CSCanada
Higher Education of Social Science
Vol. 3, No. 3, 2012, pp. 15-21
DOI:10.3968/j.hess.1927024020120303.4012

ISSN 1927-0232 [Print]
ISSN 1927-0240 [Online]
www.cscanada.net
www.cscanada.org

Pre-Warning Student Situation Analysis Based on the Correlation Analysis and the Studies on Its Transformation

SUN Hongxia[a],*

[a] Office of Academic Affairs, Nantong University Xinglin College, Nantong, China.
* Corresponding author.

Received 3 September 2012; accepted 27 November 2012

Abstract
The paper takes Nantong University Xinglin College as an example. By making the statistical analysis and correlation analysis on the scores of the pre-warning students, the paper acquires the data information of a student becoming a pre-warning student, and it also proposes solutions to different cases of the pre-warning students, which can help us more effectively to do the pre-warning students transformation work effectively. In this way, the theoretical level of the independent college teaching management can be raised to certain extent.

Key words: Independent college; Pre-warning; Statistical analysis; Correlation analysis

SUN Hongxia (2012). Pre-Warning Student Situation Analysis Based on the Correlation Analysis and the Studies on Its Transformation. *Higher Education of Social Science*, *3*(3), 15-21. Available from: http://www.cscanada.net/index.php/hess/article/view/j.hess.1927024020120303.4012
DOI: http://dx.doi.org/10.3968/j.hess.1927024020120303.4012

INTRODUCTION
Independent college is the undergraduate-level secondary college founded under the new rules and models in the educational field in our country. However, the independent college has not been running for a long time, and the school system has not been mature yet. Moreover, the independent college students have generally lower pass rate compared with the regular undergraduate students. At present, the majority of colleges and universities employ the credit system, and every student must get the required credits before graduation. If a certain student fails a course, the credit of the course will become a pre-warning credit. The paper defines the students whose warning credits reach 20 as a pre-warning student. For those pre-warning students, the college used to give them psychological guidance but ignore helping them make up for their weak courses, so the work does not have many effects.

According to the characteristics of independent college students under the new environment, we have to find a way to fully understand the pre-warning students, explore the objective reasons of their weakness in mastering the courses, do the transformation work more effectively, reveal the problems of the pre-warning students in their process of learning, find a more effective method for the students' autonomous learning, and raise the pre-warning transformation rate. Only in this way we can improve the theoretical level of the teaching management in the independent college.

1. ANALYSIS OF THE STUDENTS' CHARACTERISTICS OF INDEPENDENT COLLEGES

1.1 The Foundational Knowledge Is Weak
In recent years, the average enrollment mark of the independent college is 36 points lower than the regular undergraduate college, as the following figure shows. Because of the low admission mark, students' foundational knowledge is generally low, their mastering of the knowledge is also inadequate, most of the students go overboard on some subjects and clearly repel some courses. The students do not have a good habit and a strategy of learning, thus have low-level efficiency in their studies.

Table 1
The Enrollment Marks of the Regular Undergraduate College and the Secondary College in Jiangsu (Unit: point)

Year / Batch	2009			2010			2011		
	Regular undergraduate college	The secondary college	Differences	Regular undergraduate college	The secondary college	Differences	Regular undergraduate college	The secondary college	Differences
Humanities	489	458	31	321	283	38	319	284	35
Science	459	432	27	328	277	51	320	283	37

1.2 The Students Have Strong Self-Awareness But Weak Self-Management Ability

At present, most of students in independent colleges are single child who were born after the 1990s. They have clear marks of the modern times. They are possessive, inadequate of living independently, unsocial, lack of collective spirit, undisciplined. And they have bad psychological endurance faced with setbacks. In daily life and school life, the students have lower confidence, unclear with their objectives. They become panic when problems occur, and do not take responsibilities themselves.

Based on the characteristics of students, the following part analyzes the features of the scores of pre-warning students in independent colleges.

2. STATISTICAL ANALYSIS ON THE PRE-WARNING STUDENTS' SCORES

2.1 Data Resources

Nantong University Xinglin College has set up twenty-seven specialties, and six departments including Humanity Department, Science Department, Economics and Management Department, Engineering Department, Information Science Department, and Medical Department. There are 8082 students in the college in total.

