MSMK 7004A Marketing On The Internet Group Project

Analysis of the Talent Pool of Hong Kong Universities and Labor Market

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Member names:
1. Chen Zhexin
2. Fang Jianguang
3. Guo Hanyuan
4. Jiang Peidong
5. Li Xuemei
6. Rong Yu
7. Zhang Xinyue
8. Zhang Xiangxin

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1. Background

In 2021, China's social concept, "Involution (Nei Juan)," has gone viral. According to BBC News, views on hashtags associated with "Involution" went over 1 billion (Wang & Wang, 2021). We found several relevant phenomena as we look closely at the Chinese labor market. One research found that most recruiters gave candidates with master's degrees a higher grade in "quality" than candidates with bachelor's degrees, regardless of the least educational background required for the job positions (Huo & Sun, 2021).

In terms of policies, for college students who received higher education degrees overseas (including Hong Kong SAR), Beijing solely considers those with at least master's degrees for the household registry (Luo Hu) (Chinese Service Center for Scholarly Exchange, 2021). Other major cities also favor talents with master's degrees or higher by offering more flexible household registry requirements. In terms of current economic trends, the average monthly salary for employed overseas returnees is 10,996 RMB, while the average for employed domestic graduates is 7,000 RMB (Zhaopin.com, 2021, 7). According to Boss Zhipin's research (Exhibit 1) in the spring recruitment season of 2021, the average number of offers given to candidates with master's degrees was almost twice as high as that given to candidates with bachelor's degrees (Boss Zhipin Research, 2021, 8). In terms of social changes, Covid-19 has impacted our daily lives in multiple aspects. The recruitment demands of several key industries significantly decreased between January 2019 and February 2020 (Maimai, 2020) (Exhibit 2). In terms of technology transformation, the MGI report suggests that 50 percent of today's work tasks across 800 occupations are feasible to be automated by currently available technologies (McKinsey Global Institute, 2017, 3). Even though economic benefits, regulations, and other factors can slow down automation's impact on the labor market, undergraduates may see the necessity to

prepare themselves for this change by completing higher education in technology-related subjects.

It is undeniable that Covid-19 has impacted labor markets worldwide, but it is biased to attribute all unexpected changes in the global labor market to it. We believe that educational institutions and enterprises, as the two leading roles of the labor market, must understand the employment trends and job seekers' incentives to facilitate the labor markets and tailor their strategies to better compete in their markets.

By using qualitative and quantitative data, including industry statistics, academic publications, and reliable press releases, with our best capability, we aim to answer a question: for Chinese students, how did employment trends and Covid-19 impact their decisions on pursuing Hong Kong master's degrees? To answer this question, we decided to develop our discussion in two sections, which are the network of universities and the relationship of majors.

2. Data Collection & Cleansing

2.1 Collection of data

Our main sample data comes from the admission postgraduate (PG) offer list of COMPASS EDU, which is an educational agency from Jiangsu. Since the PG offer list was originally presented in the form of a dynamic web page, we used python to grab the profile of 2804 offer holders, including undergraduate colleges and majors, admitted universities and majors, GPA, TOEFL or IELTS scores, GRE or GMAT scores, internship or work experience.

When conducting research on universities, we refer to the 2021 QS ranking list and the 985/211 universities categorization list.

When conducting research on majors, we refer to the "National Undergraduate Majors Classification Catalog and Major Codes" issued by the Ministry of Education of China.

2.2 Cleansing process of data

Through crawling, we initially started with 2804 candidates' profiles. Then, in order to see if there are some interesting differences before and after COVID-19, we decided to focus on the period between 2018 and 2021. Therefore, we narrowed down the dataset to 1957 profiles. In addition, we processed some dirty data and removed the missing default values. Finally, 1945 pieces of data remained for further analysis.

In order to make better use of the data, we marked the data manually. For the admission time, we marked it according to enrollment year and divided it into pre epidemic and post epidemic (Exhibit 3) . For undergraduate universities, we classified it according to the universities rankings. Specifically, domestic universities were classified according to 985, 211 and non-985/211 universities, and overseas universities were classified according to the 2021 QS ranking (Exhibit 4). What's more, undergraduate and graduate majors were divided into 6 major categories (Exhibit 5). Based on this, we converted qualitative data into quantitative data, which could be further used for our gephi analysis.

3. The Network of Universities and Its Local/Global Impact

3.1 Overview of offer holders' undergraduate background

In Exhibit 7, nodes are offer holders and node color represents offer holders' undergraduate university category. Dark pink represents 985-project universities & QS-Top-50 universities, light pink represents 211-project universities & QS 50-100 universities, blue represents non-985/211 & QS 100-200 universities, green represents QS 200-400 universities, yellow represents after QS 400 universities.

Based on Exhibit 6&7, we can find the background preferences of candidates in 8 universities in Hong Kong. Top three universities (HKU&HKUST&CUHK) have a very clear

preference for students from 985/211 universities or QS-top-100 universities. These students account for more than 85 percent of the offer holders of these three universities. In contrast, the offer holders of City U and Poly U have very diverse backgrounds. Specifically, students from 985 & QS top50, 211&QS 50-100, non-985/211&QS100-200, these three types of students each account for about 30 percent of the offer holders in these two universities.The offer holders of HKBU, Lingnan U and EduHK mainly come from non-985/221 and QS 200-400 universities, accounting for more than 70 percent of total offer holders in each university.

We can gain some insights in the advanced job market from the admissions situation. First of all, even undergraduate students who graduated from 985/211 University or QS-TOP-100 University still choose to continue to pursue TPG in Hong Kong. This reflects to a certain extent that a bachelor degree, even an excellent bachelor degree, is not enough to enable graduates to achieve the best competitive status in the job market, and having a master degree has gradually changed from a bonus condition to a necessary condition. Secondly, when the master's degree became common, the pressure of job competition shifted to the ranking of graduated colleges. Obtaining a TPG degree in Hong Kong can help students enter the target school lists that are becoming more and more stringent by major companies. In general, the admission of universities is a microcosm of the ever-increasing standards of competition in the labor market.

Above statements flipped the first page of section 3, then we will develop our discussion into three directions. We will talk about how Hong Kong's top three universities are different from the last three universities, which Hong Kong university sent out the most offers, offer holders in Hong Kong and GBA, and geographic distribution of offers.

