Teaching Probability – Statistics towards Training Occupational Skills for Economic Majored Students – Case Study at Lac Hong University Viet Nam

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Abstract. Reaching a high quality of the standard learning outcomes is an important innovation in teaching and training at Lac Hong university. The knowledge and occupational skills equipped for students before graduation are clearly stated. However, a big problem is "How to teach disciplines which are major in Basic science and General knowledge to get the standard learning outcomes?". Based on the analysis of the current situation of teaching Probability – Statistics course at school. We have given out some measures to train occupational skills of economic-majored students, which aim at teaching this subject in order to meet the build standard learning outcomes, such as: problem solving, teamwork, application of information technology, algorithm-like thinking, gathering, representing and processing statistic numbers, etc.

Keywords: Standard learning outcomes; knowledge; economy; occupational skill; Probability–Statistics.

Introduction

Improving the quality, innovation in education and training are the most important criteria for a university in era of science and technology today. The innovation is the inevitable trend of the times and according to the strategic development of education is reported at the 11th National Party Congress "Educational development is the first national education policy. Radical innovation, comprehensive education in Vietnam towards standardization, modernization, socialization, democratization and international integration" (Government, 2012).

Lac Hong University is an Educational Institutions interdisciplinary, multiple levels, combine training with scientific research, technology transfer in the areas of technology, economics and the humanities and social. The school ensure to provide and care the conditions of quality learning for everyone in need of training and retraining; on the other hand ensure to provide human resources

have qualifications, expertise and political savvy for the labor market at Dong Nai province in particular , and the country in general. Lac Hong University where manpower training provided directly to the industrial zones, export processing zones at Dong Nai province and the neighboring regions. Therefore, the school has set up training program according to rate of 60% theory and 40% practice and self-study.

In recent years, one of the most important innovation content in Lac Hong University has implement is establish the standard output with high requirement. Standard output represents an affirmation of the ones that the students need to know, understand and be able to do at the end of the curriculum, including the specific requirements: Knowledge, skills, attitude, ability to learn and improve, work placement after graduation (Lac Hong, 2012). However, a big question arises "What occupational skills of the students are equipped and trained how through the process of learning the subjects in the field of basic science and general knowledge?".

Probability - Statistics is a subject of basic blocks of knowledge and today the knowledge belongs to this segment has infiltrated most of the field and the various sciences. The scientific knowledge of probability and statistics has been widespread application. Moreover, with particular applications in Mathematics should be trained of basic mathematical skills such as: generalizations, especially modeling, detect and problem solving … Learning Probability - Statistics is also contribute to training the occupational skills associated with economics students, such as: gathering, representing and processing statistic numbers; application of information technology; teamwork… These skills are an indispensable part of the requirements for occupational skills for economics students that "standard learning outcomes" of the school was set out. But, how to teach Probability - Statistics to contribute to meeting the standard learning outcomes in Lac Hong University is still a question without answers.

Teaching Probability - Statistics subject is always a topic of interest to many researchers. Related to this topic, with the learned material, we see three research trends associated with three goals:

- Help students realize intimately intertwined relationship between Probability and Statistics.
- Help learners understand the meaning of the basic concepts of Probability - Statistics.
- Help learners develop statistical thinking.

On the world, with Universities, piece of research of Artigue M. emphasizing the relations between probability and statistics in economics education (Artigue, 1992), and research of Artaud M. (1993) with doctoral thesis "*La mathématisation en économie comme problème didactique - Une étude exploratoire*" made an analysis about history of mathematics and economics to indicate that the creation of economic knowledge often associated with mathematical investigations, research shows that a close relationship between economics with mathematics, especially with Probability - Statistics theory (Artaud, 1993).

In Vietnam there have been many studies on teaching the Probability - Statistics in College and University, some doctoral dissertation authors, such as Trao Van Phan (2009), Hieu Huu Ta (2010), Tinh Thi Phan (2011), Hoat Tat Ngo (2011), Yen Thi Hoang Tran (2011), Hai Nam Hoang (2013),…. However, the object to which the author is interested in training Maths teacher in the field of Probability - Statistics and to improve the effectiveness of teaching Probability - Statistics for students but no specific research on teaching Probability - Statistics target at occupational skills training for economics students.

For these reasons above, we have done research "training occupational skills through teaching Probability - Statistics for economic majored students at Lac Hong University".