Basic data mainly contains the transcripts of the students of each term, which includes the semester, class, student number, student name, course number, course title, learning hour, credits, test nature code, test nature, testing method code, test type code, usual performance, term examination, total achievements, credits, semester of inputting. Nantong University Xinglin College warns the students whose failed courses reach 20 credits every semester. In the transcript, the score data of the pre-warning students can be seen under the category of each semester, including the student number, course title, scores, credits, course nature, department, specialty, and class. And the student number is the key words. $S = \{s_1, s_2, s_3, \cdots, s_n\}$ represents the warning data set, and the number of the recorded students is n.

Assume that $M = \{s_1, s_2, ..., s_m\}$ is the credit date set of pre-warning students in this semester. And the total number of the pre-warning students is m; $N = \{s_1, s_2, ..., s_n\}$ is the credit data set of the pre-warning students of the last semester, among which $T = \{S | S \in M \cap S \in N\}$ is the data set that shows the pre-warning students of the last semester stay to be pre-warning this term, and the number of the students is T.

Definition 1: The pre-warning rate of this semester is P, which means the ratio between the number of pre-warning students of this term and the total number of students, recorded as $P = M/m$. (1.1)

Definition 2: The pre-warning student transformation rate of the current period i, which means the ratio between the total number of the pre-warning students ($N–T$) who have been transformed by their work of the current semester and the total number of the pre-warning students of the last semester N, recorded as $i = (N–T)/N$. (1.2)

Definition 3: The new increase rate of the current period k, which represents the ratio between the newly increased number of pre-warning students ($M–T$) and the total number of pre-warning students of this semester M, recorded as $k = (M–T)/M$. (1.3)

When the total number of students stays stable, the pre-warning student transformation rate of this semester increases, the new increase rate of pre-warning students is lowered, then the pre-warning rate of this semester has reduced, which shows a satisfying teaching effect of this semester; otherwise, when the pre-warning rate increases, we need adopt the corresponding measures to prevent the students becoming the pre-warning students.

2.2 The Current Situation and Its Development Trends Analysis of the Pre-Warning Students

2.2.1 The Distribution Situation of the Pre-Warning Students in Each Department

Through the analysis of the scores of the year 2008 and the year 2007 students, we found that pre-warning students are mainly in the Medical Department, Engineering Department and Information Science Department. The comparison of the number of the year 2007 and 2008 pre-warning students in each department is shown in Figure 1 and Figure 2. Except the fourth semester, the number of pre-warning students in each department has increased, and for the other semesters, the total number of pre-warning students in most departments reduces regularly. Figure 1 and Figure 2 show the comparisons of the year 2007 and the year 2008 pre-warning rates among the departments. The pre-warning rate can be worked out with the formula 1. By analyzing scores of the 2007 and 2008 year pre-warning students', we could find that information science department and engineering department have kept a high level of pre-warning rate; in

the fourth semester, the number of pre-warning students in every department has reduced compared with the previous semester; in the fifth semester, the pre-warning rate in most departments has increased, except the Economic and Management Department in which the pre-warning rate has reduced stably.