3.2 Hong Kong Top 3 ace in offer holders' origins while last 3 are at the edge

We were surprised to see such a polarized result, but It is not surprising that we would find many meaningful insights if we dig deeper into our data. We discovered that there is a significant gap between the top three universities and the last three in offer holders' backgrounds, in other words, which institutions they attended before they applied for postgraduate programs.

Based on closeness centrality (Exhibit 8&9) , it is obvious that more students from top schools, which in this case are 985-project universities (top 39 universities in Mainland China) and QS-Top-50 universities, are admitted to the top three Hong Kong universities, which are HKU, HKUST, and CUHK, compared to lower-tier universities. It might be too early to conclude that the top three Hong Kong universities almost closed the gate for applicants from lower-tier universities, but we definitely can see a trend even solely using the data of closeness.

Moreover, as we can see in Exhibit 10 and 11, offer holders to HKBU, Lingnan U, and EdUHK are scattered at the edge of the graph, which reflects another fact that the previously-attended institutions of these offer holders are hardly related to other higher-ranked 5 universities in Hong Kong. We see an invisible wall dividing people with different backgrounds. There must be forces behind to build and sustain this wall, otherwise it will collapse. We believe that employment trends and job seekers' incentives, which we will discuss later in our report, will explain the reason why the wall exists.

3.3 City U sent most offers; Hong Kong is strongly attracting talents from GBA

Based on the ranking of the out-degree data (Exhibit 12), we can see that among all offer holders' universities, those from the greater bay area take up to 5 seats among the top 8. Firstly, this result might be explained by Hong Kong's abundant education resources that have a strong

attractiveness to applicants from the greater bay area. Secondly, citizens in the greater bay area all speak Cantonese, which makes study life more convenient and more culturally adapted**.** Thirdly, people in the greater bay area may think that this area is promising. The policy support for the Greater Bay Area may give offer holders more internships and career opportunities.

For the development of the Great Bay Area, almost all universities in Hong Kong have already or will open branch campuses in cities of Guangdong province. Such as CUHK(Shenzhen), HKUST(Guangzhou), Poly U(Foshan). The popularity of Hong Kong universities in the mainland will be greatly enhanced. As is well-known, Hong Kong universities already enjoy the highest reputation in the Greater Bay Area. At the same time, according to the data (Exhibit 13), Shenzhen is the most popular choice for talented employees in Mainland China. The truth is that the Great Bay Area has been attracting talented employees from all over China. The Hong Kong Government also launched the Greater Bay Area Youth Employment Scheme, providing employment opportunities to graduates from Hong Kong universities. Their Business scope will cover both Hong Kong and the mainland, and they can receive monthly subsidies from the government. All these policies and data show that applying to Hong Kong universities will give applicants a promising future, especially for applicants in the Great Bay Area.

Moreover, based on the ranking of the in-degree data (Exhibit 14), we found that City U sent out the most offers. One possible explanation could be that many applicants took City U as a guaranteed university. It means that finally, plenty of offer holders would choose higher-ranked universities and give up City U's offer. Therefore, City U has to send out enough offers to ensure enrollment.

Compared to the other six Hong Kong Universities, EDUHK and Lingnan U send out

much fewer offers. Probably, these two universities are less attractive to applicants who use agencies, because they may think it's just a waste of money that is paid to agencies. It can also be explained that these two universities have smaller class sizes.

3.4 No clear preference of Mainland universities over Overseas universities

Within the sample of this project, there are 260 mainland universities (81 percent) and 58 overseas universities (19 percent). Universities of Mainland China and overseas universities are divided into multiple layers based on the weights of edges (Exhibit 15). The orange dots represent universities of Mainland China, and the blue dots represent overseas universities (including universities in Hong Kong SAR). Seven out of eight major universities in Hong Kong gave over ten offers to candidates with overseas educational backgrounds. Therefore, research shows no signs that these eight universities strongly prefer students' geographic location of prior studies.

It was surprising to see an observable difference between the intake of students with overseas educational backgrounds across the eight major universities in Hong Kong. EdUHK was the only university that did not give admission offers to overseas students (Exhibit 16). HKUST was the school that gave the most offers to overseas students (Exhibit 17). More specifically, it gave offers to students from all eight major universities in Hong Kong. HKUST, CUHK, and HKU gave the most admission offers to students with overseas education backgrounds out of these eight major universities. It may seem intuitive to see three schools with higher global reputations give more offers to students with overseas backgrounds. Almost all universities of the sample are on the QS 400 list of 2021. In other words, they are all relatively reputable institutions. Therefore, the differences between the number of offers given to students with overseas education backgrounds might not accurately reflect Hong Kong universities'

enrollment preference. Instead, it might show these offer holders' selectivity of post-graduate institutions.

4. The Relationship of Majors

4.1 Overview of changes in the offer holders' majors

In addition to analyzing the current admission situation of Hong Kong universities from the school dimension, this article also explored the main flow of students from the admission major dimension.

First of all, we compare the admissions before and after COVID-19, so as to have an understanding of the overall major's transition trends. By Gephi, we draw two figures about it. For the node color, we use different colors to represent different majors. Specifically, blue means social science, orange means science, grass green means engineering, purple means business, and dark green means medicine.

By analysing, two insights are obtained from it. For one thing, the colors of EduHK and Lingnan U are relatively single, while the node colors of the other six universities are much more colorful (Exhibit 18). This showed that except for EduHK and Lingnan U, offer holders from the other six universities had more diverse major choices and these schools may attract more diversified talents, especially HKUST and PolyU. And this finding was consistent with major settings of these Hong Kong universities. For another thing, we could find that the amount of purple nodes is growing rapidly (Exhibit 19), which shows after COVID-19, there is a trend that more and more students are willing to choose business to continue their study (EIC Education, 2021).

4.2 The relationship between bachelor's major and master's major

To have a further insight, we used Gephi and Excel to analyze the data and look for the

relationship between bachelor's majors and master's majors, then we evaluate the trend of choosing a major in different periods.

Firstly, as shown in Exhibit 20, we measure the most popular major for bachelor, based on the excel, it can be easily found that the most popular bachelor major is Major 4 (Business), which includes 770 students. There are only 131 students (17 percent) in major 4 (Business) who changed their majors in the master stage.