Research methodology

Theoretical method: Analyze, summarize, collect information, research documents, … to establish theoretical foundation of the topic.

Practical method: Method of observation, survey; Method of mathematical statistics: Process surveyed and actual data.

Study results and comments

Real situation of teaching Probability - Statistics subject to request of standard output in Lac Hong University

In (Hoan, 2014) this part has pointed out that, teaching Probability-Statistics at school has limitations exist the following:

- The practice of problem-solving skills have not shown more in the lectures.
- Never focus on assessment with practical content analysis.
- No application of information technology in effective teaching.
- Not to promote self-study ability, ability to work collectively of students through group exercises, assignments at home.

This reality led to the final examination results module of Probability-Statistics is low, number of students retake a test, repeat test is high. Moreover, the majority of students said that this is a difficult subject and not the application-oriented subject for his/her specialized subjects as well as training skills through this course. This is most evident in assessment of student for teachers in the subject. For example, the content of questions, such as: 1) Lecturers provide references to students by putting many problems related to the subject; 2) Lecturer held for student group activities; and 3) Your comment on teaching quality this course. With selected items for students: a) Totally disagree; b) Disagree; c) No comments; d) Agree; and e) Totally agree, usually get the answers of students are c: No comments.

So teaching Probability - Statistics according to research is unsatisfactory set out in standard outputs of school. In particular criteria such as:

- Content of Probability - Statistics subjects is still general, heavy on theory, not apply directly to economics.
- Not organized teaching towards training the professional skills for students.

From this situation, Our research found that "Occupational skills training through teaching Probability - Statistics for economic majored students at Lac Hong University" is the urgent requirement.

Some measures to form occupational skills through teaching Probability – Statistics for economic majored students

The orientation measures set out

First, pedagogical measures proposed must base on manpower requirements of the society for the economic sector, content platforms that students may face to face in real life.

Second, pedagogical measures proposed must conform to the objectives of teaching, suitable for teaching perspective detect and solve problems, innovation trends teaching methods at present.

Third, pedagogical measures proposed to create difficulties, obstacles, consistent with the ability of students so that they can participate in the process of settlement practical issues associated with economic reality led to the formation of new knowledge and skills training.

Fourth, system of pedagogical measures must ensure stimulating students' interest in learning, to promote active and intellectual capacity of students.

Fifth, pedagogical measures proposed should be based on intellectual capital exist of students, feasible and through a measurement system of students so that realize their role in the creation as well as to acquire and apply new knowledge in particular economics.

Some measures to train occupational skills through teaching Probability – Statistics for economic majored students at Lac Hong University

Measure 1. Teaching some content knowledge through the establishment of the opening problems related to economy.

Purpose, meaning

Before a problem or a specific situation, teachers set up, problem-solving activities for students will be done, they have to learn, thinking to identify problems; attempt to resolve those issues. Then students will do it yourself the following steps: draw formula, prove theorems, find the best solutions and most concise the problem of theory or practice,... Consequently, students perceive mathematics knowledge and learn to self-discovery (Hayter 2007; Jay 2004),

This measure contributes to training: *the creative thinking skill, solutions and suggestions, Judgmental thinking.*

How to implement

In the course of teaching, each content knowledge is presented starting with a situation or a specific problem related to the economy. The analysis of the situation through the questions suggests problem will stimulate students' thinking and help them find out the knowledge, thereby they can absorb knowlegde easily (Hoan, 2015; Schoenfeld 1985). Such as teaching situations of *random quantities with Bernoulli distribution* in the following:

The teacher mentioned the problem. A machine produce a type of product, the probability that made defective products is 10%. Once the machine produces 3 products, please tabulated probability distribution the number of defective products in 3 products are made.

Teacher posed the questions suggests following:

1. Define random variable and find its value?

Expected answers: Put X is the number of defective products in 3 products manufacturing, the inferred $X \in \{0, 1, 2, 3\}$

2. Calculate probability with the values of X based on the formulas learned?

Expected answers:

$P(X = 0) = 0,9.0,9.0,9 = 0,729$

$P(X = 1) = 0,1.0,9.0,9 + 0,9.0,1.0,9 + 0,9.0,9.0,1 = 0,243$

$P(X = 2) = 0,1.0,1.0,9 + 0,1.0,9.0,1 + 0,9.0,1.0,1 = 0,027$

$P(X = 3) = 0,1.0,1.0,1 = 0,001$

3. In the result of $P(X = 1)$, each event has the occurrence of events of defective products and how many standard products?