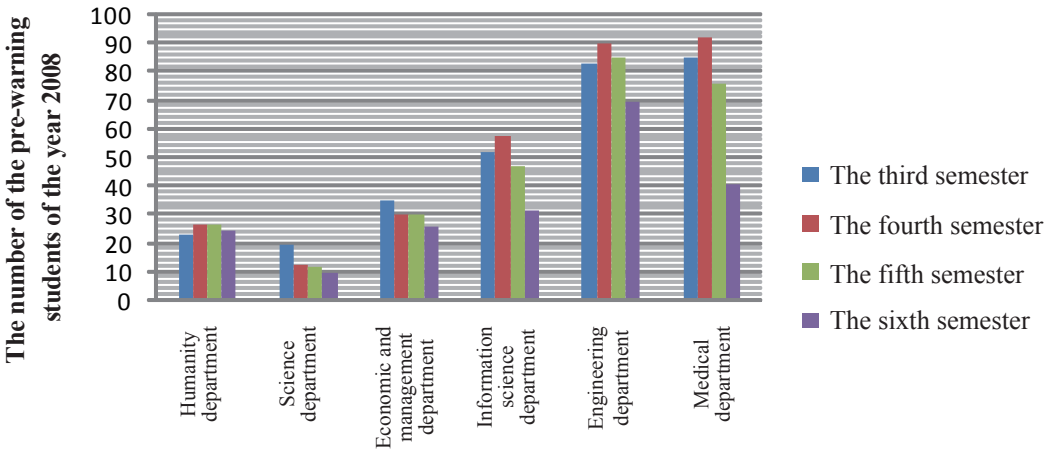

Figure 1
Distribution of the Year 2007 Pre-Warning Students in Each Department

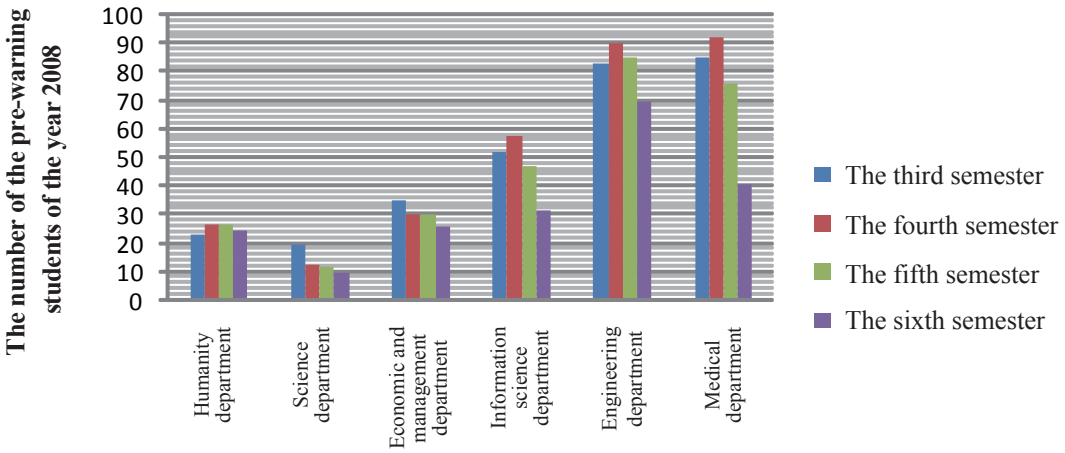

Figure 2
Distribution of the Year 2008 Pre-Warning Students in Each Department

2.2.2 Analysis of the Changing Trend of the Pre-Warning Students

The paper analyzes the changing trend of the pre-warning students by comparing the pre-warning rates between the first year and the fourth year in each department. The changing trend of the pre-warning rate of different semesters of the year 2006 and the year 2007 in each department is shown in the Figure 3, from which we could see that most of the pre-warning cases occur in the second and the fifth semester, but in the sixth semester the cases will reduce. From the start of the second semester, there are more courses, and the students have more tasks and they are easy to fail the courses.

Therefore, the management of the pre-warning students should focus on the second, the third, the fourth, and the fifth semester. The number of the pre-warning students can be reduced by improving the setup of the course hour and the teaching methods; at the same time, the pre-warning cases of the graduates should be attached importance to, and the pre-warning transformation work should be well done to make sure that most of the students can be qualified to graduate.