Secondly, it has been measured that 663 students (32%) changed majors from bachelor to master. For most majors for masters, students are inclined to study the same major as their bachelor, and the reason could be that most of them prefer to study their chosen field in depth. Some students choose to change their majors for masters. The reason could be their personal preference, the employment environment changes and the negative impact of COVD-19 on many industries.

Thirdly, as shown in Exhibit 21, it can be found that major 4 (Business) turns out to be more popular, as 44 percent of students chose it in the master stage. Major 5 (Medicine) turns out to be the most unpopular, there are only 2 percent students who chose major 5 (Medicine). One possible explanation is that commerce is the most popular major and commerce students can easily land a job. The salary is also high so lots of students change their majors in the master stage. Besides, nobody chose agriculture in the master stage, which means they may not be interested in it anymore or the employment environment of agriculture turns out to be worse.

According to Exhibit 22 and Exhibit 23, it can be summarized that the situation is about major changes from bachelor to master. For major 1 (Social Science), only 1/4 students chose to change their majors. For major 2 (Science), about a half of students changed their major, including 21 percent changed to major 3 (Engineering) and 18 percent changed to major 4 (Business). For major 3-Engineering, about a half of students changed their major, including 23 percent changed

to major 4 (Business) and 21 percent changed to major 2 (Science). For major 4 (Business), 83 percent of students remained their major, only 17 percent changed to major 1 (Social Science) and very few students changed to major 3 (Engineering). For major 5-Medicine, about a half of students changed their major, including 26 percent changed to major 4 (Business) and 15 percent changed to major 2 (Science). For major 6 (Agronomy), there are no students who chose to study the same major in master, 38 percent changed to major 3 (Engineering), 38 percent changed to major 4 (Business), 19 percent changed to major 1 (Social Science) and 6 percent changed to major 5 (Medicine).

Referring to *2020 Guangdong-Hong Kong Greater Bay Area Urgently needed talent List* and the data mentioned above, it can be found that in terms of academic qualifications, the demand for highly educated talents is rising. From the perspective of industry, commerce, scientific research and technical service, education respectively accounted for 85.48 percent, 62.13 percent and 54.65 percent of graduates with a bachelor's degree or above.

Exhibit 24 shows the undergraduate majors of students who are more inclined to further their study. In the figure, the number 1 represents social science, and the number 2 represents science, and the number 3 represents engineering, and the number 4 represents business, and the number 5 represents medicine, and the number 6 represents agronomy. The two numbers are dots that represent students with double majors. From the direction of the arrow and the size of the node, it can be seen that most students admitted to universities in Hong Kong studied social science and business during the undergraduate period, followed by science and engineering students.

Exhibit 25 shows the inflowed majors of Hong Kong universities' offer holders. The direction of the arrow and the size of the nodes are used to show the inflow direction of majors

and the number of offers. It shows that the majors that many students still apply for are social science and business, which are followed by science, engineering and medicine. One thing worth noting is that the students who majored in agriculture as an undergraduate changed their learning direction during the postgraduate period.

In order to analyze the changes of undergraduate majors and graduate majors more clearly, Exhibit 26&27 use purple to indicate undergraduate majors and serve as the basic nodes. If there is a change in student majors during the postgraduate period, the nodes will be in different colors. Moreover, the size of the node positively shows the number of students.

By analysing, it is clear that all students majoring in agronomy transferred to social science, engineering, medicine, and business. This is not only based on the availability of majors from Hong Kong's University, but is also based on the geographical environment of Hong Kong. According to the QS top 10 global university rankings for agriculture, universities in Europe, the United States and mainland China are more suitable for students to continue their studies and research. Moreover, in 2020, Hong Kong's agriculture-purpose land accounted for only 4.4 percent of total geographic area and supplied only 1.6 percent of vegetables. Therefore, the geographical environment of Hong Kong is not ideal for agronomy students who want to study further.

According to Exhibit 26 and 27, most undergraduate students with dual majors chose only one major during the graduate period, and most of them chose social science, business, and engineering majors. In addition to students' personal interests, this shift is to some extent related to the large demand in the labor market for talents majoring in those three academic fields and the superior job benefits in these industries.

The blue lines and arrows in Exhibit 27 show that undergraduates majoring in

engineering chose business or science majors for their postgraduate education. To a certain extent, this reflects that the composite background of science/engineering majors and business majors probably bring a competitive advantage for students when they enter the labor market.

5. Limitations

There is neither perfect research nor flawless conclusion. Our project also has embedded limitations. Through our discussion and self-reflection, we found 4 major restraining factors in our project.

The first restraint is survivorship bias, which is that some top-school candidates probably don't need agencies for graduate school applications, therefore we may lose sight of those candidates, and this could make our data not as representative, especially when we talk about top-school candidates who are from elite institutions, such as Harvard, MIT, etc.

Apart from the survivorship bias mentioned above, we found that offer holders who use agencies are mainly from universities in Mainland China, therefore, some offers of applicants from overseas universities might not be counted in our project. This imposed a geographical bias/tendency on our data, and it might lead to a conclusion that could not be generalized.

The third restraint is that we might oversimplify data of candidates having multiple degrees. To make the data easier to be processed, for offer holders having multiple degrees, we recorded their first-enrolled institution as the data source, which may negatively impact our data reliability in a way that we might overlook some education experiences that better represent an offer holder's potential. For example, for an offer holder who attended a "2+2 project", he or she might attend a higher-ranked university in the second stage of college, but we recorded the first-enrolled one, which puts the lower-ranked school in our dataset for this offer holder. Furthermore, offer holders having multiple majors were recorded as single-major offer holders,

which made it impossible for us to discover the impact of having multiple majors on receiving offers.

The last restraint of our project is that we do not have data of total applications and final enrollments, which may restrict our insights only to applicants who were admitted. This puts us in a position where we can only talk about a one-way selection process, which is how Hong Kong universities selected applicants. If we have data of total applications and final enrollments, we will be able to see a bigger picture of how candidates select Hong Kong universities, and what the final enrollment looks like, etc.

Although we have restraints in our project, we are aware of most of them, and we are still able to see facts through data and selectively combine facts to bring out insights.

