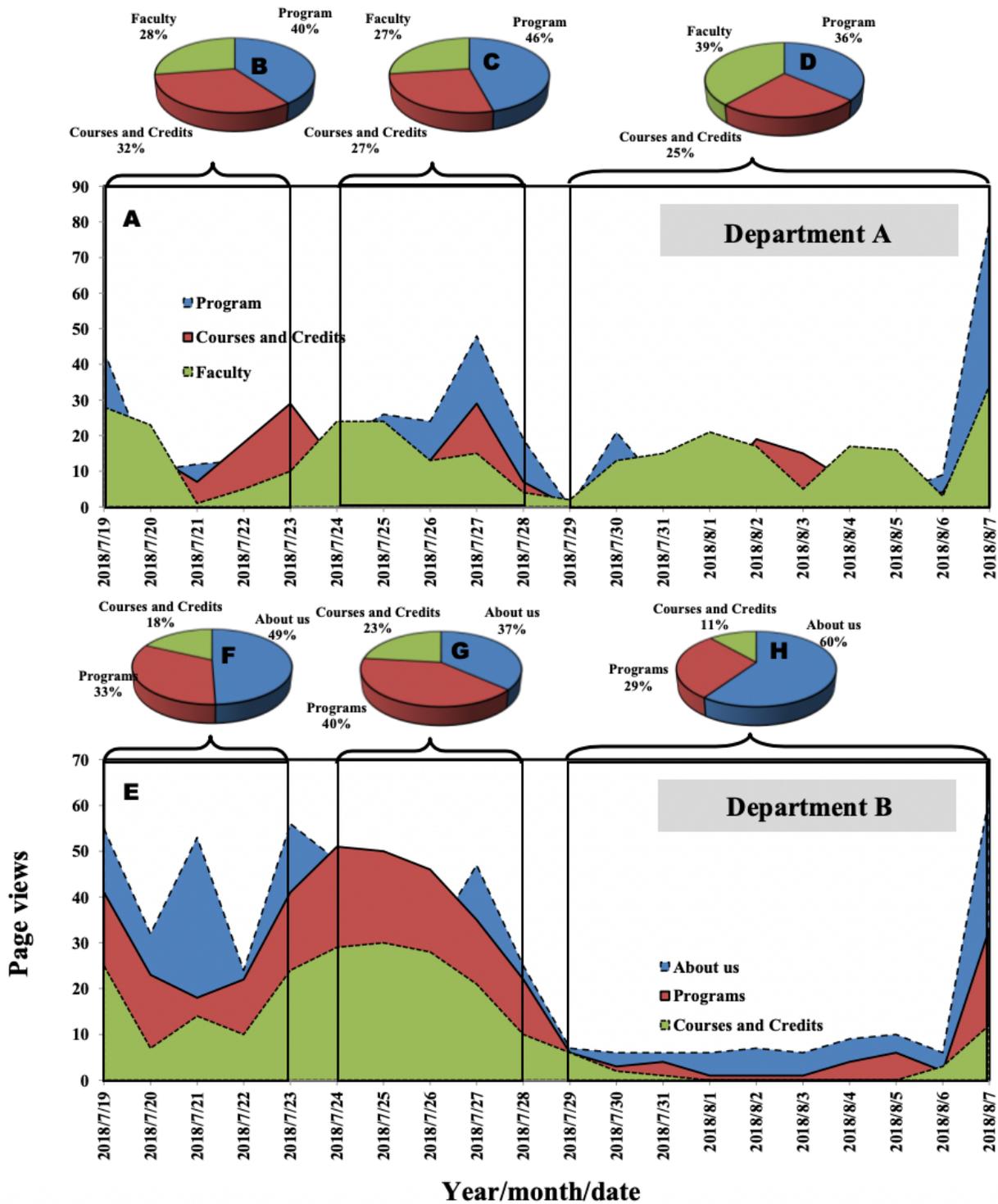
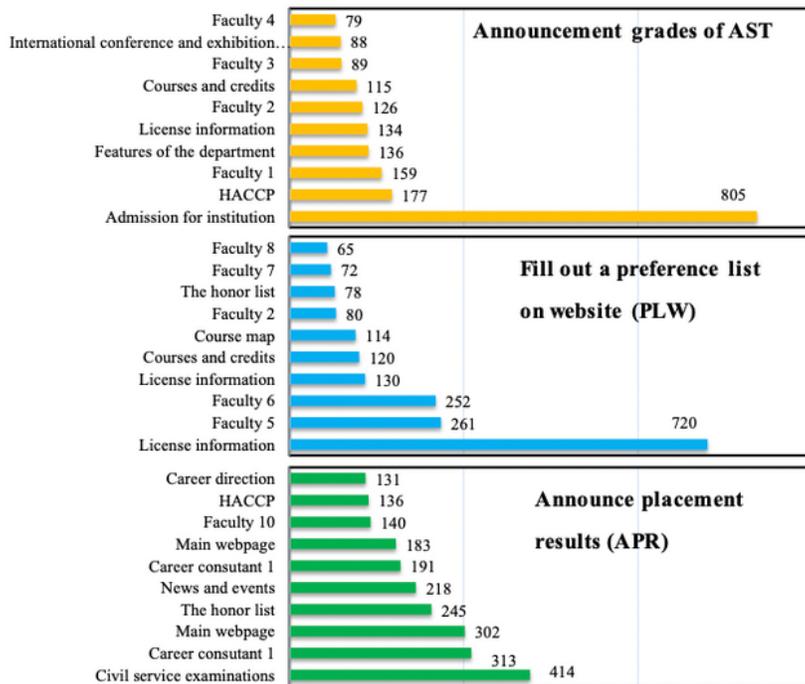