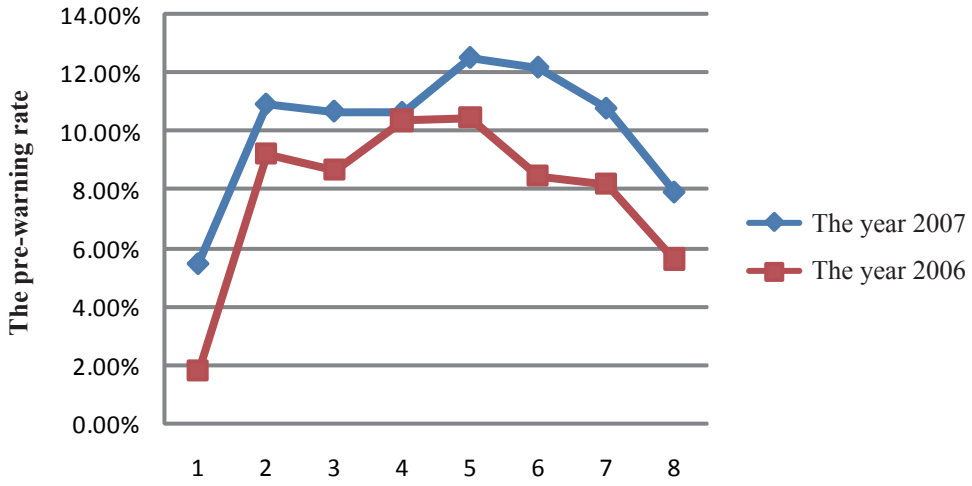

Figure 3
Changing Curve of the Pre-Warning Rates of the Year 2006 and the Year 2007 Students

2.3 The Transformation Rate and New Increase Rate of the Pre-Warning Students in Each Department

The transformation rate and the new increase rate of different semesters in different years for every department can be worked out with the formula (1.2) and (1.3), shown in Figure 4 and Figure 5. Between the second and the fifth semester, the transformation rate and the increase rate of pre-warning students show the curve change, which shows its unstableness. In the last college year, the transformation rate of pre-warning students of every department has increased, and the increase rate reduces, which shows that students make more efforts before the graduation, and thus the increase rate of pre-warning students in the whole university has reduced, and the transformation rate has increased.

Therefore, the management of pre-warning students should be a long-term work, and should be focused on the second and the fifth semesters. By improving and updating the teaching arrangements and teaching methods of every course, the cases of pre-warning students could be prevented.

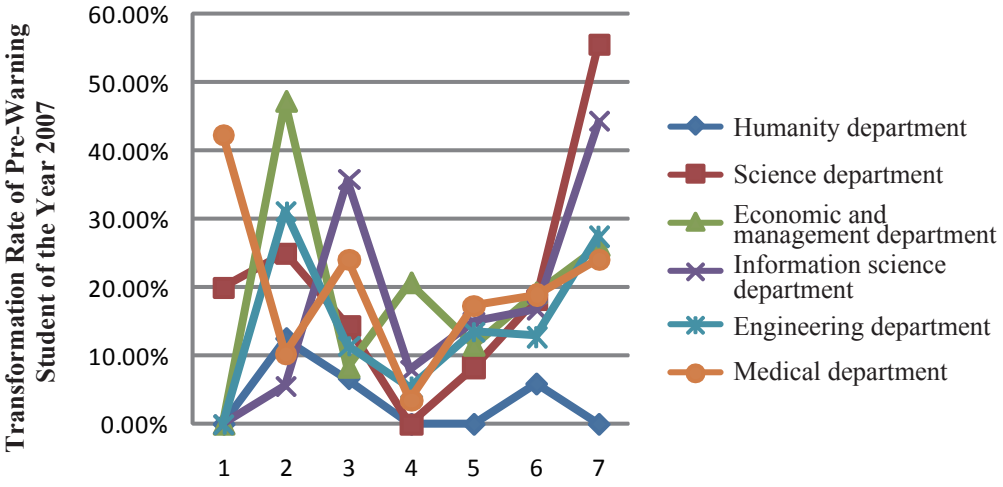

Figure 4
Comparison Diagram of the Pre-Warning Student of the Year 2007 Transformation Rate

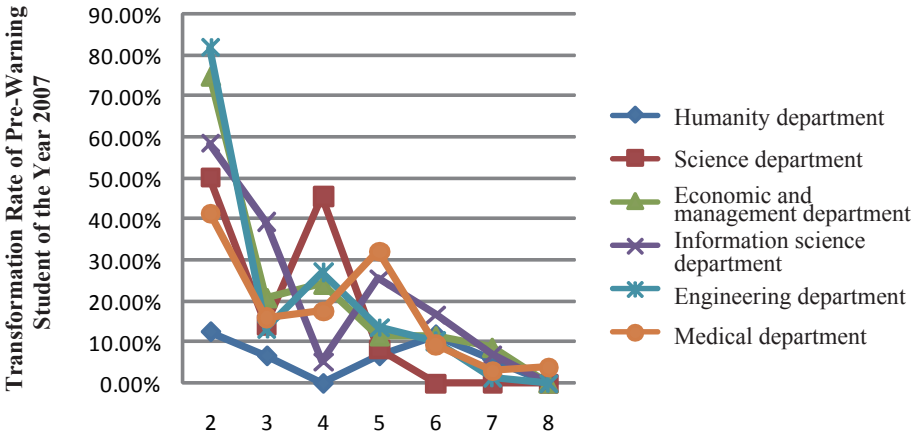

Figure 5
Comparison Diagram of the Pre-Warning Student of the Year 2007 Transformation Rate