6. Conclusion

The admission trend of universities in Hong Kong is a microcosm of shifts in the labor market. In terms of academic background, the master's degree has changed from a bonus condition to an implicit requirement. At the same time, the list of target schools for various companies has become more stringent, which also pushes students to continuously pursue entry into a higher-ranked university during their master's studies. In terms of geographic areas for employment, the government’s policy inclination and assistance for employment and education in the Greater Bay Area are indeed effective, which has made the talent connections between cities in the GBA closer and also attracted many students to approach the GBA. In terms of industry, business (especially the financial industry), scientific research and technical services (especially the IT industry), and education and training industries have a strong demand for highly educated talents. Therefore, more students choose these industries for their postgraduate studies. In short, the increasing demands of employers and the concentration of talents in certain

industries after Covid-19 have led to more fierce competition in the labor market and increasingly intensified involution (Nei Juan).

There are always multiple factors to take into consideration when we analyze a complex social phenomenon. Having a master's degree won't guarantee job offers, as there are factors that might play a bigger role in one's career development, such as his/her bachelor degree, previous experiences (leadership and full-time work), professional certificates, family networks, and even age and gender, etc. We even see a geographic inclination, which is that employers do not like long-distance job candidates. (Green, 2014) We are not saying that having a master degree has no positive impacts, instead, it certainly helps a candidate to an extent. We will elaborate on why people are still running after a master degree nowadays in the next paragraph.

If we attempt to apply the findings of this project to a grander scale, it leads us to one of the least known but most important principles in the field of social science, the Matthew effect. The Matthew effect describes the occurrence when "social advantages lead to further advantages and social disadvantages lead to further disadvantages" (Rigney, 1893, 1). Along with China's rapid economic growth in recent years, the percentage of individuals with higher education in the Chinese labor market rises. Under such circumstances, perhaps getting a master's degree is one of the most feasible and efficient methods to make an individual stand out in an increasingly competitive labor market. However, more reputable educational institutions generally form stronger bonds with other creditable universities and enterprises. The combination of tangible and intangible resources gained from this social network of elite institutions potentially drive undergraduates to pursue master's degrees nowadays.

7. Appendix

Exhibit 1. Recruitment Scale and Salary Changes for Different Academic Qualifications in the Spring Recruitment Season of 2021 Freshmen (Data Source: Boss Zhipin's research)

Academic requirements	Year-on-year increase in recruitment scale	Average recruitment salary (RMB)	Average recruitment salary increased year-on-year
Doctor	75.7%	24775	1.7%
Master	57.9%	11224	13.6%
Undergraduate	57.5%	6331	7.1%
Associate	49.5%	5417	2.0%

Exhibit 2. Recruitment Demand Trend of Some Industries from January 2019 to February 2020 (Data Source: Maimai data research institute)

Exhibit 3. Admission Time Mark Description

Admission time	Explanation	Mark
2017.8-2018.7	Before COVID-19	2018
2018.8-2019.7		2019
2019.8-2020.7	After COVID-19	2020
2020.8-2021.7		2021

Exhibit 4. School Mark Description

Domestic Universities	Overseas Universities	Mark
985	QS top 50	1
211	QS 50-100	2
Non-985/211	QS 100-200	3
\	QS 200-400	4
\	Others	5

Exhibit 5. Major Mark Description

Major Category	Explanation	Mark
Social Science	Philosophy, Law, Education, Literature, History, Art etc.	1
Science	Math, Psychology etc.	2

Engineering	\	3
Business	Economics, Management etc.	4
Medicine	Pharmacy, Clinical medicine etc.	5
Agronomy	\	6

Exhibit 6. Undergraduate Background of Offer Holders

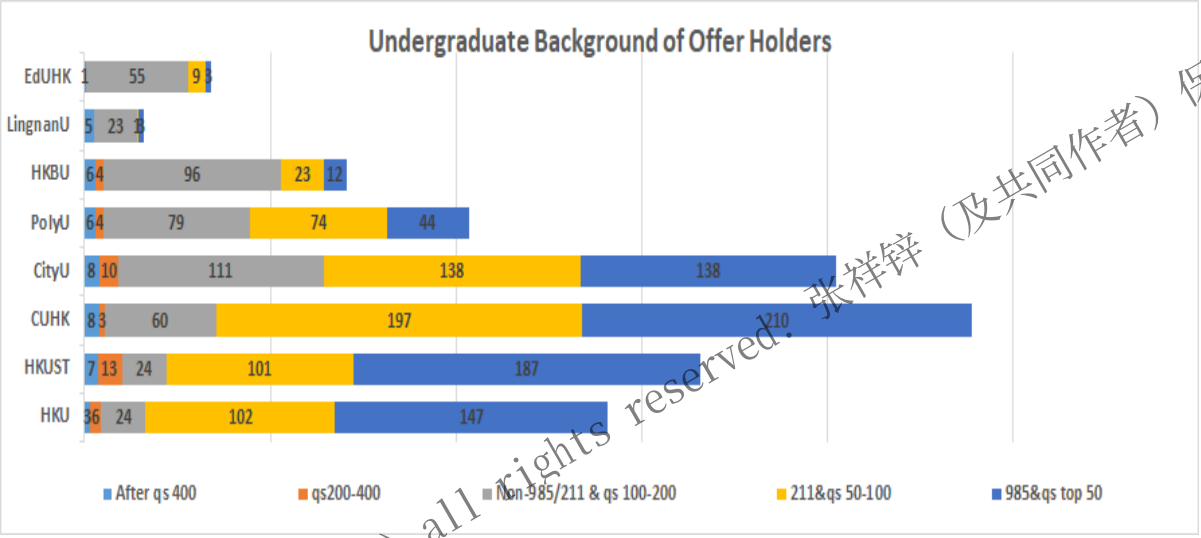


***Exhibit 7.* Overview of Hong Kong universities' preference for applicants' undergraduate background**

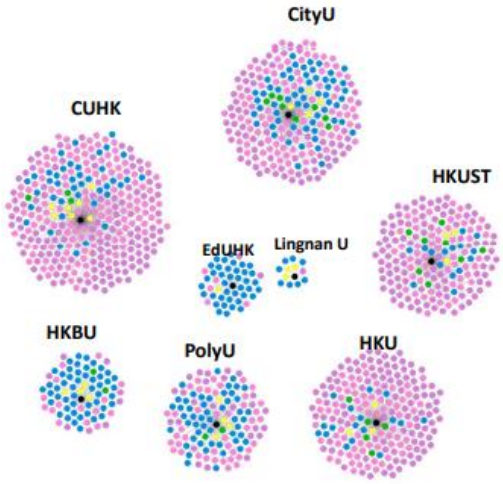


Exhibit 8. The Closeness Centrality of 8 universities in Hong Kong

(screenshot-1)