Figure 5

(A) The visit flow during the investigation periods in (A) department A and (E) Department B. (B, C, and D) show the percentage of visiting page subject.

## Department A



## Department B

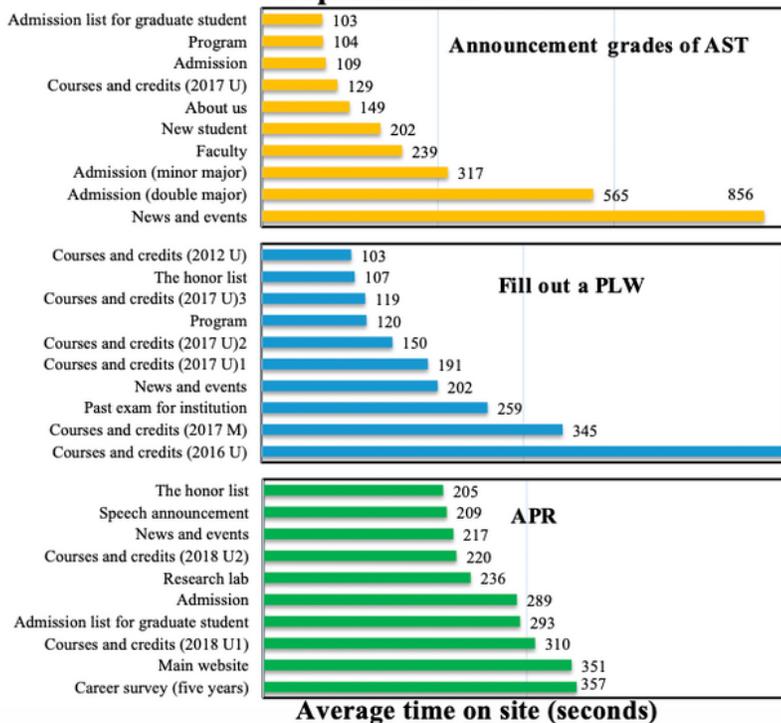


Figure 6

The average time spent on the site (in seconds) in three different stages: announcement grades of Advanced Subjects Test (AST), fill out a preference list on website (PLW), and announce placement results (APR).

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Appendix0324.docx](#)