2.4 Current Situation of the Pre-Warning Courses

From the pre-warning students of the year 2006, among the first 20 pre-warning courses, six have been repeated, as shown in Figure 6. These pre-warning courses are mainly the basic courses of science and engineering, among which the Advanced Mathematics (2) always stands out in the first place, and the number of the pre-warning students of the computer technology basic courses reduces rapidly. The most courses are arranged between the second and the fourth semester, and we could see from the previous analysis, the increase rate is high in the last half of the first semester; the new increase rate is high in the second year and the transformation rate is low; the transformation rate of the third year is low. Therefore, the management of the pre-warning students should be concentrated on the management of the second year students.

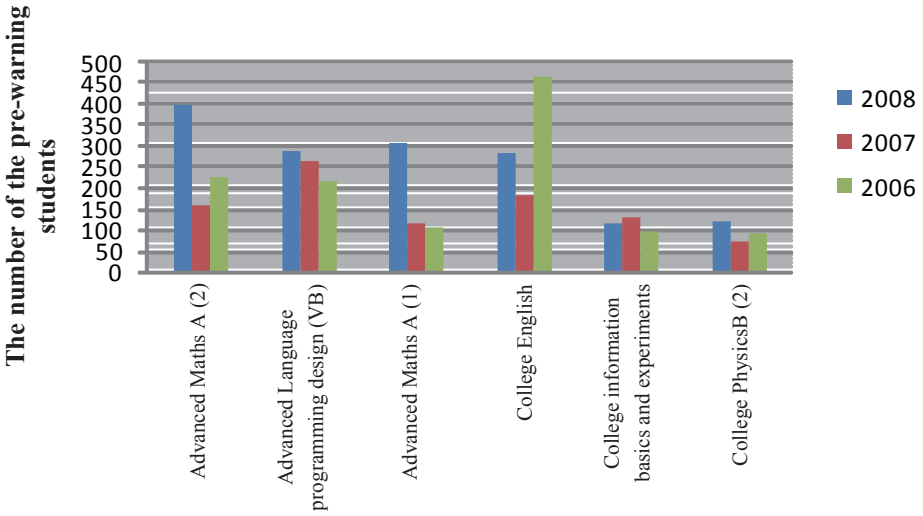

Figure 6

After the further analysis, the total number of the pre-warning students of the four courses College English, Advanced Maths, College Physics, and College information basics and experiments takes up 30% of the total number of the pre-warning students, and the rate tends to increase. There are more and more pre-warning students in these four public basic courses, which mean that these courses are the key basic courses and should be the key points in the teaching reform. The learning levels of the students of independent colleges are uneven, and they are easy to fail the courses. Improving the teaching methods of these public courses and the efficiency of the class is crucial and urgent.

Through the analysis above, we could see that the pre-warning rate of the public courses of each department keeps a high level. And therefore, we need to find the elements that cause the pre-warning students cases and its inner nature to predict a case that a student will become a pre-warning student, thus to reduce the pre-warning student increase rate. We should also explore the potential correlations among the courses that fail most the students, and find the possible reasons and key reasons why the students fail these courses, thus to increase the pre-warning student transformation rate.

3. CORRELATION ANALYSIS OF THE BASIC COURSES AND THE SOME SPECIALIZED COURSES

3.1 Analysis on the Correlations Among the Basic Courses

From the analysis above, we could see that College English, Advanced Mathematics, College Physics, and College Information Basics and Experiments are the four courses that need more attention in the pre-warning teaching. Data recourses are from the score data set of the pre-warning students. Make support level = 0.3, confidence level = 0.5, we could find nine common rules, as shown in the Table 3. Rule 1 means College Physics B(1), Advanced Mathematics A(1) and Advanced Mathematics A(2) are easily failed at the same time, and its probability is 3.52%, if a student fails College Physics B(1) and Advanced Mathematics A(1), then it has the 95.24% probability that he will fail the Advanced Mathematics A(2). Rule 3 means that the probability a student fails College Physics B, Advanced Mathematics at the same time is 60%; if a student fails Advanced Mathematics, then it has the 73% probability that he will fail the College Physics. Then it can be known that the basic courses are interactive one another and they have potential correlations, we should give them equal attention in the teaching process.