Id	Label	Closeness Centrality
重庆大学	重庆大学	1.0
郑州大学	郑州大学	1.0
西安交通大学	西安交通大学	1.0
西南财经大学	西南财经大学	1.0
西北工业大学	西北工业大学	1.0
苏州大学	苏州大学	1.0
澳门科技大学	澳门科技大学	1.0
澳门大学	澳门大学	1.0
深圳大学	深圳大学	1.0
武汉理工大学	武汉理工大学	1.0
武汉大学	武汉大学	1.0
广州大学	广州大学	1.0
山东大学威海校区	山东大学威海校区	1.0
山东大学	山东大学	1.0
对外经济贸易大学	对外经济贸易大学	1.0
太原理工大学	太原理工大学	1.0
天津大学	天津大学	1.0
大连理工大学	大连理工大学	1.0
大连海事大学	大连海事大学	1.0
四川大学	四川大学	1.0
四川农业大学	四川农业大学	1.0
哈尔滨工程大学	哈尔滨工程大学	1.0
哈尔滨工业大学威海校区	哈尔滨工业大学威海校区	1.0
哈尔滨工业大学	哈尔滨工业大学	1.0
同济大学	同济大学	1.0
吉林大学	吉林大学	1.0
厦门大学	厦门大学	1.0
南昌大学	南昌大学	1.0
南开大学	南开大学	1.0
南京航空航天大学	南京航空航天大学	1.0
南京理工大学	南京理工大学	1.0
南京师范大学	南京师范大学	1.0
南京大学	南京大学	1.0
南京农业大学	南京农业大学	1.0
华南理工大学	华南理工大学	1.0
华南师范大学	华南师范大学	1.0
华中科技大学	华中科技大学	1.0
华东理工大学	华东理工大学	1.0
北京邮电大学	北京邮电大学	1.0
北京航空航天大学	北京航空航天大学	1.0
北京科技大学	北京科技大学	1.0
北京理工大学	北京理工大学	1.0
北京林业大学	北京林业大学	1.0
北京师范大学	北京师范大学	1.0
北京交通大学	北京交通大学	1.0
中山大学	中山大学	1.0
中央财经大学	中央财经大学	1.0
中国矿业大学（徐州）	中国矿业大学（徐州）	1.0
中国矿业大学	中国矿业大学	1.0
中国海洋大学	中国海洋大学	1.0
中国农业大学	中国农业大学	1.0
中国人民大学	中国人民大学	1.0
中南财经政法大学	中南财经政法大学	1.0

Exhibit 9. The Closeness Centrality of 8 universities in Hong Kong

(screenshot-2)

Id	Label	Closeness Centrality
首都师范	首都师范	0.4
韩国庆熙大学	韩国庆熙大学	0.4
美国德州理工大学	美国德州理工大学	0.4
浙江工商大学	浙江工商大学	0.4
河北经贸大学	河北经贸大学	0.4
新疆财经大学	新疆财经大学	0.4
宾州州立	宾州州立	0.4
天普大学	天普大学	0.4
加拿大西蒙佛雷泽大学	加拿大西蒙佛雷泽大学	0.4
加拿大西安大略大学	加拿大西安大略大学	0.4
加拿大约克大学	加拿大约克大学	0.4
中央民族大学	中央民族大学	0.4
中国药科大学	中国药科大学	0.4
三明学院	三明学院	0.4
新加坡管理大学	新加坡管理大学	0.4
黄山学院	黄山学院	0.461538
首都师范大学	首都师范大学	0.461538
韩山师范学院	韩山师范学院	0.461538
陕西中医药	陕西中医药	0.461538
长江师范学院	长江师范学院	0.461538
贵州财经大学	贵州财经大学	0.461538
西华大学	西华大学	0.461538
绍兴文理学院元培学院	绍兴文理学院元培学院	0.461538
湖州师范学院	湖州师范学院	0.461538
淮阴师范学院	淮阴师范学院	0.461538
淮海工学院	淮海工学院	0.461538
杭州师范大学	杭州师范大学	0.461538
成都文理学院	成都文理学院	0.461538
南京信息工程大学滨江学院	南京信息工程大学滨江学院	0.461538
北华大学	北华大学	0.461538
北京理工大学珠海学院	北京理工大学珠海学院	0.461538
北京印刷学院	北京印刷学院	0.461538
中山大学南方学院	中山大学南方学院	0.461538
中央戏剧学院	中央戏剧学院	0.461538
中国矿业大学徐海学院	中国矿业大学徐海学院	0.461538
东南大学成贤学院	东南大学成贤学院	0.461538
上海电机学院	上海电机学院	0.461538

Exhibit 10. The Closeness Centrality of 8 universities in Hong Kong (Gephi)

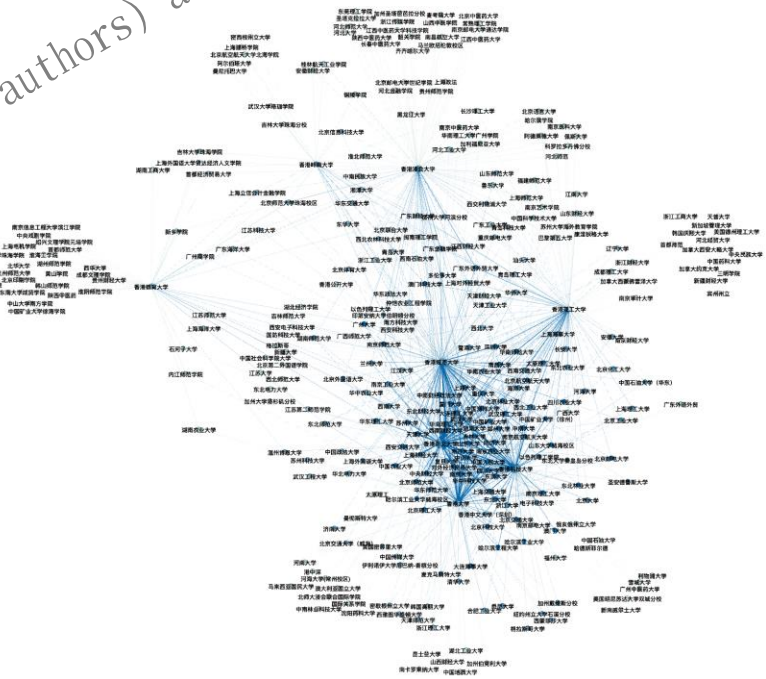


Exhibit 11. The Closeness Centrality of 8 universities in Hong Kong (Gephi-Partial Enlarged View)