Expected answers: 1 defective products and 2 standard products.

4. In the result of $P(X = 1)$, how many set of accumulate aforementioned and why?

Expected answers: 3 set of accumulates, for each accumulates above how to choose one location for the event is defective products from 3 position, so:

$P(X = 1) = C_3^1 0,1^1 0,9^2$

5. Do the same thing for the remaining results?

Expected answers:

$P(X = 0) = C_3^0 0,1^0 0,9^3 = 0,729$, $P(X = 2) = C_3^2 0,1^2 0,9^1 = 0,027$,

$P(X = 3) = C_3^3 0,1^3 0,9^0 = 0,001$

6. Teachers mentioned the general problem: If in each batch manufacturing 100 products. Calculate the probability of k substandard products in 100 products? (with $k = 0, 1, K, 100$).

Expected answers:

$P(X = k) = C_n^k 0,1^k 0,9^{n-k}$, $k = 0, K, 100$.

Thence teacher guide students to state Bernoulli general formula.

Measure 2. Strengthening the examples and exercises towards applying Probability - Statistics to solve the problems set out detail in economic

Purpose, meaning

Practice play a decisive role of cognitive processes, is the standard of truth of Mathematics and other sciences. Practicality of mathematics expressed through application of Mathematics in practical life. Practices also have an important role in the formation for students' problem-solving skills because it is a very favorable environment training for students, develop the skills, techniques and knowledge learned to master (Wu, 2006; Hoan, 2015).

This measure contributes to training: *problem-solving skill.* (Hoan, 2015; Schoenfeld, 1992).

How to implement

In the teaching process, teachers give some examples and application exercises under the direction of applying knowledge content to solve specific problem in economics. This not only helps students more interested in learning, but also for students to get the knowledge about Probability - Statistics is used as tool to solve the problems related to practice their profession in the future. Examples apply the following specific:

• **Applying meaning of expectations in choosing investment plans, business**

Example. Assuming a bookstore intends to enter some statistical yearbooks. The annual demand of this yearbook are given in the following table 1:

Table 1. Table needs of statistical yearbook

Demand (j) book	20	21	22	23	24	25
Probability (Pj)	0,3	0,25	0,18	0,14	0,1	0,03

Store bought for 7 USD/book sold for 10 USD/book. But by the end of the year must sell off 4 USD/book. The store want to define the number of import so that profits biggest expectations?

• **The problem apply estimation, accreditation, solve specific problems in the economic**

Example. Expenditures survey (million VND) 160 random students from other provinces in Lac Hong University obtained the following table 2:

Table 2. Monthly expenses table of Lac Hong University students

Spend	1	1,2	1,3	1,4	1,5	1,7	1,8	1,9	2	2,1	2,2	2,3	2,4	2,5	2,6	2,7	3
Number of students	5	3	2	1	27	6	7	3	60	2	6	4	4	23	1	1	5

a) Please estimate the average monthly expenditure of students from other provinces in Lac Hong University?

b) Currently the proportion of students from other provinces in Lac Hong University with spending of 1.4 million/month about 60%. Please check insists on the significance level of 5%?

Thus after examples, students will better understand the level of monthly spending. Moreover, students can compare their spending with average spending, thus helping them to change their spending habits in order to have the most reasonable spending before the situation escalated price at the present (Moore, 2006).

Measure 3. Training for students capable of performing, data processing and forming the statistics icon

Purpose, meaning

Statistics is the scientific study of random phenomena in nature large number on the basis of collected and processing the statistics - the observed results.Thus contents of statistics is to create the collection methods and dealing with statistics to take out scientific conclusions and practical.

The role of statistics can be seen for the whole society, not only at nationally but also within the region and globally. The statistics are used regularly in all the aspect, all areas of social life, from planning and policymakers of countries to the conferences, research projects, teaching,… Especially in business, statistics are used to: Inform the public, forecasts for planning and making decision... But the reality of teaching statistics show that students are not really interested when studying this module.

This measure contributes to training: *gathering, performance and statistical data processing skills*.

Content and form

In the course of class teachers should spend a certain amount of time to introduce some examples of practical content to help students initially formed the visual icon of statistics and know how to perform, processing the data. Teachers should make students understand the importance of the concept, all kinds of diagrams, charts, tables, graphs ... in mathematical statistics.