Table 3
Correlation Rules of the Basic Courses

Rule	Confidence	Support	Lift
Advanced Mathematics A(1) & College Physics B(1) ==> Advanced Mathematics A(2)	95.24	3.52	2.67
Advanced Mathematics A(1) & College English (3) ==> Advanced Mathematics A(2)	94.83	2.42	2.66
Advanced Mathematics A(1) & College Physics B(1) & College Physics B(2) ==> Advanced Mathematics A(2)	93.02	1.76	2.61
Advanced Mathematics A(1) & College English (2) ==> Advanced Mathematics A(2)	91.94	2.51	2.58
Advanced Mathematics A(1) & College English (1) ==> Advanced Mathematics A(2)	91.30	1.85	2.56
Advanced Mathematics A(1) & College English (4) ==> Advanced Mathematics A(2)	90.20	2.03	2.53
Advanced Mathematics A(1) & College Physics B(2) ==> Advanced Mathematics A(2)	87.14	2.69	2.45
Advanced Mathematics A(1) & College Information Basics and Experiments ==> Advanced Mathematics A(2)	77.78	2.16	2.18
College Physics A(1) ==> Advanced Mathematics A(2)	76.92	1.76	2.16
College English (3) & College Physics B(1) ==> College Physics B(2)	72.73	1.76	6.91
Advanced Mathematics A(1) ==> Advanced Mathematics A(2)	72.45	17.84	2.03
College English (3) & College Physics B(2) ==> College Physics B(1)	67.80	1.76	6.26
Advanced Mathematics A(2) & College English (2) ==> Advanced Mathematics A(1)	53.77	2.51	2.18
College Physics B(1) & College Physics B(2) ==> Advanced Mathematics A(2)	51.82	2.51	1.45
College Physics B(1) ==> Advanced Mathematics A(2)	51.22	5.55	1.44
Advanced Mathematics B(1) ==> Advanced Mathematics B(2)	51.22	3.70	5.99
Advanced Mathematics A(1) & College Physics B(1) ==> College Physics B(2)	51.19	1.89	4.86
Advanced Mathematics A(1) & Advanced Mathematics A(2) & College Physics B(1) ==> College Physics B(2)	50.00	1.76	4.75
Advanced Mathematics A(1) & College Physics B(1) ==> Advanced Mathematics A(2) & College Physics B(2)	47.62	1.76	11.14
Advanced Mathematics A(2) & College English (4) ==> Advanced Mathematics A(1)	45.54	2.03	1.85
Advanced Mathematics A(2) & College Physics B(1) ==> College Physics B(2)	45.24	2.51	4.30
College Physics B(1) ==> College Physics B(2)	44.72	4.85	4.25
College Physics B(2) ==> Advanced Mathematics A(2)	40.59	4.27	1.14
College Physics B(1) & College Physics B(2) ==> College English (3)	36.36	1.76	2.59
College Physics B(1) & College Physics B(2) ==> Advanced Mathematics A(1) & Advanced Mathematics A(2)	36.36	1.76	2.04
College Physics B(1) ==> Advanced Mathematics A(1)	34.15	3.70	1.39
College Physics B(1) ==> Advanced Mathematics A(1) & Advanced Mathematics A(2)	32.52	3.52	1.82
Advanced Mathematics A(2) & College Physics B(1) ==> Advanced Mathematics A(1) & College Physics B(2)	31.75	1.76	10.29

3.2 Analysis on the Specialized Courses of a Certain Department

From the analysis of the medical specialties in our college, we find that Histology and Embryology stands in the first place. Make support level = 0.12, confidence level = 0.8, we could get 28 rules, as shown in Table 4, from which, we could see that many course are related to the Histology and Embryology, if a student fails the Histology and Embryology, he would easily fail the Human Anatomy and Biochemistry, therefore, it is essential to improve the teaching level of the Histology and Embryology. In the process of the pre-warning student management, students should pay more attention to the starting courses to prevent the possibilities of failing the future courses.