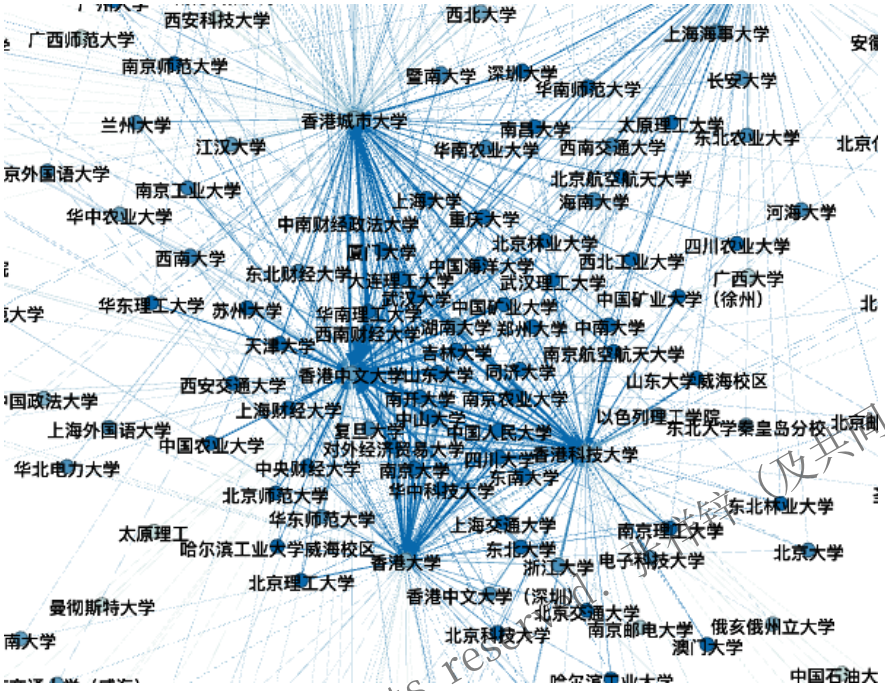


Exhibit 12. The Out-degree Centrality of 8 universities in Hong Kong

Label	Out-Degree
澳门科技大学	7
广州大学	7
南京师范大学	7
华东理工大学	7
西南大学	6
苏州大学	6
深圳大学	6
广东外语外贸大学	6

Exhibit 13. Top ten cities ranked by net talent inflow in 2019 (Data Source: Maimai data research institute)

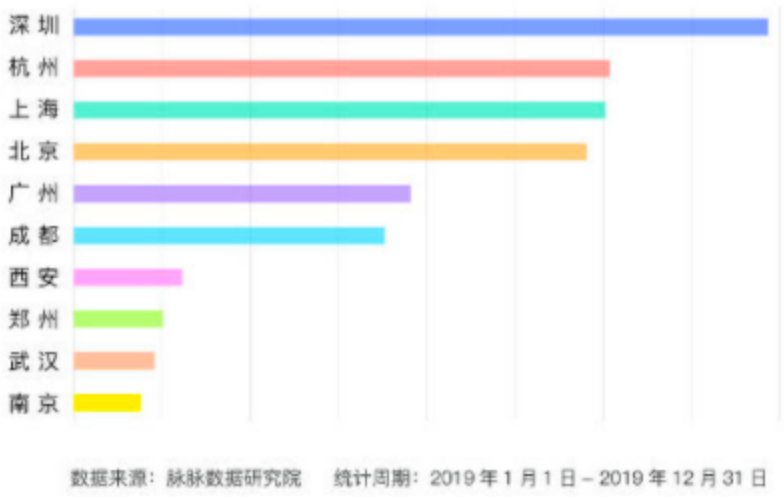


Exhibit 14. The In-degree Centrality of 8 universities in Hong Kong

Label	In-Degree
香港城市大学	163
香港中文大学	125
香港大学	119
香港理工大学	112
香港科技大学	111
香港浸会大学	107
香港教育大学	51
香港岭南大学	29