Some types of symbols in mathematical statistics should be equipped for students when learning probability and statistics modules as follows:

• Forming a visual symbol of the frequency table, frequency table (%)

Teachers should clearly distinguish for students to know the role, usage of frequency tables and frequency of the performance metrics. For example, pig breed A is tested on a farm. To evaluate the quality, weighing pigs after slaughter and obtained results:

Table 3. Table weight of pigs A

Weight (kg)	85	87	88	89	90	91	93	95	
Frequency	10	20	25	20	12	8	13	13	N=121

For example, with this frequency table, we can compare the percentage of pigs weighing 68kg compared to pigs weight 71kg. The concept of frequency in this situation is not really necessary. However, if the problem is that there are two breeds A and B put into breed tests in the same time and through data on the weight when finisher below we need to make decisions that choosing breeds put into adopted large-scale the concept of frequency is necessary.

Table 4. **Table weight of two pigs A and B**

Weight (kg)	85	87	88	89	90	91	93	95	
Frequency(breed A)	10	20	25	20	12	8	13	13	N=135
Frequency(breed B)	14	22	30	30	15	7	11	12	N=139

• Forming of intuitive icons about graphs, charts

This section should be analyzed for students the role and usage of chart suitable for requests every problem. Moreover when teaching this section, teachers can pose an assignment for the student at home as follows: Why has collected sample data they must arrange and describe them in the other form?

1) The frequency distribution table
2) Cumulative frequency distribution table
3) The frequency distribution table (%)
4) Column charts
5) Wheel graph
6) The polygon

• Forming a visual symbol about the average value, sample variance, deviation of the sample.

Teaching this section should make students understand the meaning and how to use each parameter characteristic above. For example, at a pig farm they applied a drug weight gain test added to the diet of pigs. After raising three month obtained the following results:

Table 5. Table weight of pigs with growth drugs

Weight (kg)	65	67	68	69	70	71	73
Number	1	3	4	7	6	2	2

Table 6. Table weight of pigs non-drug weight gain

Weight (kg)	55	56	58	59	60	62	63	65	67
Number	1	2	4	5	6	3	2	1	1

Applying formula: $\bar{x} = \dfrac{\sum_{i=1}^{n} x_i n_i}{n}; \overline{x^2} = \dfrac{\sum_{i=1}^{n} x_i^2 n_i}{n}; \overline{s}^2 = \overline{x^2} - (\bar{x})^2; s^2 = \dfrac{n}{n-1}\overline{s}^2$

Spreadsheet calculations values we obtain:

Sample 1: $\bar{x} = 69,16; \ s^2 = 3,2233$

Sample 2: $\bar{x} = 59,92; \; s^2 = 7,5767$

Thus through the weighted average value after 3 months and the degree of dispersion of weight than the average weight, we noticed the effect of the drug for weight gain.

Measure 4. Guiding students to use Excel to solve statistical problems
Purpose, meaning
Today, with the explosion of information technology has a huge impact on the educational environment. Therefore the research, using the tools of information technology to apply to solving problems will bring more practical benefits. Moreover, through solving problems by using the tools of information technology support will initially set up and develop algorithms thinking for students. This kind of thinking should be to equip students in the current era.
This measure contributes to training: ***application of information technology, algorithm-like thinking***.

How to implement

In the process of teaching besides guiding students to use pocket calculators to calculation of parameters characteristic of the denominator, then teacher should guide students to sovle statistical problems such as: estimation problems, software testing using excel. Using Excel for statistical analysis because:
• Excel availability in the office
• Excel strong enough to solve problems common statistical
• Users can understand the meaning of statistical issues
Example. (Using Excel to solve estimated average expenditure by students of Lac Hong University in items)
Key
Put *m* is the average monthly expenditure of students from other provinces in Lac Hong University. We will estimate *m* with reliability 95%.
Step 1: Set up Table parameters characteristics of the denominator (sample average and corrected pattern deviation).
Step 2: Calculating the precision of estimates by confidence function