Table 4
Correlation Rules Among the Specialties

Rule	Confidence	Support	Lift
Immunology & Pathological Anatomy ==> Physiopathology	96.23	5.30	3.42
Physiology & Physiopathology ==> Histology and Embryology & pharmacology	62.10	8.00	3.58
Biochemistry & Physiopathology ==> Histology and Embryology & pharmacology	60.19	6.44	3.47
Pathological Anatomy ==> Immunology & Physiopathology	59.30	5.30	3.78
pharmacology & Physiology ==> Histology and Embryology & Physiopathology	58.78	8.00	3.56
pharmacology & Human Anatomy ==> Histology and Embryology & Physiopathology	58.72	6.65	3.55
Human Anatomy & Physiopathology ==> Histology and Embryology & pharmacology	58.72	6.65	3.38
Histology and Embryology & Biochemistry ==> pharmacology & Physiopathology	58.49	6.44	3.14
Biochemistry & Physiopathology ==> Histology and Embryology & Physiology	58.25	6.24	3.79
Histology and Embryology & Immunology ==> pharmacology & Physiopathology	56.62	8.00	3.04
Histology and Embryology & Biochemistry ==> Physiology & Physiopathology	56.60	6.24	4.39
Human Anatomy & Physiopathology ==> Histology and Embryology & Immunology	55.96	6.34	3.96
Histology and Embryology & Biochemistry ==> pharmacology & Physiology	55.66	6.13	4.09
Physiology & Physiopathology ==> Histology and Embryology & Immunology	55.65	7.17	3.94
Biochemistry & Physiopathology ==> Pharmacology & Physiology	55.34	5.93	4.06
Biochemistry & Physiopathology ==> Physiology & Immunology	54.37	5.82	3.42
pharmacology & Biochemistry ==> Histology and Embryology & Physiopathology	53.91	6.44	3.26
physilology & Physiopathology ==> pharmacology & Immunology	53.23	6.86	3.30
Human Anatomy & Immunology ==> Histology and Embryology & Physiopathology	53.04	6.34	3.21
pharmacology & Human Anatomy ==> Immunology & Physiopathology	52.29	5.93	3.33
Human Anatomy & Physiopathology ==> pharmacology & Immunology	52.29	5.93	3.25
Regional Anatomy ==> Immunology & Physiopathology	51.52	5.30	3.28
Biochemistry & Physiopathology ==> Histology and Embryology & Immunology	51.46	5.51	3.64
pharmacology & Biochemistry ==> Histology and Embryology & Physiology	51.30	6.13	3.33
Histology and Embryology & Immunology ==> Physiology & Physiopathology	50.74	7.17	3.94
pharmacology & Human Anatomy ==> Histology and Embryology & Immunology	50.46	5.72	3.57
pharmacology & Physiology ==> Immunology & Physiopathology	50.38	6.86	3.21
Histology and Embryology & Biochemistry ==> Immunology & Physiopathology	50.00	5.51	3.19

CONCLUSION

The paper adopted the concrete examples to analyze and finally found that public courses are the most foundational courses in college. Improving the teaching level of these courses will greatly facilitate to solve the problems of other courses. College English, Advanced Mathematics, College Physics, and College information basics and exper iments are four key courses and these courses are interactive and dependent to one another. We could divide the students into different groups to teach them separately according to their different learning levels. For the specialized courses, we should focus on the starting courses thus to reduce the failing rate of the following courses. Finally, we could take initiative, scientific, targeted, preventive, and effective actions to solve the pre-warning problems as early as possible, in this way, the teaching quality of the independent college can be raised.

REFERENCES

FANG, Wenjuan, & HE, Ruhai (2009). Teaching Management Research Based on the Characteristics of the Students in Independent Colleges. *Anhui Agricultural University Journal (Social Science)*, *16*(2), 92-94.

n.d. (2009). *The Analysis and Application of the (Pre-Warning) Students Situation Based on the Data Exploration* (p. 22). Wuhan, Wuhan University of Science and Technology.