Exhibit 15. The Network Between Chinese and Overseas Universities

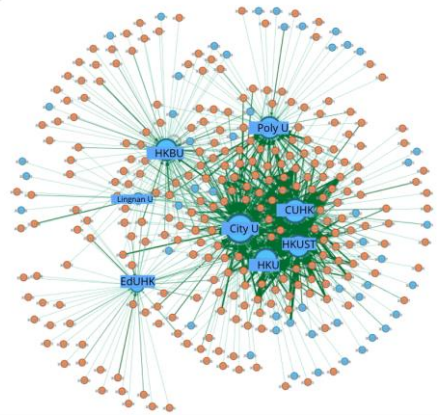


Exhibit 16. The Network of Admission Offers in EdUHK

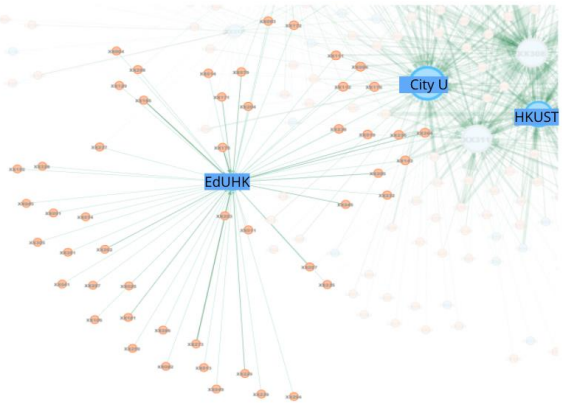


Exhibit 17. The Network of Admission Offers in HKUST

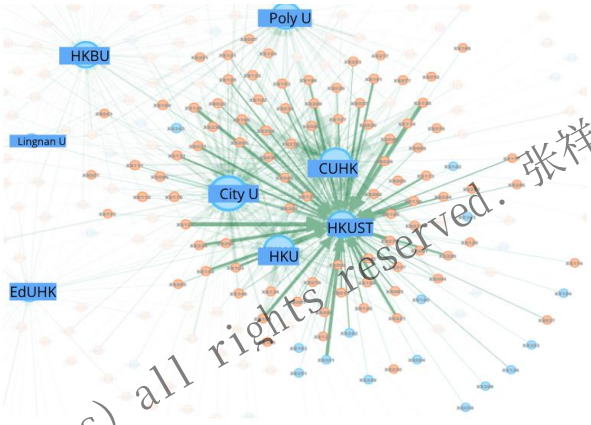


Exhibit 18. The Major Admission Situation before COVID-19

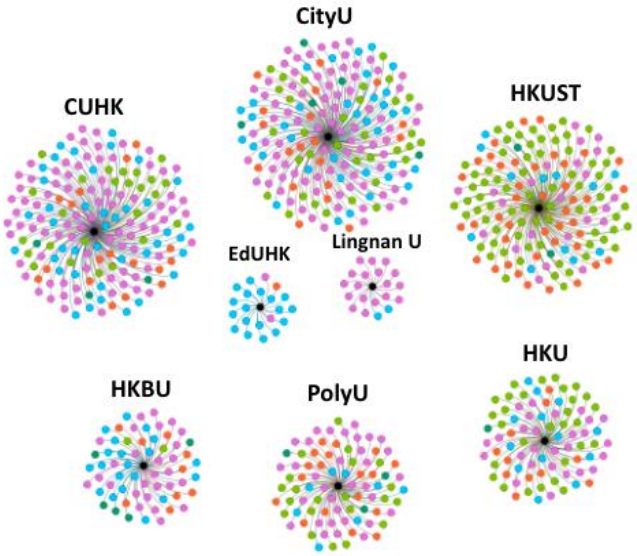


Exhibit 19. The Major Admission Situation after COVID-19

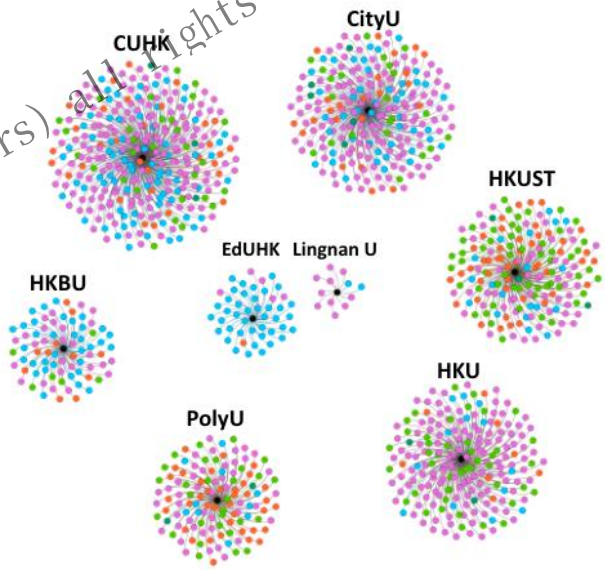


Exhibit 20. The Most Popular Major for Bachelor

The most popular major for bachelor					
Major	No. of students choose the Single major	No. of students choose double majors	sum	No. of students change their major	No. of students change their major(rate)
1	406	11	417	103	25%
2	172	13	185	90	49%
3	690	7	697	339	49%
4	744	26	770	131	17%
5	26	1	27	13	48%
6	16	0	16	16	100%

Exhibit 21. The most popular inflow majors

Which majors turn to be more popular or unpopular?					
Major	No. of students	the most popular major for master	students choose the most popular major for master(rate)	the most unpopular major for master	students choose the most unpopular major for master(rate)
1	396	4	44%	5	2%
2	298				
3	424				
4	925				
5	40				

Exhibit 22. Major transitions trend in 8 universities in Hong Kong (Table)

The situation about major changes from bachelor to master (value)							
	direction 1	direction 2	direction 3	direction 4	direction 5	direction 6	sum
1	314	7	6	89	1	0	417
2	7	95	38	34	11	0	185
3	20	145	358	162	12	0	697
4	56	56	18	639	1	0	770
5	0	4	2	7	14	0	27
6	3	0	6	6	1	0	16
							2112

The situation about major changes from bachelor to master (rate)							
	direction 1	direction 2	direction 3	direction 4	direction 5	direction 6	sum
1	75%	2%	1%	21%	0%	0%	100%
2	4%	51%	21%	18%	6%	0%	100%
3	3%	21%	51%	23%	2%	0%	100%
4	7%	7%	2%	83%	0%	0%	100%
5	0%	15%	7%	26%	52%	0%	100%
6	19%	0%	38%	38%	6%	0%	100%

Exhibit 23. Major transitions trend in 8 universities in Hong Kong (Histogram)