$$e = t_a \, \frac{s}{\sqrt{n}} = CONFIDENCE(a,s,n)$$

Step 3: Find the lower and upper bounds of estimates $(\bar{x} \pm e)$

Table 7. The table illustrates the use of Excel in the estimation problems

Ordinal	x_i	n_i	$n_i.x_i$	$x_i^2.n_i$
1	1	5	5	5
2	1,2	3	3,6	4,32
3	1,3	2	2,6	3,38
4	1,4	1	1,4	1,96
5	1,5	27	40,5	60,75
6	1,7	6	10,2	17,34
7	1,8	7	12,6	22,68
8	1,9	3	5,7	10,83
9	2	60	120	240
10	2,1	2	4,2	8,82
11	2,2	6	13,2	29,04
12	2,3	4	9,2	21,16
13	2,4	4	9,6	23,04
14	2,5	23	57,5	143,75
15	2,6	1	2,6	6,76
16	2,7	1	2,7	7,29
17	3	5	15	45
Total		160	315,6	651,12
Sample average				1,9725
The average of the squares				4,0695
Sample variance				0,17874
Corrected sample variance				0,17987
Corrected pattern deviation				0,42411
The accuracy of estimates				0,06572
Lower bound				1,90678
Upper bound				2,03822

Measure 5. Improve teamwork skill, presentation skill for students through assignments and homework.

Purpose, meaning

Group learning methods helps students conditional, exchange, mutual learning through activities group. This method helps to meet the requirements: learn to live, one of the four purposes of UNESCO of teaching in the current era. Moreover, according to the National training laboratories, Bethel, Maine, the interchange method will help students acquire knowledge is 70%.

This measure contributes to training: *teamwork skill, presentation skill, communication skill.*

How to implement

We suggest organizational learning process for student groups in teaching Probability–Statistics courses as follows:

(1) Preparation before the report:

Step 1. (Content) Teachers require students to do assignments and orientation for them solve exercises, also mentioned student activity assessment forms. (See Appendix 1)

Step 2. (Groups organizing) Divide the class into groups of suitable so that the team members as diverse as possible and assign tasks to team members.

Step 3. (Group activities) Conducting group activities as scheduled, exchange to teachers if there are problems to solve.

(2) The report conducted in class: Teachers require students presentations their assignments in class. After the report, teachers spent some time to other groups comment, suggestion ... Finally, the teacher confirmed the results and summarize the knowledge gained from their presentation.

(3) Assessment of student activities: reporting on group activities for 20% of the self-study score

Research results and survey

Content, methods, evaluation aims and object of surveying

With the aim of evaluating the effectiveness of the application of teaching methods towards occupational skills training for students through Probability–Statistics course, after impact methods with the lecturer in charge of subject, we conducted a survey on the subject is first year student of Faculty of Finance and Accounting and Faculty of International economic business, Lac Hong University, school years: 2014 to 2015. Votes have clear data to use for statistics in the survey was 152.

Research methodology, at the time survey: Information and Documentation Center of Lac Hong University conducted a survey on student course evaluations after students semester exam in that subject, the survey was carried out through the website.

Tools and content assessment survey: Questionnaire for the survey includes 20 questions with level scale: 5 = totally agree, 4 = agree, 3 = no ideas, 2 = disagree, 1 = totally disagree.

Survey results

Survey findings are taken from Information and Documentation Center of Lac Hong University (Here only lists of questions related to skills-table 8).

Table 8. Course evaluation results of Probabilily and Statistics courses of students in academic year 2014 - 2015

Ordinal	CONTENT SURVEY	STUDENT'S COMMENTS				
		1	2	3	4	5
1	The teacher organizes, guides group activities for students to reinforce lessons, expand awareness and adoption of knowledge	0	0	12	130	10
2	Teachers teaching methods toward raising issues, stimulate critical thinking and creativity of learners	1	2	4	135	10
3	During school hours, Teachers focus on developing expression skills, problem-solving skills of students	2	6	5	121	18
4	Lesson content connects with the real life, in association with future career majors	5	5	13	119	10

Survey results show that the majority of students agree with the comments set out, in there the rate agree and totally agree, high in the critical comments related to teaching towards skills training in standard learning outcomes. Specific question No. 6: "Teacher organizes, guides group activities for students to reinforce lessons, expand awareness and adoption of knowledge" have 92.11% students, question No. 7: "Teachers teaching methods toward raising issues, stimulate critical thinking and creativity of learners" have 95,39% students, question No. 8: "During school hours, Teachers focus on developing expression skills, problem-solving skills of students" have 91,45% students choice answers are agree and totally agree. Moreover, if comparing the percentage of students pass an annual examination, namely academic year 2012 - 2013 are 60.2%; 2013 - 2014 are 67.5%; 2014 - 2015 are 85.4%, and when compared to the survey results of the school year 2013 - 2014 we noticed there was a positive change, this insists that these measures have contributed to the teaching of subjects respond to standard learning outcomes, as well as contact with the practical applications for job from Probability – Statistics course.