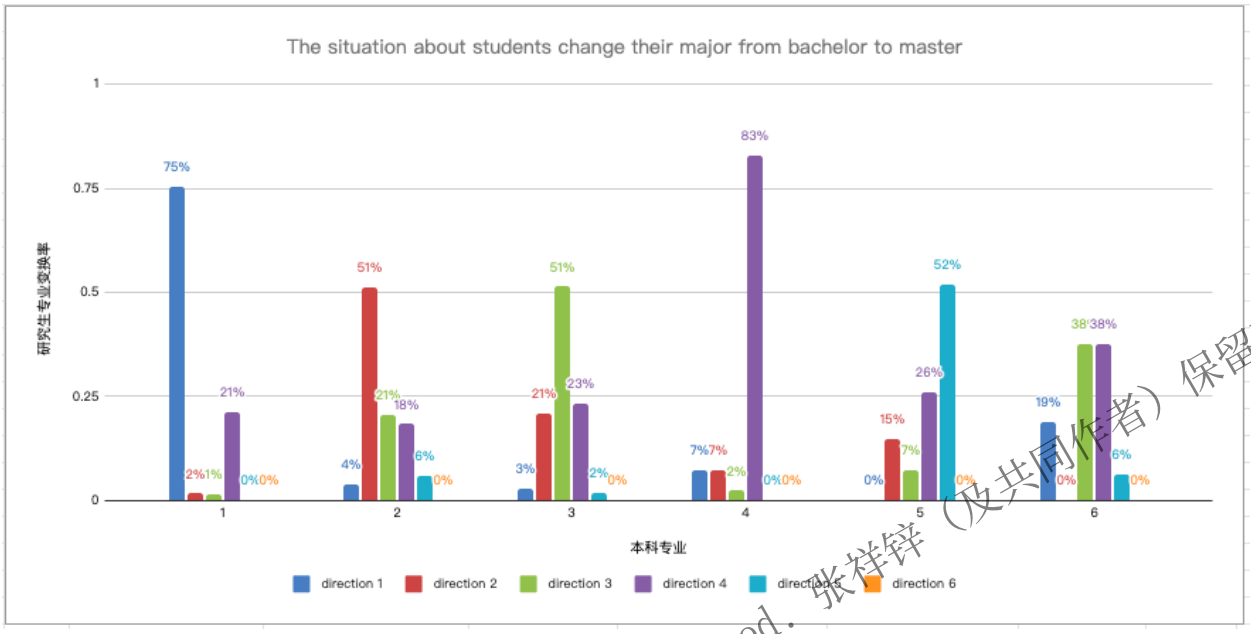


Exhibit 24. Undergraduate Outflow Majors for Hong Kong Universities Applicants

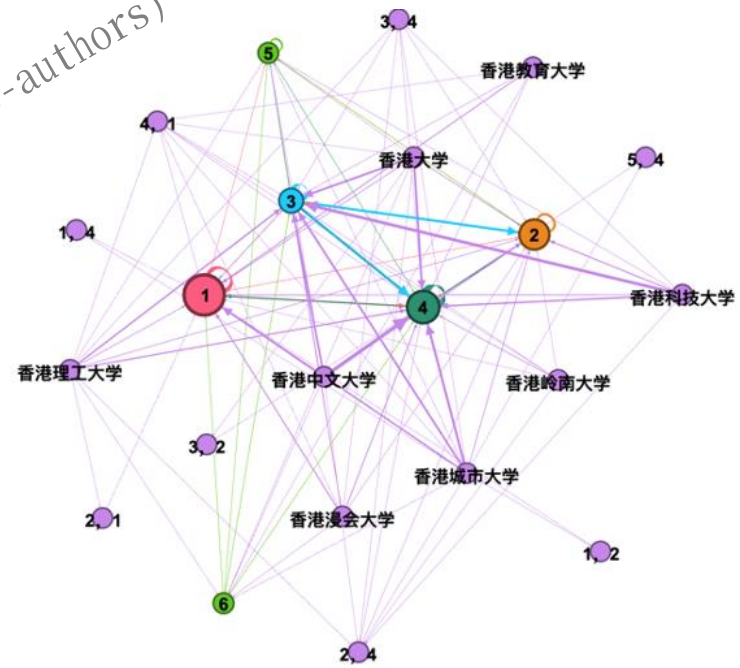


Exhibit 25. Admission Majors in Hong Kong Universities

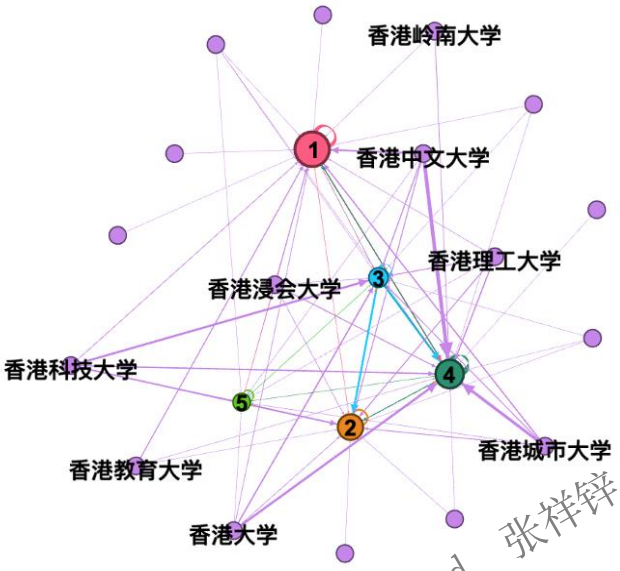


Exhibit 26. Major changes from undergraduate to graduatel (refer back to Exhibit 5 for Mark Description if needed)

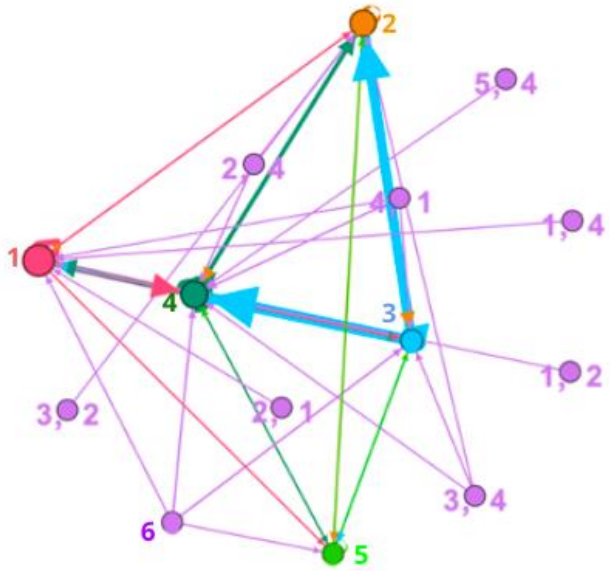
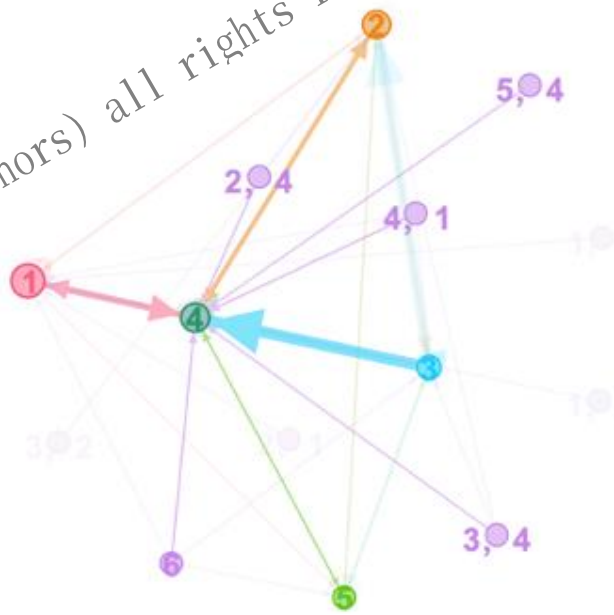


Exhibit 27. Major changes from undergraduate to graduate2 (refer back to Exhibit 5 for Mark Description if needed)



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