Conclusions
Thus, these measures have initially oriented teaching Probability–Statistics course with purpose of occupational skills training of economic majored students are specified in the standard learning outcomes.
These results suggest that students learn Probability–Statistics more positive, specially application capabilities knowledge of Probability–Statistics to solve practical problems profession is improved remarkably. Those things help us get the basis for perfection, target synchronization, content and teaching methods

for Probability–Statistics associated with training objectives economics aims meet the standard learning outcomes set out.

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APPENDIX
ASSIGNMENT OF PROBABILILY AND STATISTICS SUBJECT
(SAMPLE)

Exercise 1. (20 marks) Before bringing products to market, they interviewed 200 randomly selected students about the product and get answers of 34 respondents "will buy", 97 people answered "probably will buy" and 69 people answered "do not buy". Experience shows that the percentage of customers will actually buy the product corresponding to the answers above are: 70%; 30% and 1%.

a. Evaluate the market potential of the product.

b. Among customers actually buy the product, how many percent answered "will buy"?.

Exercise 2. (30 marks) The ability to collect on a debt of credit officer at a bank is a random variable with normal distribution with an average recovery is 30 billion. Knowing that the ability to collect more than 36 billion is 11.51%.

a. Calculate the probability that a loan officer collected on a debt from 26 billion to 32 billion

b. Knowing that the repayment capacity of the customer below 24 is 0.8 billion, from 24 billion to 36 billion is 0.6 and over 36 billion is 0.4. Calculate the probability that a credit officer collects on debts.

c. Bonuses of the bank for officers to collect on debt below 24 billion is 10 million, from 24 billion to 36 billion is 15 million and over 36 billion is 20 million. How much is the average bonus rate of credit officers?

Exercise 3. (20 marks) A maker of baby formula announced that the protein content of 100g milk powder is 13g and standard deviation 3g. Before bringing products to market, company conduct self-assessment of the production line by the trial production of 300 boxes.Then made 36 out of 300 boxes were randomly sampled.

a. Calculate probabilistic of the collected sample average have protein content in 100g milk powder less than 12g? If the product weighs less than 12g from 1 box or less, the test results meet the requirements and are able to produce in bulk to hit the market. Your conclusion in this case?

b. The assumption after internal inspection, satisfactory products and is marketed in bulk (large quantities). A quality inspection group also tested the product above with 36 samples randomly collected from 36 stores in the province. You shall Calculate probabilistic of the collected sample average has protein content in 100g milk powder is less than 12g? Your comments compared with the results of sentence a?

c. Calculate estimation for sample average in cases as question b with 3 different confidence levels respectively is 90%; 95% and 99%. Your comments about interval estimation in 3 cases? Please explain your answer?

Exercise 4. (30 marks) To compare the quality of training in economic majored students of 2 Universities: A and B. A research has been done with the following design. Select the students from A University with college entrance exam scores from 20-24 points and graduated graded fairly. Select group of students of B university are similar. Results only 10 students from A University and 12 students from B University satisfying the

above conditions and agree to participate in research. Assuming all 22 students above can get a job specialization immediately after graduation and average salaries (million VND) per month in the first year to work can be summarized as the following table:

A UNIVERSITY			B UNIVERSITY	
ORDINAL	SALARY		ORDINAL	SALARY
1	17		1	12
2	15		2	15
3	10		3	8
4	13		4	16
5	18		5	11
6	12		6	13
7	13		7	14
8	11		8	9
9	18		9	10
10	15		10	12
			11	14
			12	17

Based on the information above you perform the following requirements:

a. You calculate that the statistical characteristics necessary to conclusions about the variability in salaries of the 2 groups above?

b. Interval estimation 95% for the average salaries of the students majored in economics satisfy the requirements of the college entrance exam scores and graduated graded fairly of each school?

c. Interval estimation for the differences in average salaries of students between 2 schools with significance level $\alpha = 10\%$?

d. What is your conclusions when drawn from the results in sentence a, b and c above?

<div align="center">---The end---</div>

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